ANEXO II
(Hojas técnicas de los dispositivos)

Índice

1. IRG4PH40KD.

International
IOR Rectifier

PD- 91577B

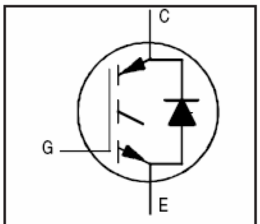
IRG4PH40KD

INSULATED GATE BIPOLAR TRANSISTOR WITH ULTRAFAST SOFT RECOVERY DIODE

Short Circuit Rated
UltraFast IGBT

Features

- High short circuit rating optimized for motor control, t_{sc} =10µs, V_{CC} = 720V , T_J = 125°C, V_{GE} = 15V
- Combines low conduction losses with high switching speed
- Tighter parameter distribution and higher efficiency than previous generations
- IGBT co-packaged with HEXFRED™ ultrafast, ultrasoft recovery antiparallel diodes



n-channel

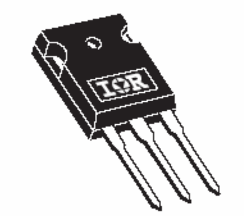
V_{CES} = 1200V

$V_{CE(on)\ typ.}$ = 2.74V

@V_{GE} = 15V, I_C = 15A

Benefits

- Latest generation 4 IGBT's offer highest power density motor controls possible
- HEXFRED™ diodes optimized for performance with IGBTs. Minimized recovery characteristics reduce noise, EMI and switching losses
- This part replaces the IRGPH40KD2 and IRGPH40MD2 products
- For hints see design tip 97003


TO-247AC

Absolute Maximum Ratings

	Parameter	Max.	Units
V_{CES}	Collector-to-Emitter Voltage	1200	V
I_C @ T_C = 25°C	Continuous Collector Current	30	A
I_C @ T_C = 100°C	Continuous Collector Current	15	
I_{CM}	Pulsed Collector Current ①	60	
I_{LM}	Clamped Inductive Load Current ②	60	
I_F @ T_C = 100°C	Diode Continuous Forward Current	8.0	
I_{FM}	Diode Maximum Forward Current	130	
t_{sc}	Short Circuit Withstand Time	10	µs
V_{GE}	Gate-to-Emitter Voltage	± 20	V
P_D @ T_C = 25°C	Maximum Power Dissipation	160	W
P_D @ T_C = 100°C	Maximum Power Dissipation	65	
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 to +150	°C
	Soldering Temperature, for 10 sec.	300 (0.063 in. (1.6mm) from case)	
	Mounting Torque, 6-32 or M3 Screw.	10 lbf•in (1.1 N•m)	

Thermal Resistance

	Parameter	Min.	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case - IGBT	——	——	0.77	°C/W
$R_{\theta JC}$	Junction-to-Case - Diode	——	——	1.7	
$R_{\theta CS}$	Case-to-Sink, flat, greased surface	——	0.24	——	
$R_{\theta JA}$	Junction-to-Ambient, typical socket mount	——	——	40	
Wt	Weight	——	6 (0.21)	——	g (oz)

www.irf.com 1

2/7/2000

IRG4PH40KD

International IOR Rectifier

Electrical Characteristics @ T_J = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)CES}$	Collector-to-Emitter Breakdown Voltage③	1200	—	—	V	V_{GE} = 0V, I_C = 250μA
$\Delta V_{(BR)CES}/\Delta T_J$	Temperature Coeff. of Breakdown Voltage	—	0.37	—	V/°C	V_{GE} = 0V, I_C = 1.0mA
$V_{CE(on)}$	Collector-to-Emitter Saturation Voltage	—	2.74	3.4	V	I_C = 15A; V_{GE} = 15V
		—	3.29	—		I_C = 30A; See Fig. 2, 5
		—	2.53	—		I_C = 15A, T_J = 150°C
$V_{GE(th)}$	Gate Threshold Voltage	3.0	—	6.0		V_{CE} = V_{GE}, I_C = 250μA
$\Delta V_{GE(th)}/\Delta T_J$	Temperature Coeff. of Threshold Voltage	—	-3.3	—	mV/°C	V_{CE} = V_{GE}, I_C = 250μA
g_{fe}	Forward Transconductance ④	8.0	12	—	S	V_{CE} = 100V, I_C = 15A
I_{CES}	Zero Gate Voltage Collector Current	—	—	250	μA	V_{GE} = 0V, V_{CE} = 1200V
		—	—	3000		V_{GE} = 0V, V_{CE} = 1200V, T_J = 150°C
V_{FM}	Diode Forward Voltage Drop	—	2.6	3.3	V	I_C = 8.0A; See Fig. 13
		—	2.4	3.1		I_C = 8.0A, T_J = 125°C
I_{GES}	Gate-to-Emitter Leakage Current	—	—	±100	nA	V_{GE} = ±20V

Switching Characteristics @ T_J = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions	
Q_g	Total Gate Charge (turn-on)	—	94	140	nC	I_C = 15A	
Q_{ge}	Gate - Emitter Charge (turn-on)	—	14	22		V_{CC} = 400V See Fig.8	
Q_{gc}	Gate - Collector Charge (turn-on)	—	37	55		V_{GE} = 15V	
$t_{d(on)}$	Turn-On Delay Time	—	50	—	ns		
t_r	Rise Time	—	31	—		T_J = 25°C	
$t_{d(off)}$	Turn-Off Delay Time	—	96	140		I_C = 15A, V_{CC} = 800V	
t_f	Fall Time	—	220	330		V_{GE} = 15V, R_G = 10Ω	
E_{on}	Turn-On Switching Loss	—	1.31	—	mJ	Energy losses include "tail"	
E_{off}	Turn-Off Switching Loss	—	1.12	—		and diode reverse recovery	
E_{ts}	Total Switching Loss	—	2.43	2.8		See Fig. 9,10,18	
t_{sc}	Short Circuit Withstand Time	10	—	—	μs	V_{CC} = 720V, T_J = 125°C	
						V_{GE} = 15V, R_G = 10Ω , V_{CPK} < 500V	
$t_{d(on)}$	Turn-On Delay Time	—	49	—	ns	T_J = 150°C, See Fig. 10,11,18	
t_r	Rise Time	—	33	—		I_C = 15A, V_{CC} = 800V	
$t_{d(off)}$	Turn-Off Delay Time	—	290	—		V_{GE} = 15V, R_G = 10Ω,	
t_f	Fall Time	—	440	—		Energy losses include "tail"	
E_{ts}	Total Switching Loss	—	5.1	—	mJ	and diode reverse recovery	
L_E	Internal Emitter Inductance	—	13	—	nH	Measured 5mm from package	
C_{ies}	Input Capacitance	—	1600	—	pF	V_{GE} = 0V	
C_{oes}	Output Capacitance	—	77	—		V_{CC} = 30V See Fig. 7	
C_{res}	Reverse Transfer Capacitance	—	26	—		f = 1.0MHz	
t_{rr}	Diode Reverse Recovery Time	—	63	95	ns	T_J = 25°C See Fig.	
		—	106	160		T_J = 125°C 14	I_F = 8.0A
I_{rr}	Diode Peak Reverse Recovery Current	—	4.5	8.0	A	T_J = 25°C See Fig.	
		—	6.2	11		T_J = 125°C 15	V_R = 200V
Q_{rr}	Diode Reverse Recovery Charge	—	140	380	nC	T_J = 25°C See Fig.	
		—	335	880		T_J = 125°C 16	di/dt = 200Aμs
$di_{(rec)M}/dt$	Diode Peak Rate of Fall of Recovery	—	133	—	A/μs	T_J = 25°C See Fig.	
	During t_b	—	85	—		T_J = 125°C 17	

2 www.irf.com

International Rectifier

IRG4PH40KD

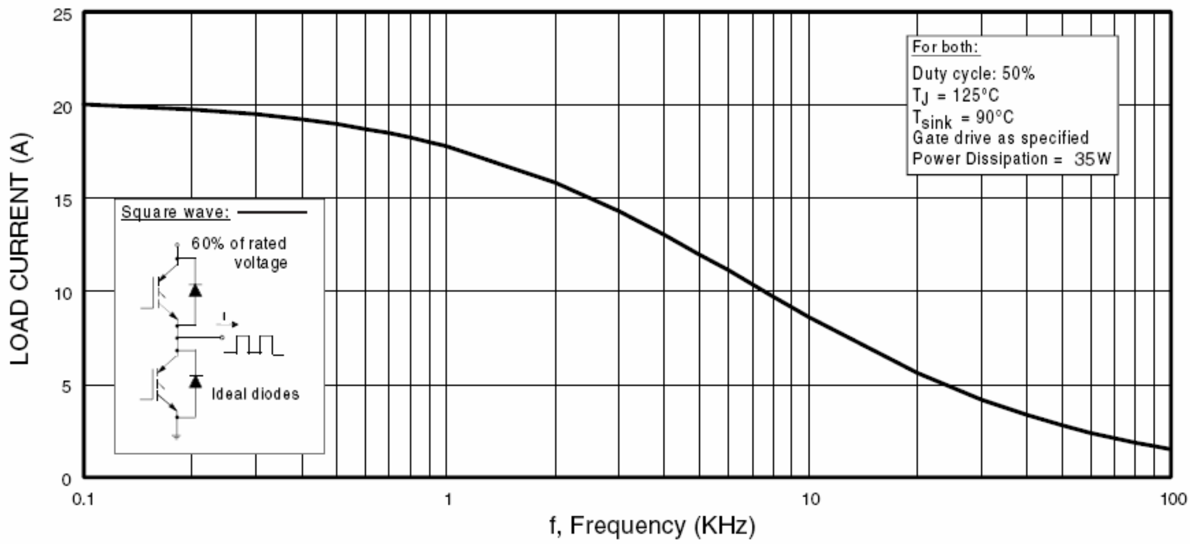


Fig. 1 - Typical Load Current vs. Frequency
(Load Current = I_{RMS} of fundamental)

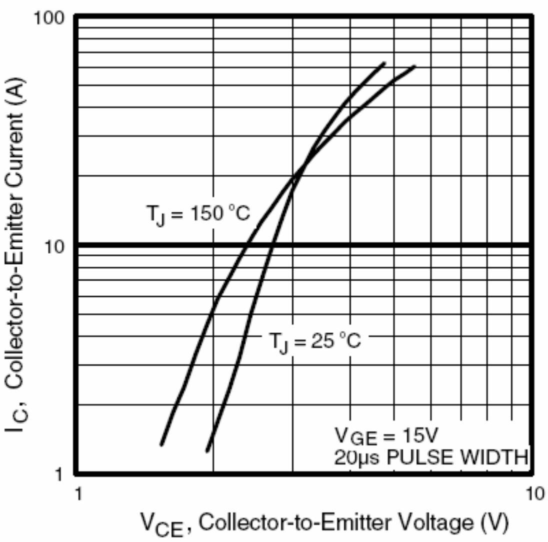


Fig. 2 - Typical Output Characteristics

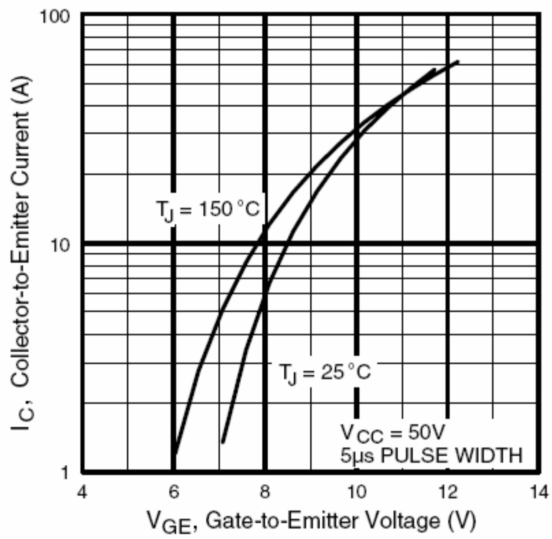


Fig. 3 - Typical Transfer Characteristics

IRG4PH40KD

International IOR Rectifier

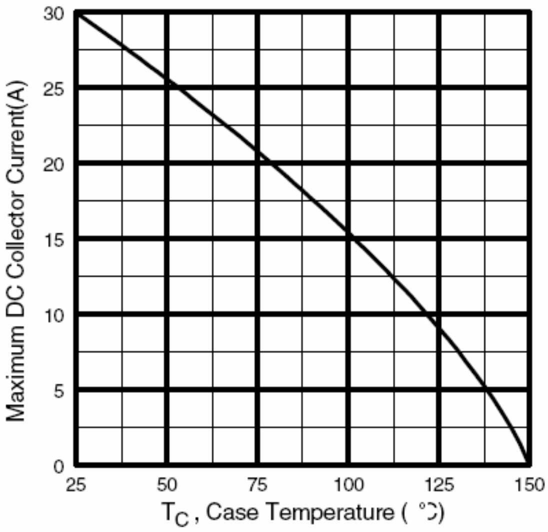


Fig. 4 - Maximum Collector Current vs. Case Temperature

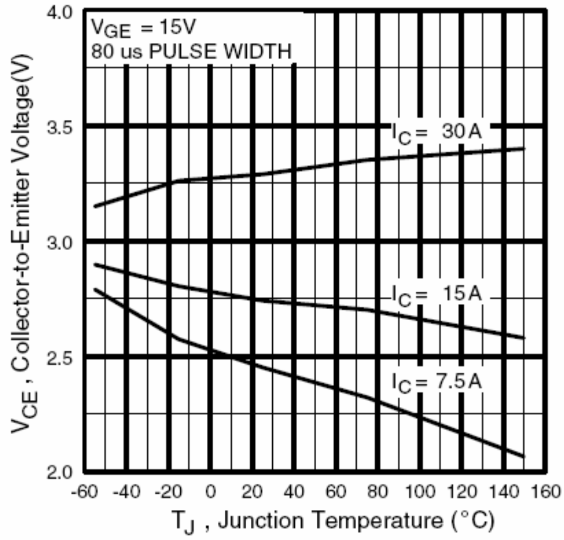


Fig. 5 - Typical Collector-to-Emitter Voltage vs. Junction Temperature

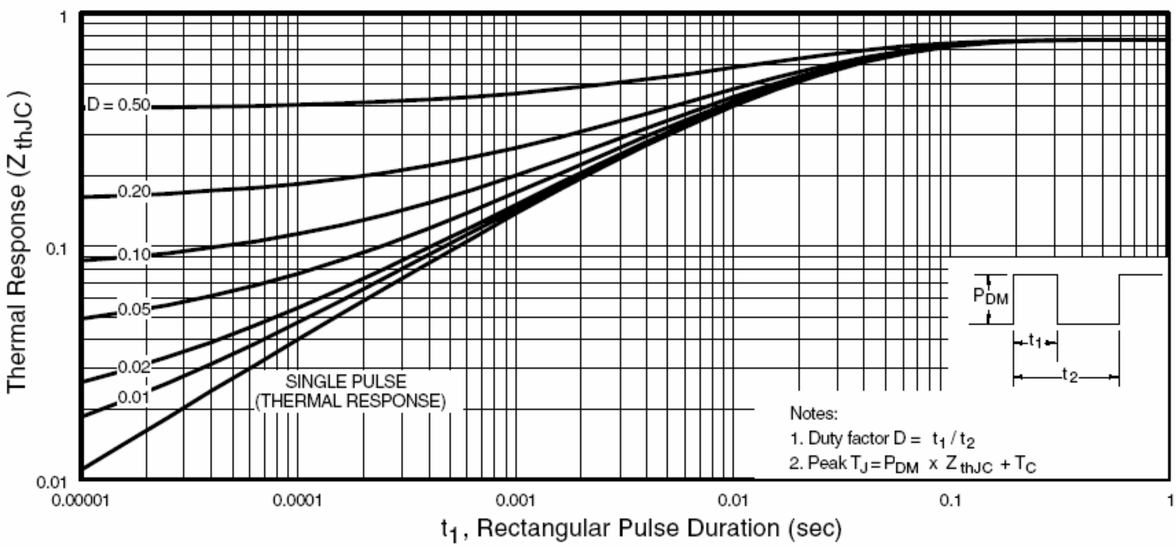


Fig. 6 - Maximum Effective Transient Thermal Impedance, Junction-to-Case

4 www.irf.com

International
IOR Rectifier

IRG4PH40KD

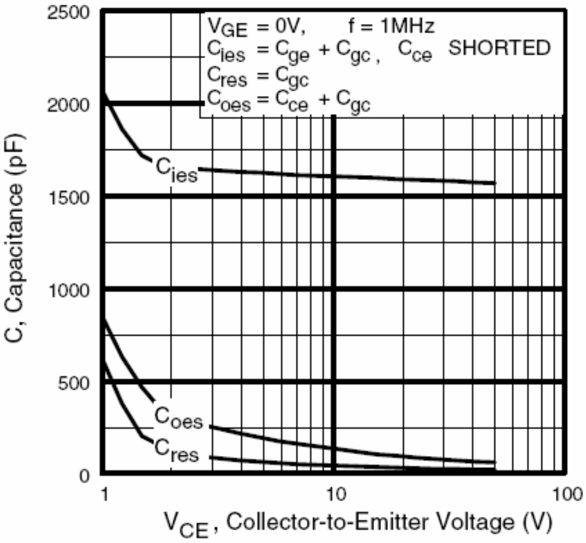


Fig. 7 - Typical Capacitance vs. Collector-to-Emitter Voltage

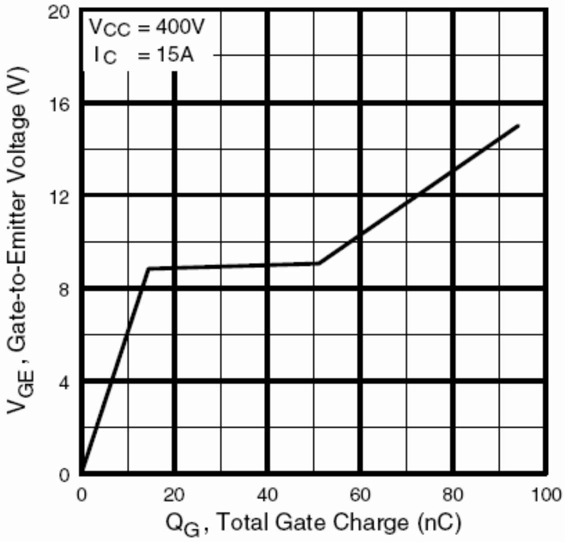


Fig. 8 - Typical Gate Charge vs. Gate-to-Emitter Voltage

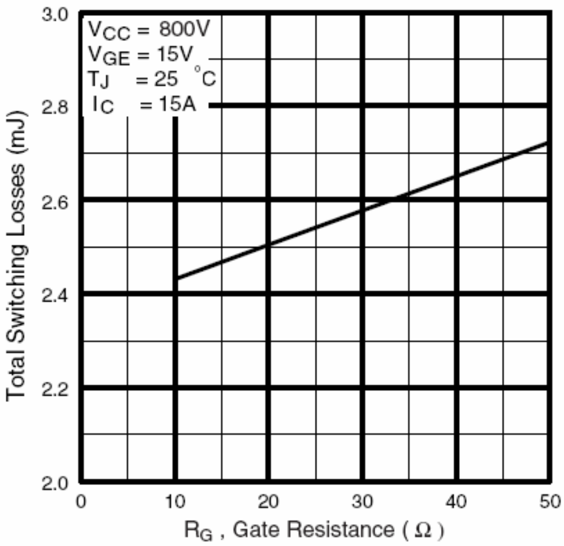


Fig. 9 - Typical Switching Losses vs. Gate Resistance

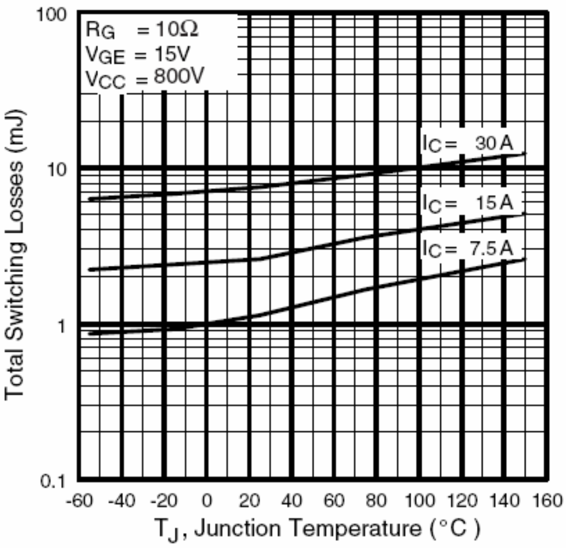


Fig. 10 - Typical Switching Losses vs. Junction Temperature

www.irf.com 5

IRG4PH40KD

International
IOR Rectifier

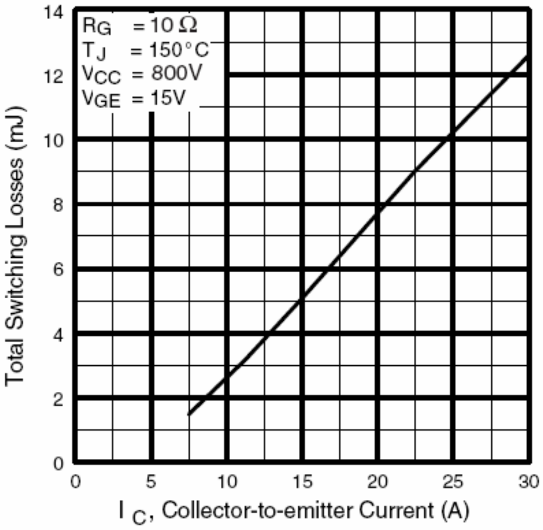


Fig. 11 - Typical Switching Losses vs. Collector-to-Emitter Current

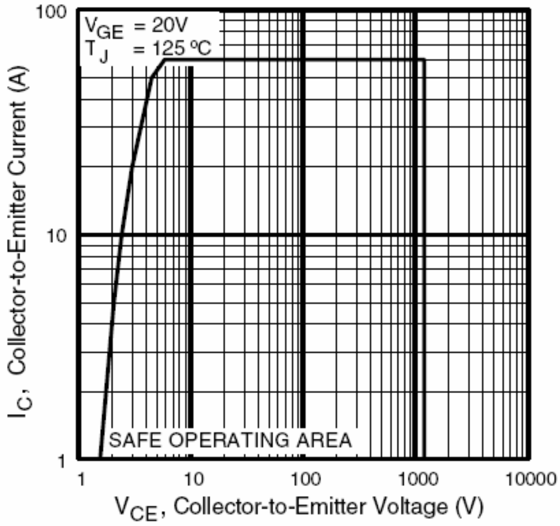


Fig. 12 - Turn-Off SOA

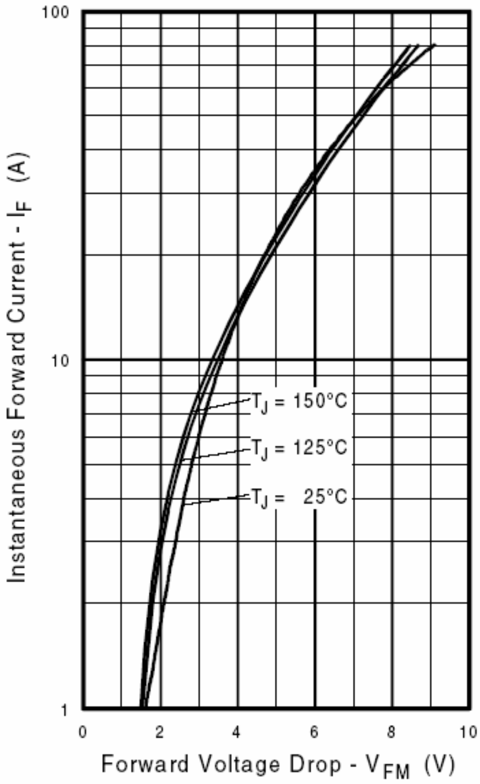


Fig. 13 - Maximum Forward Voltage Drop vs. Instantaneous Forward Current

6 www.irf.com

International IOR Rectifier

IRG4PH40KD

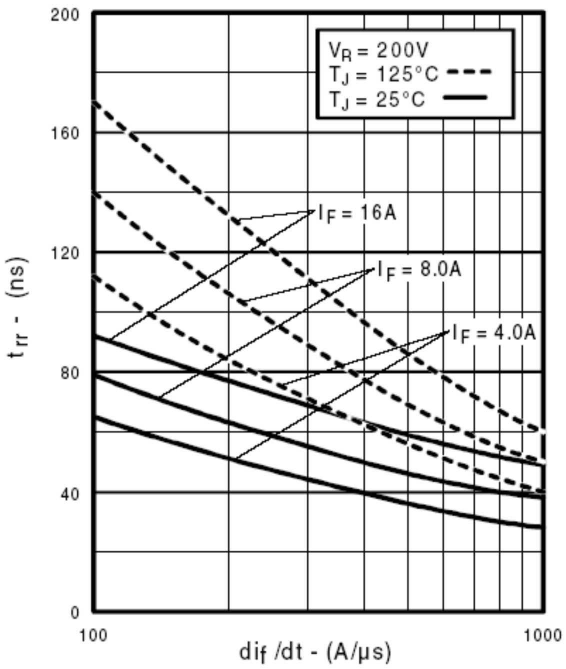


Fig. 14 - Typical Reverse Recovery vs. di_f/dt

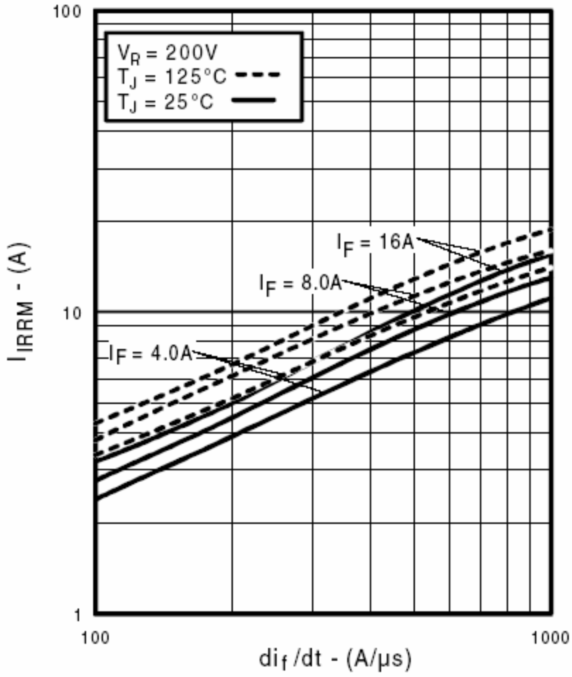


Fig. 15 - Typical Recovery Current vs. di_f/dt

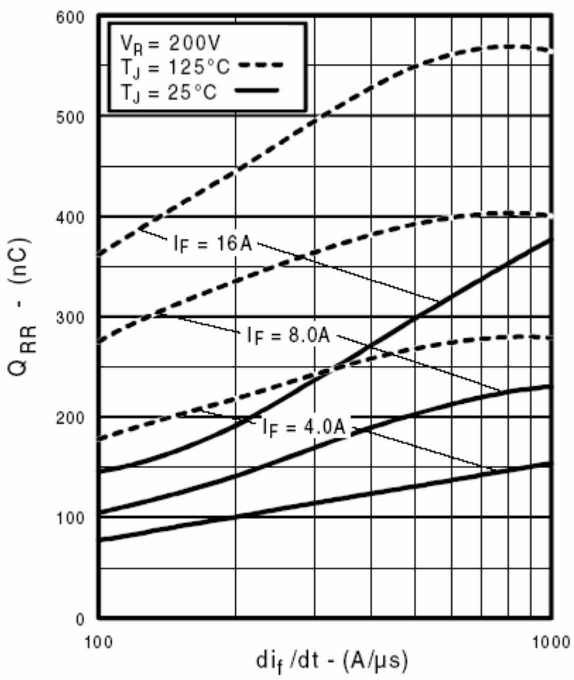


Fig. 16 - Typical Stored Charge vs. di_f/dt

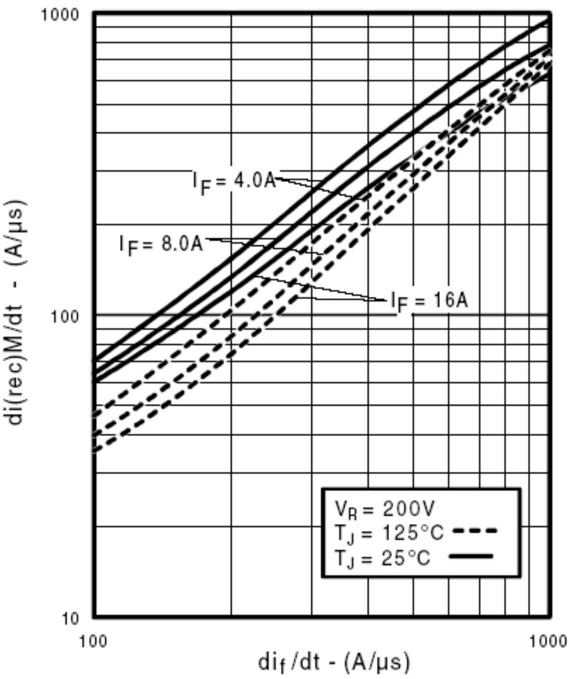


Fig. 17 - Typical $di_{(rec)M}/dt$ vs. di_f/dt

www.irf.com 7

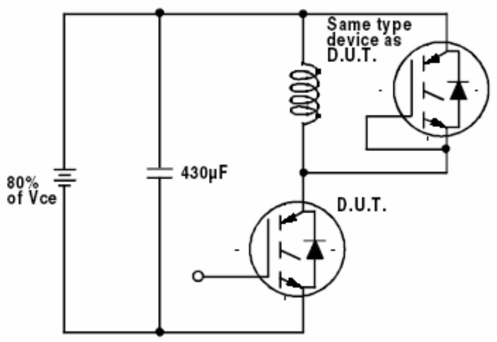


Fig. 18a - Test Circuit for Measurement of I_{LM}, E_{on}, $E_{off(diode)}$, t_{rr}, Q_{rr}, I_{rr}, $t_{d(on)}$, t_r, $t_{d(off)}$, t_f

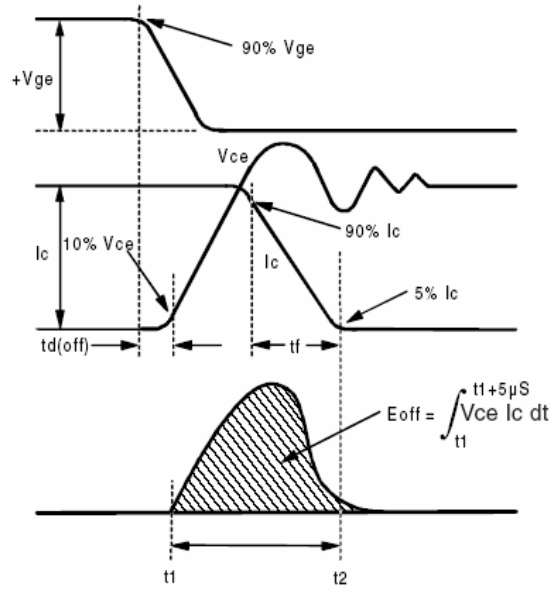


Fig. 18b - Test Waveforms for Circuit of Fig. 18a, Defining E_{off}, $t_{d(off)}$, t_f

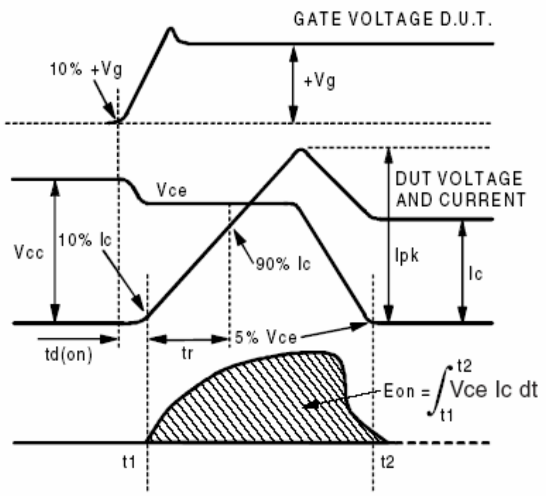


Fig. 18c - Test Waveforms for Circuit of Fig. 18a, Defining E_{on}, $t_{d(on)}$, t_r

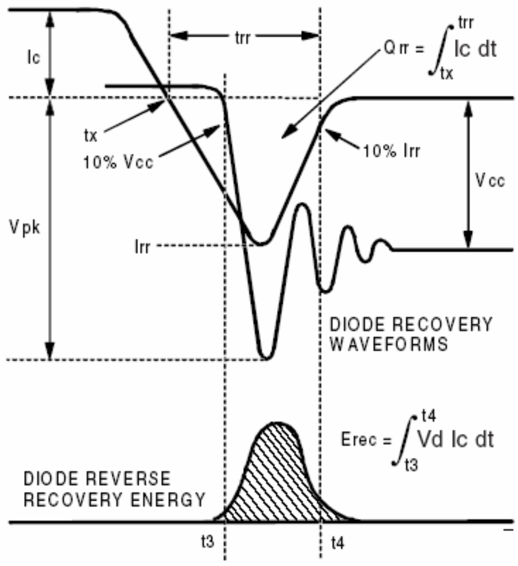


Fig. 18d - Test Waveforms for Circuit of Fig. 18a, Defining E_{rec}, t_{rr}, Q_{rr}, I_{rr}

International
IOR Rectifier

IRG4PH40KD

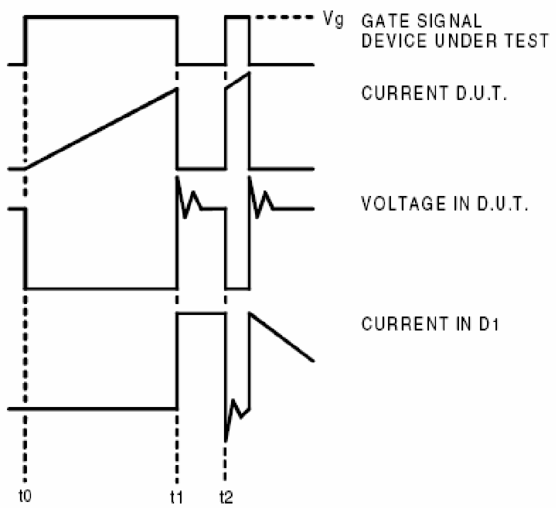


Figure 18e. Macro Waveforms for Figure 18a's Test Circuit

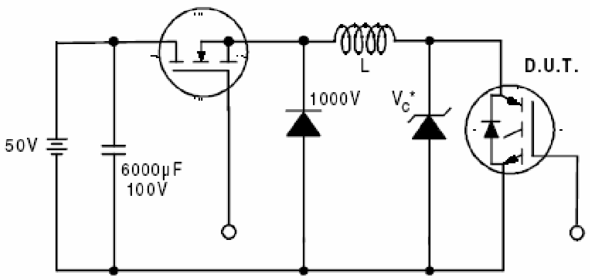


Figure 19. Clamped Inductive Load Test Circuit

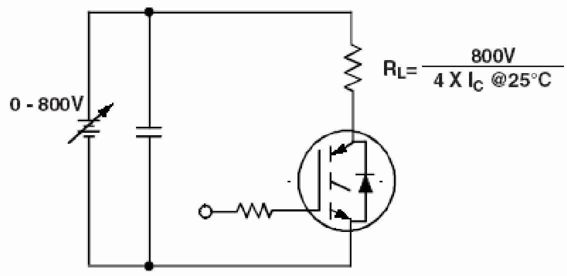


Figure 20. Pulsed Collector Current Test Circuit

www.irf.com 9

IRG4PH40KD

International IOR Rectifier

Notes:

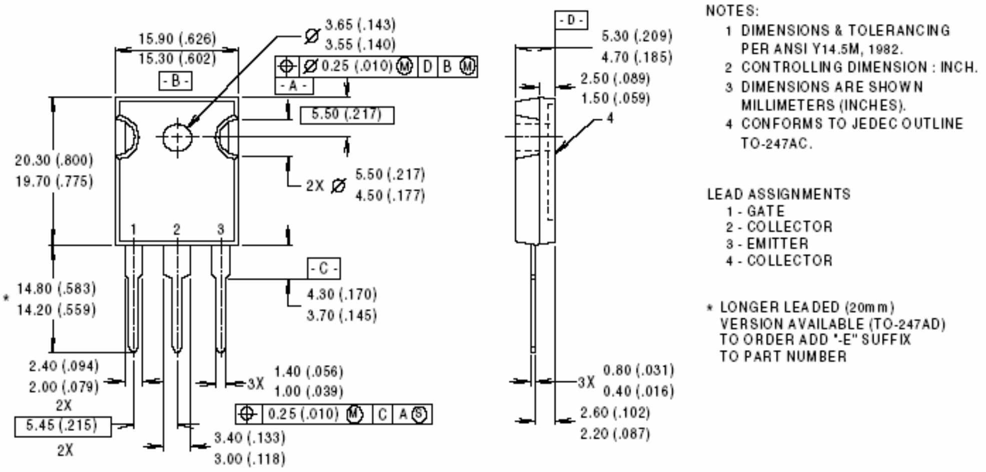
① Repetitive rating: V_{GE}=20V; pulse width limited by maximum junction temperature (figure 20)

② V_{CC}=80%(V_{CES}), V_{GE}=20V, L=10µH, R_G= 10Ω (figure 19)

③ Pulse width ≤ 80µs; duty factor ≤ 0.1%.

④ Pulse width 5.0µs, single shot.

Case Outline — TO-247AC



CONFORMS TO JEDEC OUTLINE TO-247AC (TO-3P)
Dimensions in Millimeters and (Inches)

International IOR Rectifier

IR WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245, USA Tel: (310) 252-7105
IR EUROPEAN REGIONAL CENTRE: 439/445 Godstone Rd, Whyteleafe, Surrey CR3 OBL, UK Tel: ++ 44 (0)20 8645 8000
IR CANADA: 15 Lincoln Court, Brampton, Ontario L6T3Z2, Tel: (905) 453 2200
IR GERMANY: Saalburgstrasse 157, 61350 Bad Homburg Tel: ++ 49 (0) 6172 96590
IR ITALY: Via Liguria 49, 10071 Borgaro, Torino Tel: ++ 39 011 451 0111
IR JAPAN: K&H Bldg., 2F, 30-4 Nishi-Ikebukuro 3-Chome, Toshima-Ku, Tokyo 171 Tel: 81 (0)3 3983 0086
IR SOUTHEAST ASIA: 1 Kim Seng Promenade, Great World City West Tower, 13-11, Singapore 237994 Tel: ++ 65 (0)838 4630
IR TAIWAN:16 Fl. Suite D. 207, Sec. 2, Tun Haw South Road, Taipei, 10673 Tel: 886-(0)2 2377 9936
Data and specifications subject to change without notice. 6/00

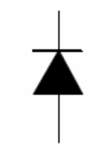
2. 10ETF10.

I2146 rev. A 11/99

International IOR Rectifier

QUIETIR Series 10ETF..

FAST SOFT RECOVERY RECTIFIER DIODE



V_F < 1.33V @ 10A

t_{rr} = 80ns

V_{RRM} 1000 to 1200V

Description/Features

The 10ETF.. fast soft recovery QUIETIR rectifier series has been optimized for combined short reverse recovery time and low forward voltage drop.

The glass passivation ensures stable reliable operation in the most severe temperature and power cycling conditions.

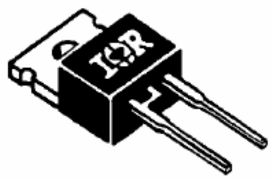
Typical applications are both:

- output rectification and freewheeling in inverters, choppers and converters
- and input rectifications where severe restrictions on conducted EMI should be met.

Major Ratings and Characteristics

Characteristics	10ETF..	Units
$I_{F(AV)}$ Sinusoidal waveform	10	A
V_{RRM}	1000 to 1200	V
I_{FSM}	160	A
V_F @ 10A, T_J = 25°C	1.33	V
t_{rr} @ 1A, 100A/µs	80	ns
T_J	-40 to 150	°C

Package Outline



TO-220AC

10ETF.. QUIETIR Series

I2146 rev. A 11/99

International IOR Rectifier

Voltage Ratings

Part Number	V_{RRM}, maximum peak reverse voltage V	V_{RSM}, maximum non repetitive peak reverse voltage V	I_{RRM} 150°C mA
10ETF10	1000	1100	4
10ETF12	1200	1300	

Absolute Maximum Ratings

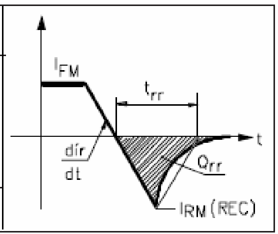
	Parameters	10ETF..	Units	Conditions
$I_{F(AV)}$	Max. Average Forward Current	10	A	@ T_C = 125° C, 180° conduction half sine wave
I_{FSM}	Max. Peak One Cycle Non-Repetitive	160	A	10ms Sine pulse, rated V_{RRM} applied
	Surge Current	185		10ms Sine pulse, no voltage reapplied
I^2t	Max. I^2t for fusing	128	A^2s	10ms Sine pulse, rated V_{RRM} applied
		180		10ms Sine pulse, no voltage reapplied
$I^2\sqrt{t}$	Max. $I^2\sqrt{t}$ for fusing	1800	$A^2\sqrt{s}$	t = 0.1 to 10ms, no voltage reapplied

Electrical Specifications

	Parameters	10ETF..	Units	Conditions	
V_{FM}	Max. Forward Voltage Drop	1.33	V	@ 10A, T_J = 25°C	
r_t	Forward slope resistance	22.9	mΩ	T_J = 150°C	
$V_{F(TO)}$	Threshold voltage	0.96	V		
I_{RM}	Max. Reverse Leakage Current	0.1	mA	T_J = 25 °C	V_R = rated V_{RRM}
		4		T_J = 150 °C	

Recovery Characteristics

	Parameters	10ETF..	Units	Conditions
t_{rr}	Reverse Recovery Time	310	ns	I_F @ 10Apk
I_{rr}	Reverse Recovery Current	4.7	A	@ 25A/ µs
Q_{rr}	Reverse Recovery Charge	1.05	µC	@ 25°C
S	Typical Snap Factor	0.6		



Thermal-Mechanical Specifications

	Parameters		10ETF..	Units	Conditions
T_J	Max. Junction Temperature Range		-40 to 150	°C	
T_{stg}	Max. Storage Temperature Range		-40 to 150	°C	
R_{thJC}	Max. Thermal Resistance Junction to Case		1.5	°C/W	DC operation
R_{thJA}	Max. Thermal Resistance Junction to Ambient		62	°C/W	
R_{thCS}	Typical Thermal Resistance, Case to Heatsink		0.5	°C/W	Mounting surface , smooth and greased
wt	Approximate Weight		2 (0.07)	g (oz.)	
T	Mounting Torque	Min.	6 (5)	Kg-cm (lbf-in)	
		Max.	12 (10)		
	Case Style		TO-220AC		JEDEC

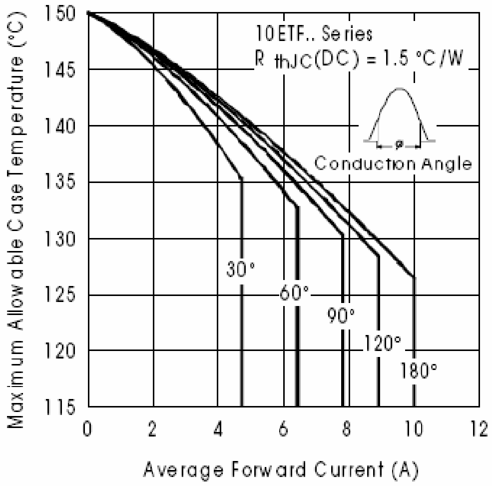


Fig. 1 - Current Rating Characteristics

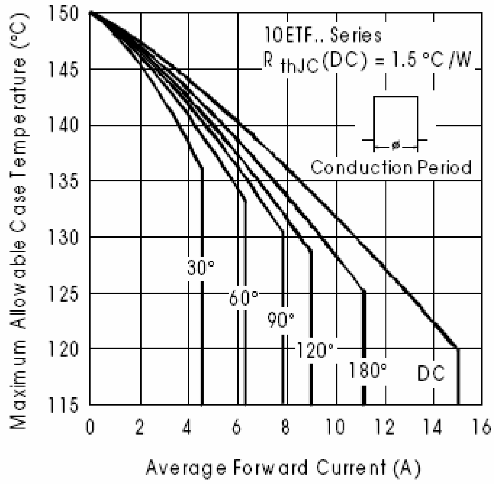


Fig. 2 - Current Rating Characteristics

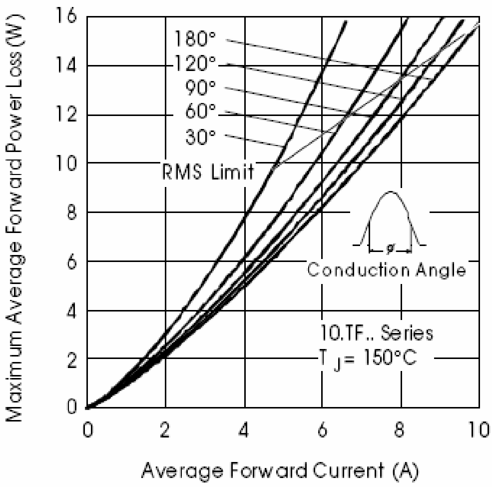


Fig. 3 - Forward Power Loss Characteristics

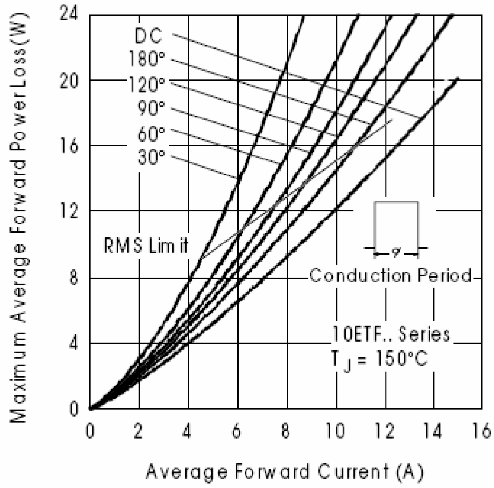


Fig. 4 - Forward Power Loss Characteristics

10ETF.. QUIETIR Series

I2146 rev. A 11/99

International IOR Rectifier

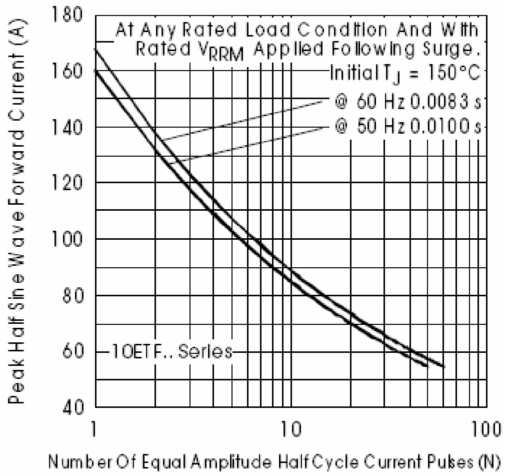


Fig. 5 - Maximum Non-Repetitive Surge Current

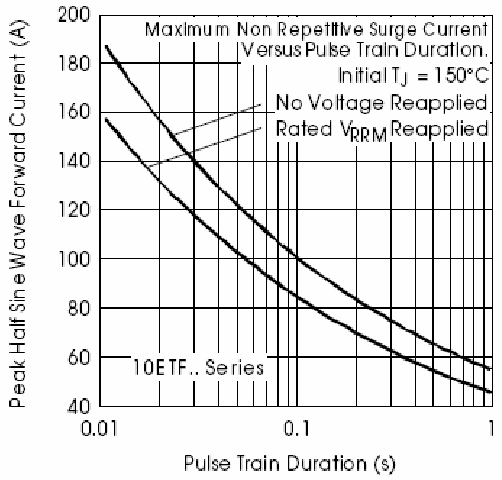


Fig. 6 - Maximum Non-Repetitive Surge Current

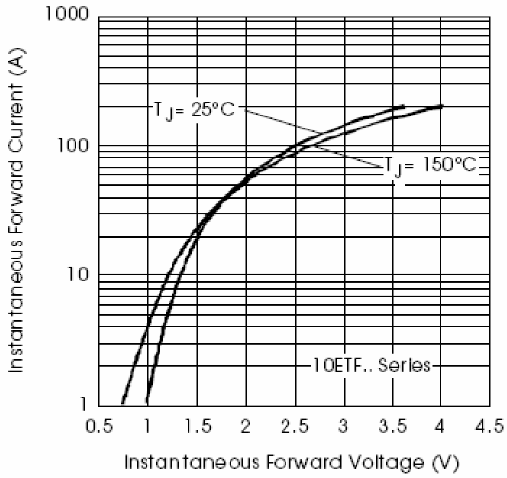


Fig. 7 - Forward Voltage Drop Characteristics

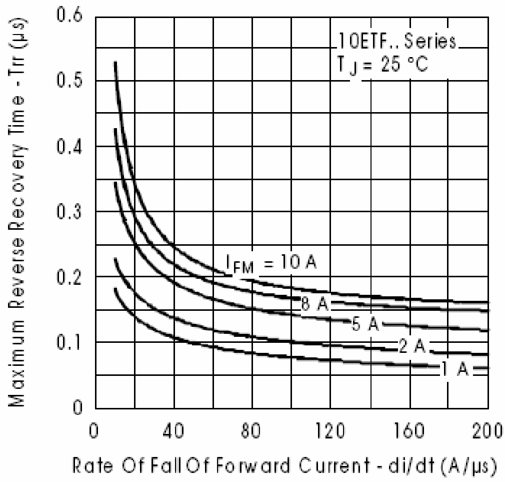


Fig. 8 - Recovery Time Characteristics, $T_J = 25°C$

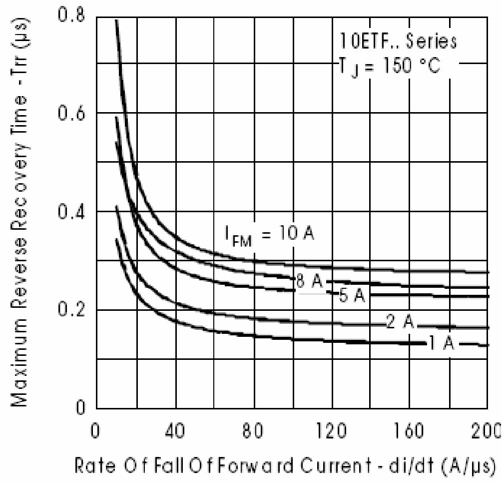


Fig. 9 - Recovery Time Characteristics, $T_J = 150°C$

International IOR Rectifier

10ETF.. QUIETIR Series

I2146 rev. A 11/99

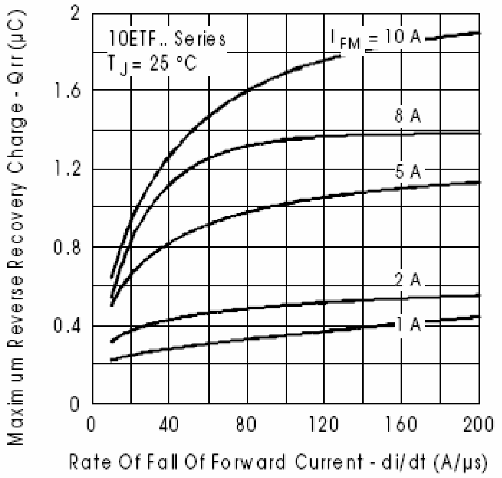


Fig. 10 - Recovery Charge Characteristics, $T_J = 25°C$

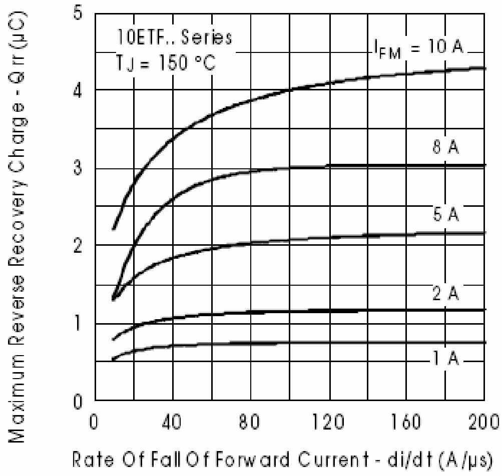


Fig. 11 - Recovery Charge Characteristics, $T_J = 150°C$

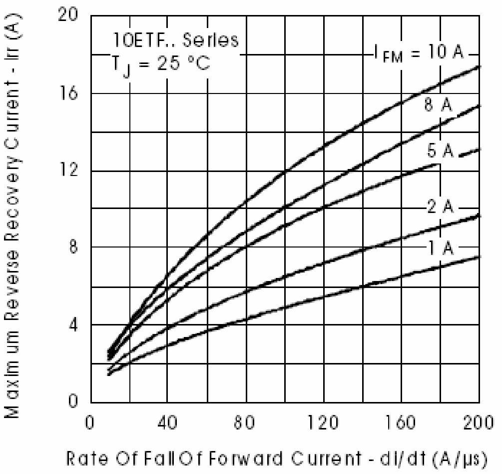


Fig. 12 - Recovery Current Characteristics, $T_J = 25°C$

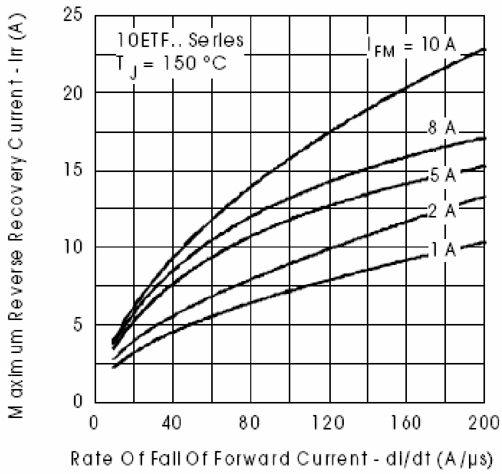


Fig. 13 - Recovery Current Characteristics, $T_J = 150°C$

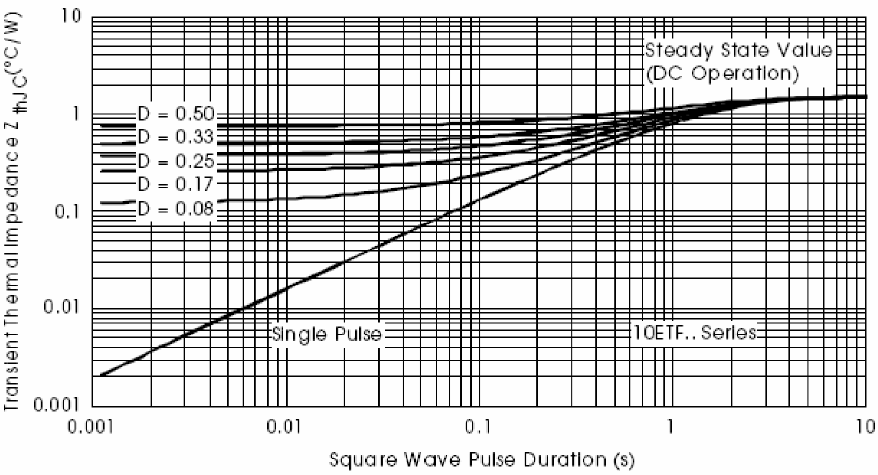
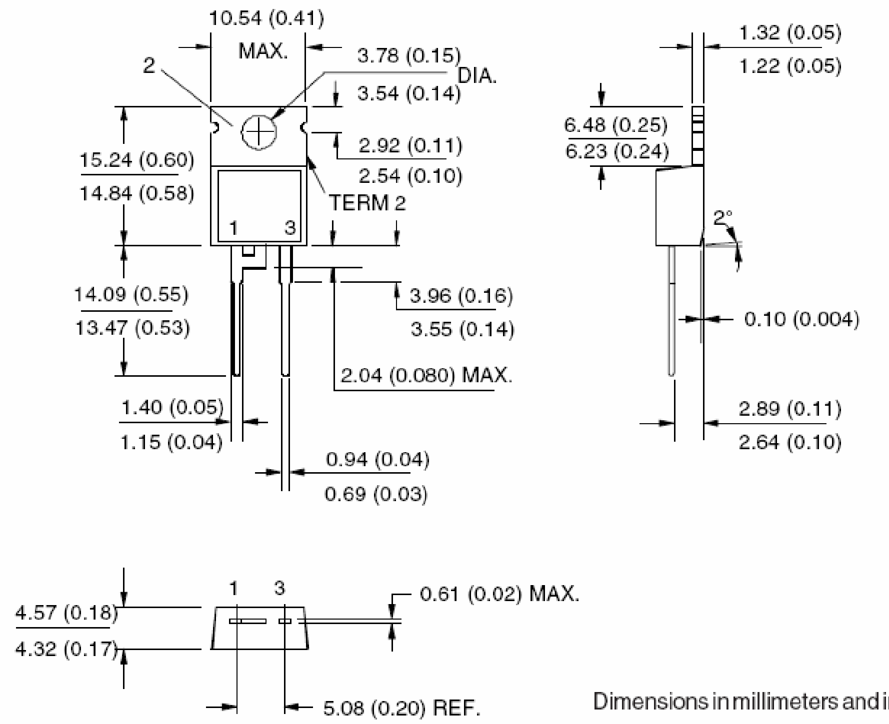


Fig. 14 - Thermal Impedance Z_{thJC} Characteristics

10ETF.. QUIETIR Series
I2146 rev. A 11/99

International IOR Rectifier

Outline Table

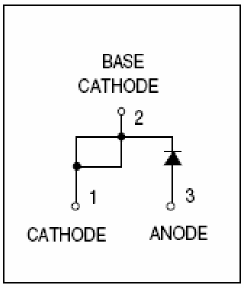


Dimensions in millimeters and inches

Ordering Information Table

Device Code

10	E	T	F	12
1	2	3	4	5



1 - Current Rating
2 - Circuit Configuration:
E = Single Diode
3 - Package:
T = TO-220AC
4 - Type of Silicon:
F = Fast Soft Recovery Rectifier
5 - Voltage code: Code x 100 = V_{RRM}

10	=	1000V
12	=	1200V

International Rectifier

WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245 U.S.A. Tel: (310) 322 3331. Fax: (310) 322 3332.
EUROPEAN HEADQUARTERS: Hurst Green, Oxted, Surrey RH8 9BB, U.K. Tel: ++ 44 1883 732020. Fax: ++ 44 1883 733408.
IR CANADA: 15 Lincoln Court, Brampton, Markham, Ontario L6T3Z2. Tel: (905) 453 2200. Fax: (905) 475 8801.
IR GERMANY: Saalburgstrasse 157, 61350 Bad Homburg. Tel: ++ 49 6172 96590. Fax: ++ 49 6172 965933.
IR ITALY: Via Liguria 49, 10071 Borgaro, Torino. Tel: ++ 39 11 4510111. Fax: ++ 39 11 4510220.
IR FAR EAST: K&H Bldg., 2F, 30-4 Nishi-Ikebukuro 3-Chome, Toshima-Ku, Tokyo, Japan 171. Tel: 81 3 3983 0086.
IR SOUTHEAST ASIA: 1 Kim Seng Promenade, Great World City West Tower,13-11, Singapore 237994. Tel: ++ 65 838 4630.
IR TAIWAN: 16 Fl. Suite D.207, Sec. 2, Tun Haw South Road, Taipei, 10673, Taiwan. Tel: 886 2 2377 9936.

http://www.irf.com Fax-On-Demand: +44 1883 733420

3. IR2118.

International
IOR Rectifier

Data Sheet No. PD60146 Rev N

IR2117(S)/IR2118(S) & (PbF)

SINGLE CHANNEL DRIVER

Features

- Floating channel designed for bootstrap operation
  Fully operational to +600V
  Tolerant to negative transient voltage
  dV/dt immune
- Gate drive supply range from 10 to 20V
- Undervoltage lockout
- CMOS Schmitt-triggered inputs with pull-down
- Output in phase with input (IR2117) or out of phase with input (IR2118)
- Also available LEAD-FREE

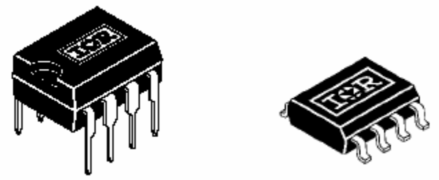
Product Summary

V_{OFFSET}	600V max.
I_O+/-	200 mA / 420 mA
V_{OUT}	10 - 20V
$t_{on/off}$ (typ.)	125 & 105 ns

Description

The IR2117/IR2118(S) is a high voltage, high speed power MOSFET and IGBT driver. Proprietary HVIC and latch immune CMOS technologies enable ruggedized monolithic construction. The logic input is compatible with standard CMOS outputs. The output driver features a high pulse current buffer stage designed for minimum cross-conduction. The floating channel can be used to drive an N-channel power MOSFET or IGBT in the high or low side configuration which operates up to 600 volts.

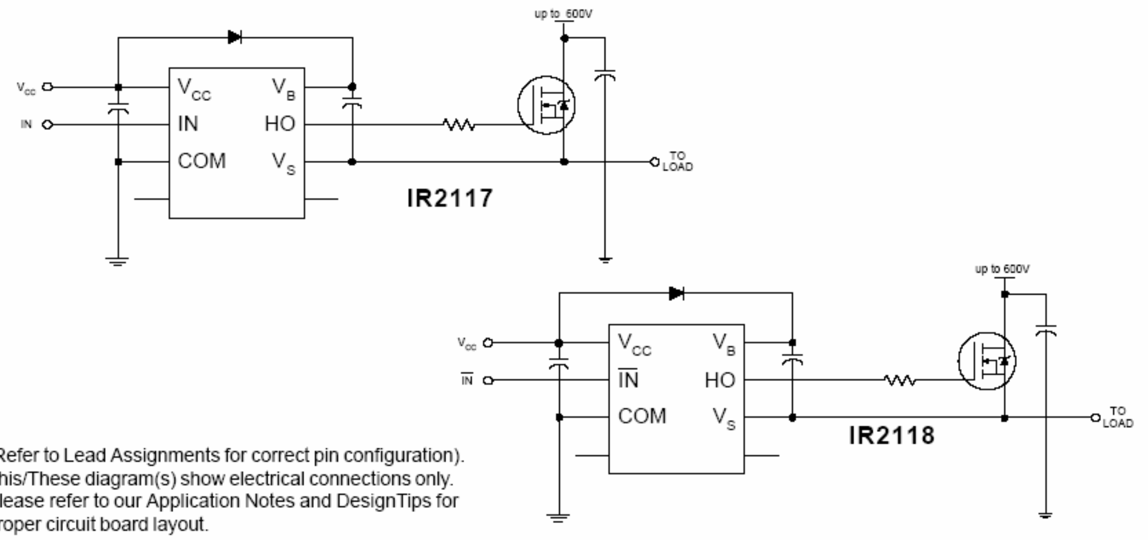
Packages



8-Lead PDIP
IR2117/IR2118

8-Lead SOIC
IR2117S/IR2118S

Typical Connection



(Refer to Lead Assignments for correct pin configuration). This/These diagram(s) show electrical connections only. Please refer to our Application Notes and DesignTips for proper circuit board layout.

IR2117(S)/IR2118(S) & (PbF)

International IOR Rectifier

Absolute Maximum Ratings

Absolute maximum ratings indicate sustained limits beyond which damage to the device may occur. All voltage parameters are absolute voltages referenced to COM. The thermal resistance and power dissipation ratings are measured under board mounted and still air conditions. Additional information is shown in Figures 5 through 8.

Symbol	Definition		Min.	Max.	Units
V_B	High side floating supply voltage		-0.3	625	V
V_S	High side floating supply offset voltage		V_B - 25	V_B + 0.3	
V_{HO}	High side floating output voltage		V_S - 0.3	V_B + 0.3	
V_{CC}	Logic supply voltage		-0.3	25	
V_{IN}	Logic input voltage		-0.3	V_{CC} + 0.3	
dV_S/dt	Allowable offset supply voltage transient (figure 2)		—	50	V/ns
P_D	Package power dissipation @ $T_A \leq +25°C$	(8 lead PDIP)	—	1.0	W
		(8 lead SOIC)	—	0.625	
Rth_{JA}	Thermal resistance, junction to ambient	(8 lead PDIP)	—	125	°C/W
		(8 lead SOIC)	—	200	
T_J	Junction temperature		—	150	°C
T_S	Storage temperature		-55	150	
T_L	Lead temperature (soldering, 10 seconds)		—	300	

Recommended Operating Conditions

The input/output logic timing diagram is shown in figure 1. For proper operation the device should be used within the recommended conditions. The V_S offset rating is tested with all supplies biased at 15V differential.

Symbol	Definition	Min.	Max.	Units
V_B	High side floating supply absolute voltage	V_S + 10	V_S + 20	V
V_S	High side floating supply offset voltage	Note 1	600	
V_{HO}	High side floating output voltage	V_S	V_B	
V_{CC}	Logic supply voltage	10	20	
V_{IN}	Logic input voltage	0	V_{CC}	
T_A	Ambient temperature	-40	125	°C

Note 1: Logic operational for V_S of -5 to +600V. Logic state held for V_S of -5V to $-V_{BS}$. (Please refer to the Design Tip DT97-3 for more details).

International IOR Rectifier

IR2117(S)/IR2118(S) & (PbF)

Dynamic Electrical Characteristics

V_{BIAS} (V_{CC}, V_{BS}) = 15V, C_L = 1000 pF and T_A = 25°C unless otherwise specified. The dynamic electrical characteristics are measured using the test circuit shown in Figure 3.

Symbol	Definition	Min.	Typ.	Max.	Units	Test Conditions
t_{on}	Turn-on propagation delay	—	125	200	ns	V_S = 0V
t_{off}	Turn-off propagation delay	—	105	180		V_S = 600V
t_r	Turn-on rise time	—	80	130		
t_f	Turn-off fall time	—	40	65		

Static Electrical Characteristics

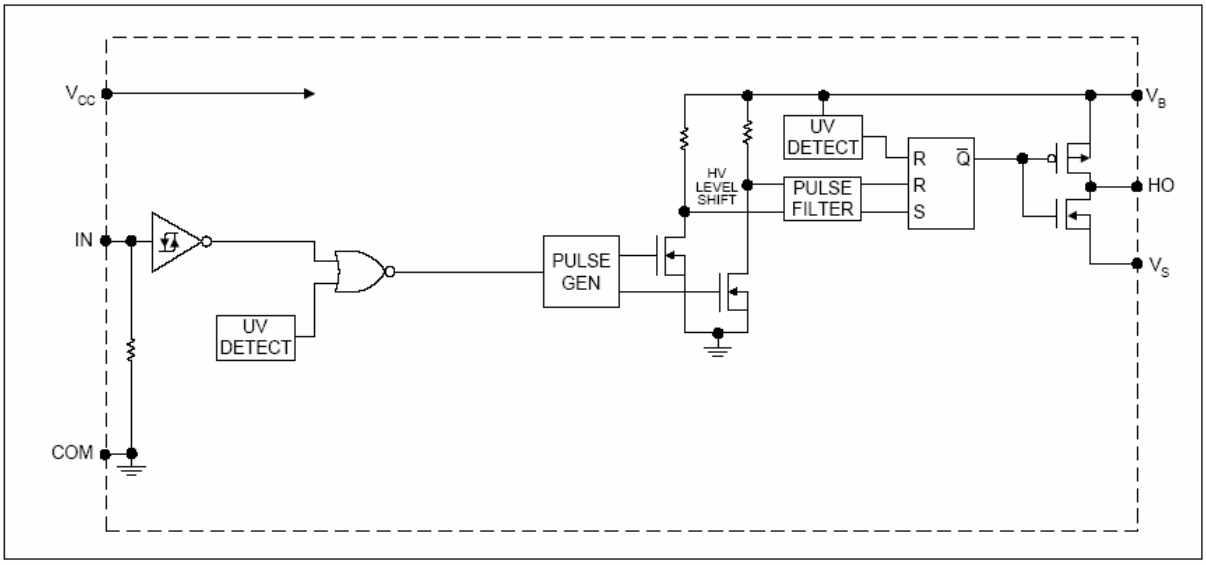
V_{BIAS} (V_{CC}, V_{BS}) = 15V and T_A = 25°C unless otherwise specified. The V_{IN}, V_{TH} and I_{IN} parameters are referenced to COM. The V_O and I_O parameters are referenced to COM and are applicable to the respective output leads: HO or LO.

Symbol	Definition	Min.	Typ.	Max.	Units	Test Conditions
V_{IH}	input voltage - logic “1” (IR2117) logic “0” (IR2118)	9.5	—	—	V	
V_{IL}	Input voltage - logic “0” (IR2117) logic “1” (IR2118)	—	—	6.0		
V_{OH}	High level output voltage, V_{BIAS} - V_O	—	—	100	mV	I_O = 0A
V_{OL}	Low level output voltage, V_O	—	—	100		I_O = 0A
I_{LK}	Offset supply leakage current	—	—	50	µA	V_B = V_S = 600V
I_{QBS}	Quiescent V_{BS} supply current	—	50	240		V_{IN} = 0V or V_{CC}
I_{QCC}	Quiescent V_{CC} Supply Current	—	70	340		V_{IN} = 0V or V_{CC}
I_{IN+}	Logic “1” input bias current (IR2117)	—	20	40		V_{IN} = V_{CC}
	(IR2118)					V_{IN} = 0V
I_{IN-}	Logic “0” input bias current (IR2117)	—	—	1.0		V_{IN} = 0V
	(IR2118)					V_{IN} = V_{CC}
V_{BSUV+}	V_{BS} supply undervoltage positive going threshold	7.6	8.6	9.6	V	
V_{BSUV-}	V_{BS} supply undervoltage negative going threshold	7.2	8.2	9.2		
V_{CCUV+}	V_{CC} supply undervoltage positive going threshold	7.6	8.6	9.6		
V_{CCUV-}	V_{CC} supply undervoltage negative going threshold	7.2	8.2	9.2		
I_{O+}	Output high short circuit pulsed current	200	250	—	mA	V_O = 0V V_{IN} = Logic “1” PW ≤ 10 µs
I_{O-}	Output low short circuit pulsed current	420	500	—		V_O = 15V V_{IN} = Logic “0” PW ≤ 10 µs

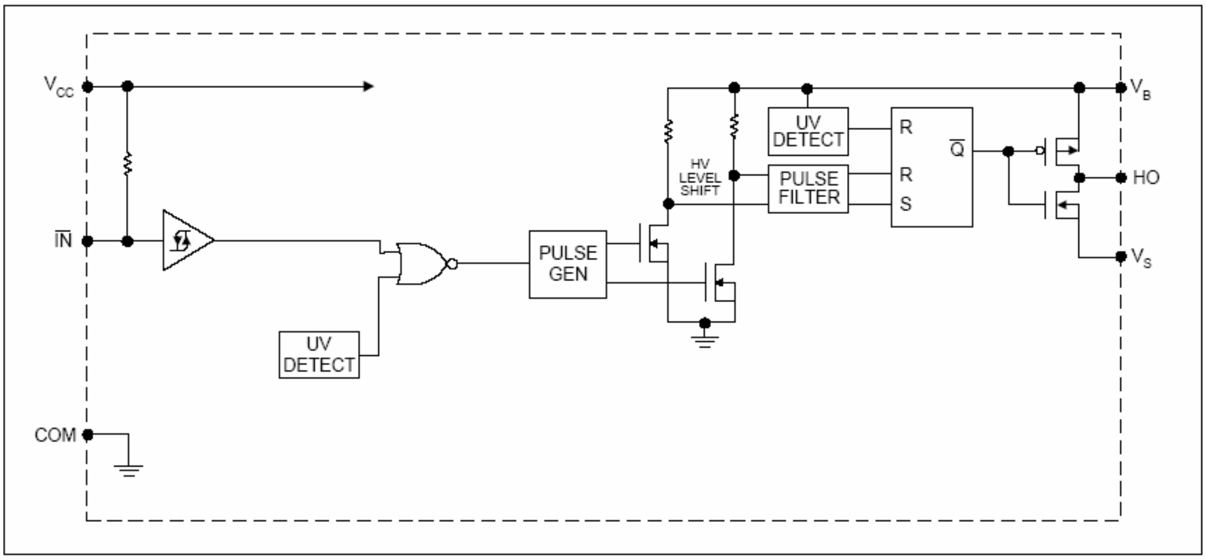
IR2117(S)/IR2118(S) & (PbF)

International IOR Rectifier

Functional Block Diagram (IR2117)



Functional Block Diagram (IR2118)



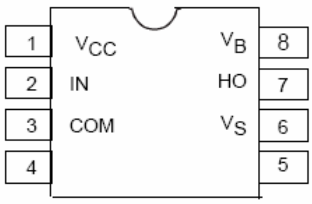
International IOR Rectifier

IR2117(S)/IR2118(S) & (PbF)

Lead Definitions

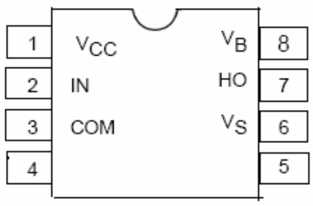
Symbol	Description
V_{CC}	Logic and gate drive supply
IN	Logic input for gate driver output (HO), in phase with HO (IR2117)
$\overline{IN}$	Logic input for gate driver output (HO), out of phase with HO (IR2118)
COM	Logic ground
V_B	High side floating supply
HO	High side gate drive output
V_S	High side floating supply return

Lead Assignments



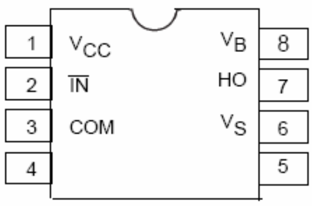
8 Lead PDIP

IR2117



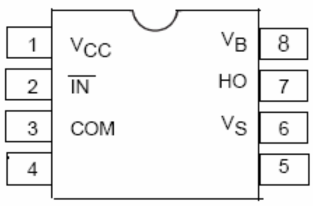
8 Lead SOIC

IR2117S



8 Lead PDIP

IR2118



8 Lead SOIC

IR2118S

IR2117(S)/IR2118(S) & (PbF)

International
IOR Rectifier

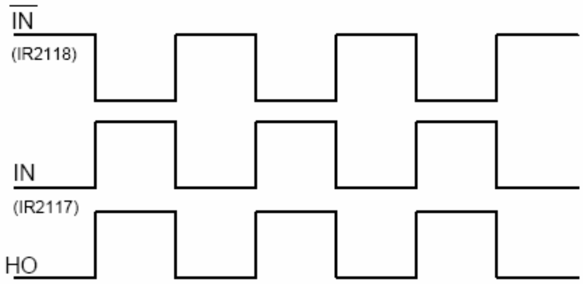


Figure 1. Input/Output Timing Diagram

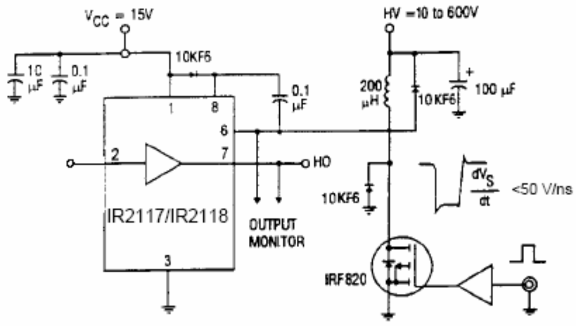


Figure 2. Floating Supply Voltage Transient Test Circuit

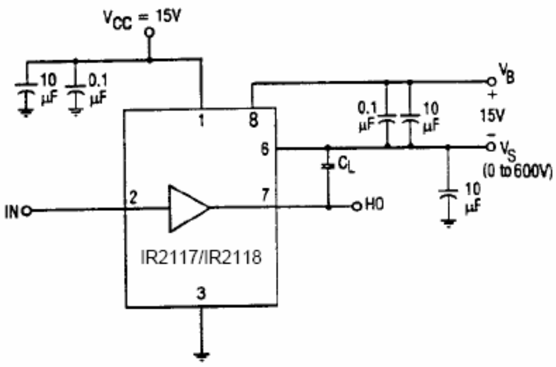


Figure 3. Switching Time Test Circuit

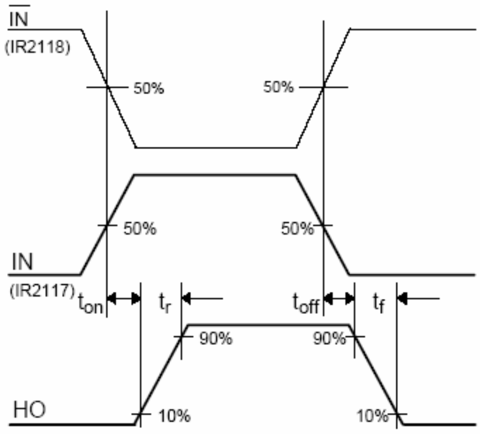


Figure 4. Switching Time Waveform Definition

International
IOR Rectifier

IR2117(S)/IR2118(S) & (PbF)

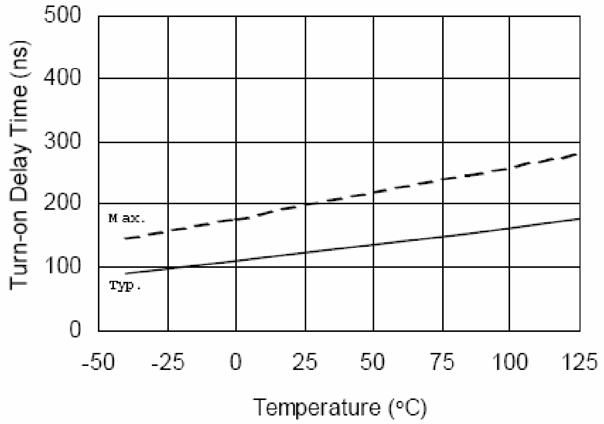


Figure 4A. Turn-On Time vs. Temperature

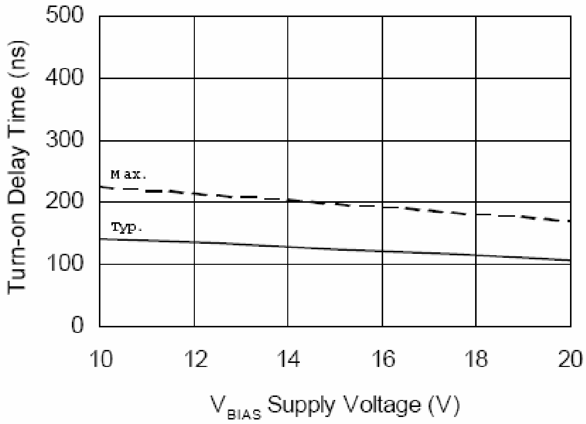


Figure 4B. Turn-On Time vs. Supply Voltage

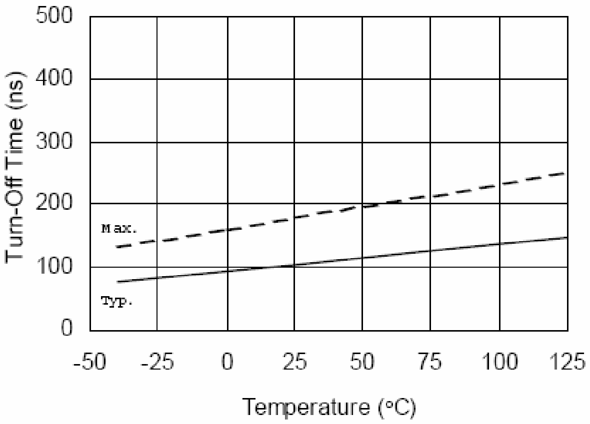


Figure 5A. Turn-Off Time vs. Temperature

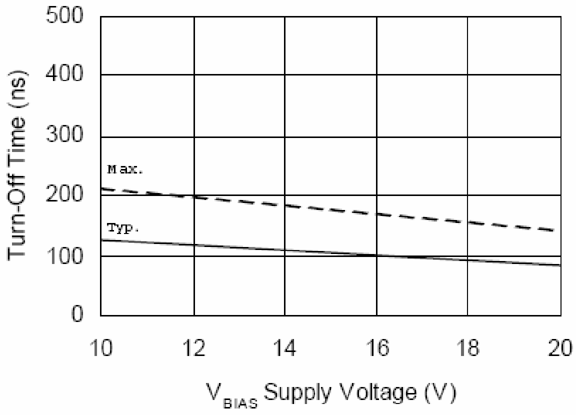
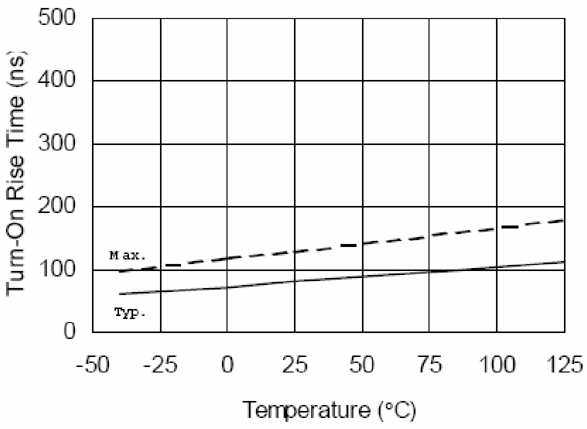


Figure 5B. Turn-Off Time vs. Supply Voltage

IR2117(S)/IR2118(S) & (PbF)

International IOR Rectifier



Fiure 6A. Turn-On Rise Time vs.Temperature

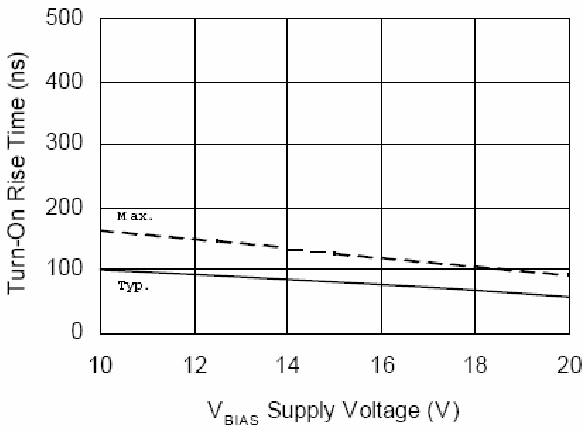


Figure 6B. Turn-On Rise Time vs. Supply Voltage

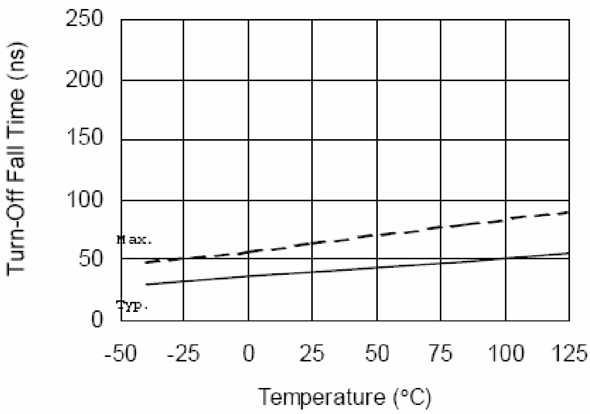


Figure 7A. Turn-Off Fall Time vs. Temperature

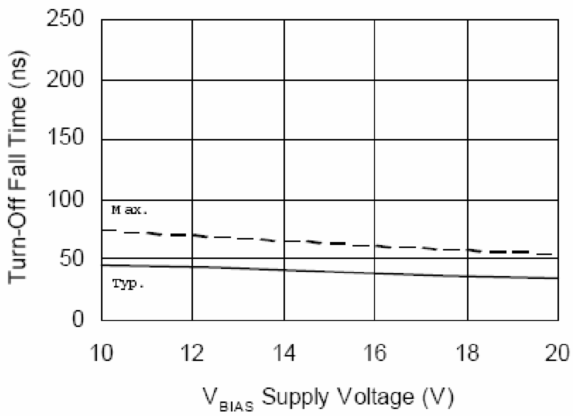


Figure 7B. Turn-Off Fall Time vs. Supply Voltage

International IOR Rectifier

IR2117(S)/IR2118(S) & (PbF)

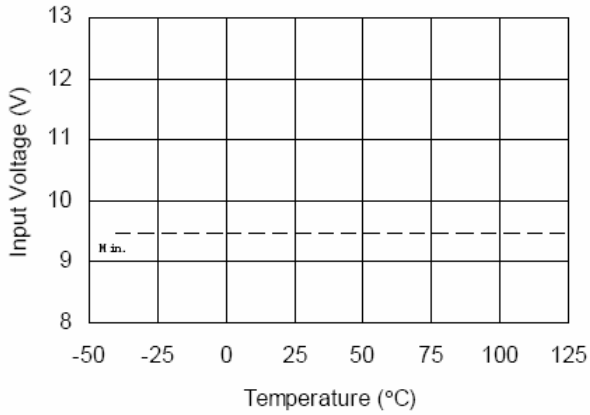


Figure 8A. Logic "1" (IR2118 "0") Input Voltage vs. Temperature

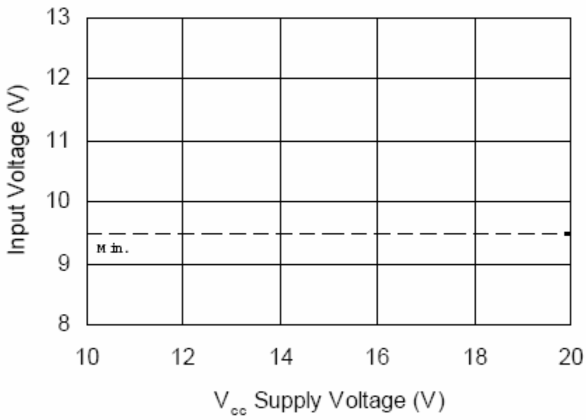


Figure 8B. Logic "1" (IR2118 "0") Input Voltage vs. Supply Voltage

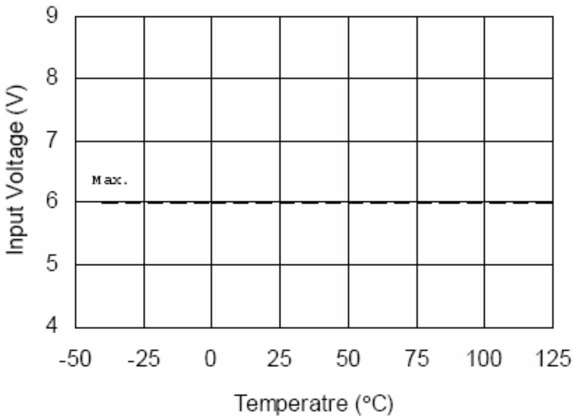


Figure 9A. Logic "0" (IR2118 "1") Input Voltage vs. Temperature

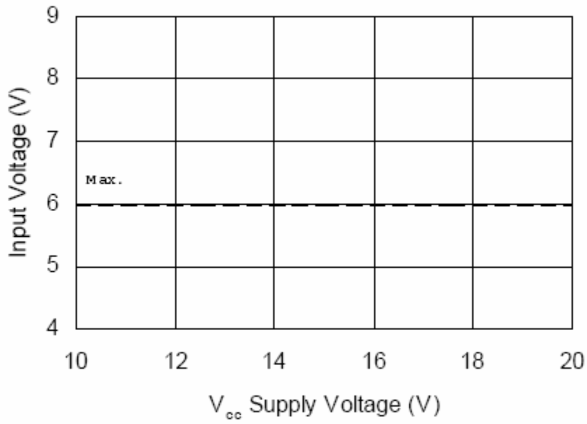


Figure 9B. Logic "0" (IR2118 "1") Input Voltage vs. Supply Voltage

IR2117(S)/IR2118(S) & (PbF)

International IOR Rectifier

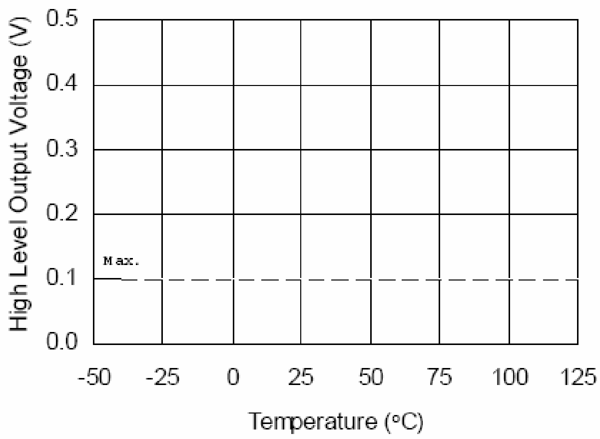


Figure 10A. High Level Output vs. Temperature

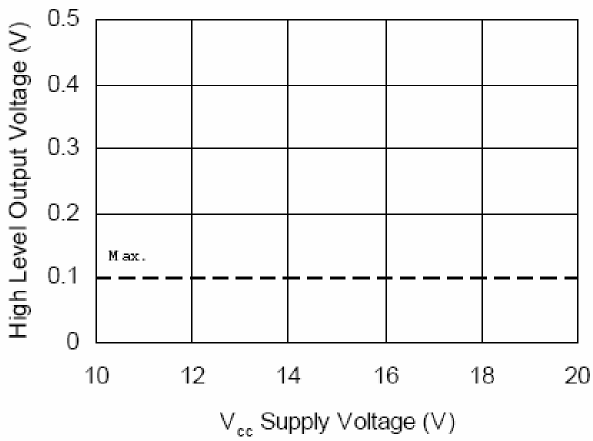


Figure 10B. High Level Output vs. Supply Voltage

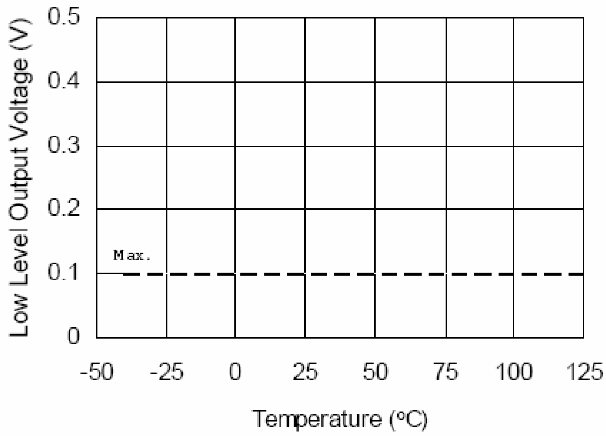


Figure 11A. Low Level Output vs.Temperature

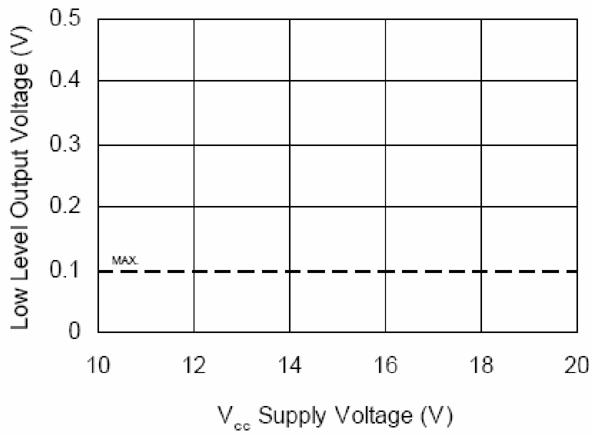


Figure 11B. Low Level Output vs. Supply Voltage

International Rectifier

IR2117(S)/IR2118(S) & (PbF)

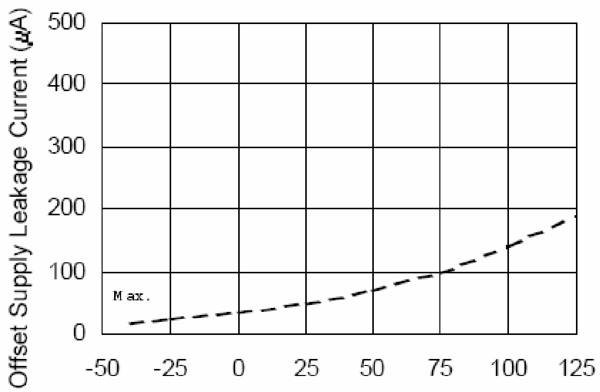


Figure 12A. Offset Supply Leakage Current vs. Temperature

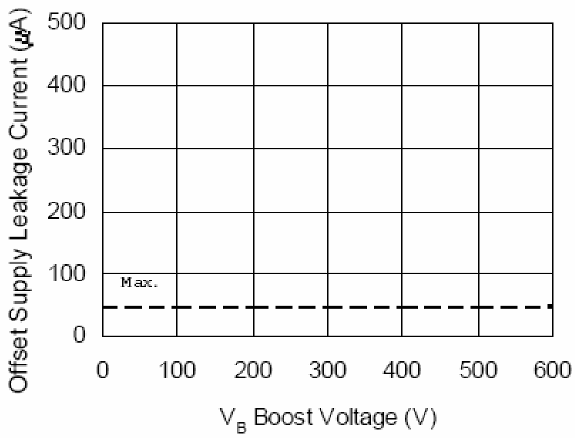


Figure 12B. Offset Supply Leakage Current vs. V_B Boost Voltage

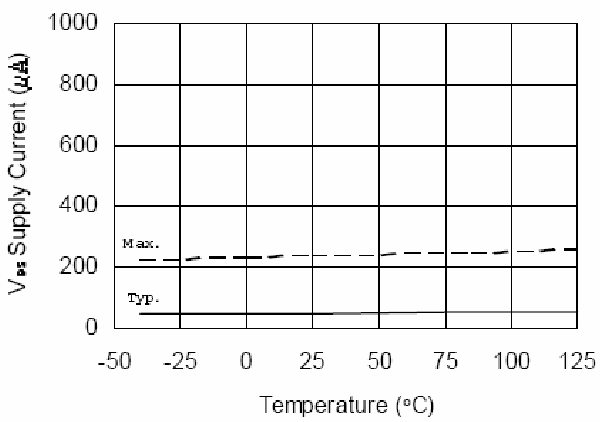


Figure 13A. V_{BS} Supply Current vs. Temperature

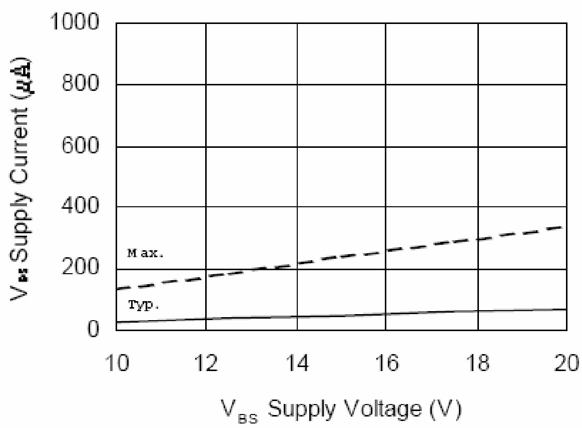


Figure 13B. V_{BS} Supply Current vs. Supply Voltage

IR2117(S)/IR2118(S) & (PbF)

International IOR Rectifier

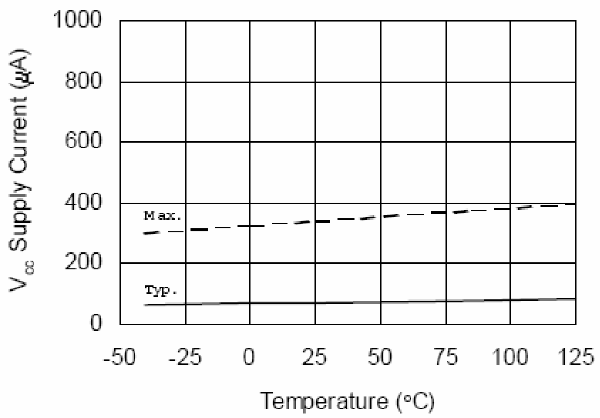


Figure 14A. V_{cc} Supply Current vs. Temperature

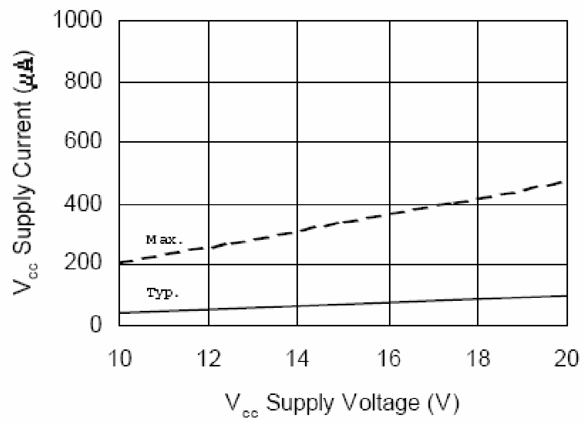


Figure 14B. V_{cc} Supply Current vs. Supply Voltage

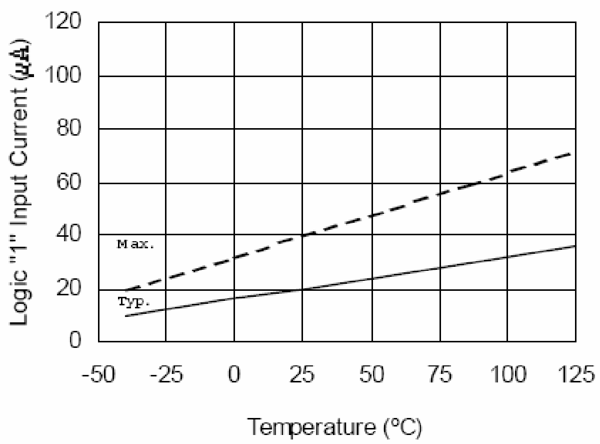


Figure 15A. Logic "1" (2118 "0") Input Current vs. Temperature

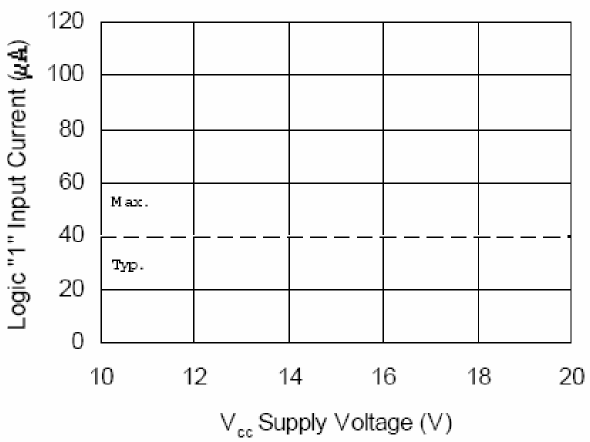


Figure 15B. Logic "1" (2118 "0") Input Current vs. Supply Voltage

International IOR Rectifier

IR2117(S)/IR2118(S) & (PbF)

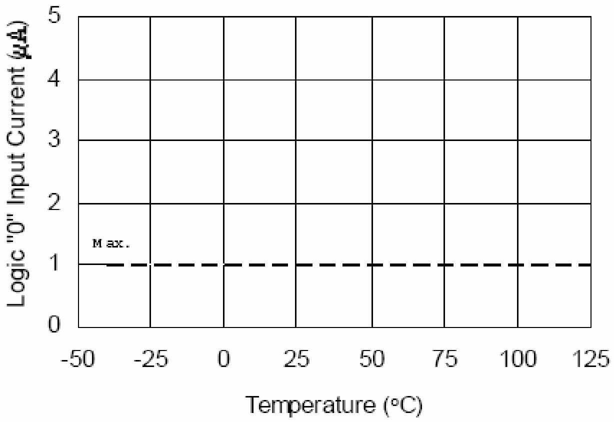


Figure 16A. Logic "0" (2118"1") Input Current vs. Temperature

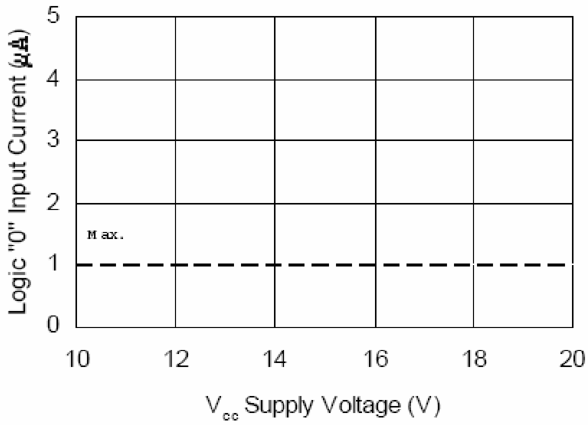


Figure 16B. Logic "0" (2118"1") Input Current vs. Supply Voltage

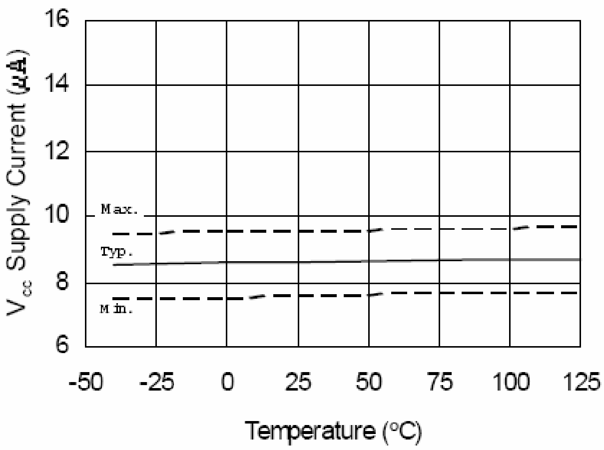


Figure 17A. V_{cc} Undervoltage Threshold (+) vs. Temperature

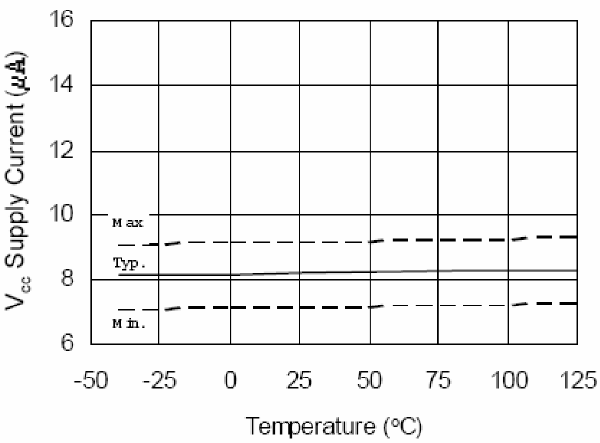


Figure 18A. V_{cc} Undervoltage Threshold (-) vs. Temperature

IR2117(S)/IR2118(S) & (PbF)

International IOR Rectifier

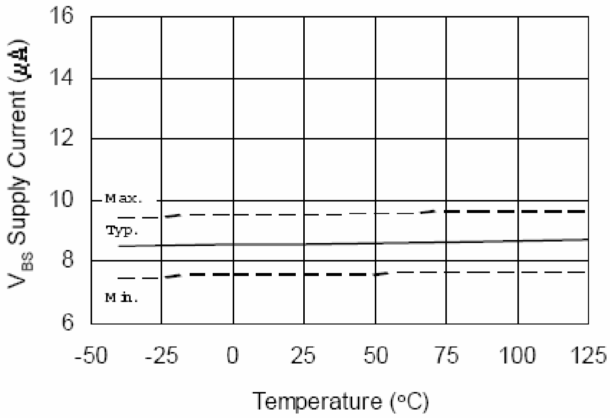


Figure 19A. V_{BS} Undervoltage Threshold (+) vs. Temperature

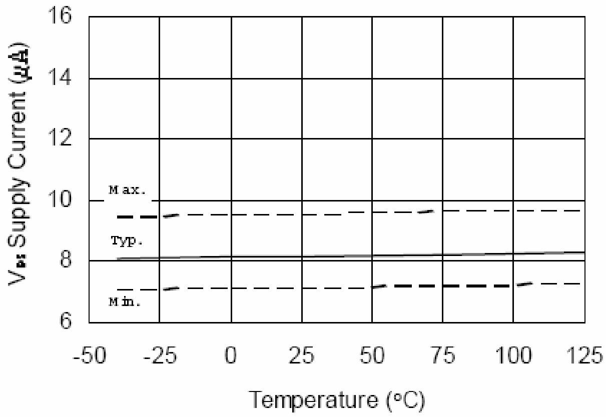


Figure 20A. V_{BS} Undervoltage Threshold (-) vs. Temperature

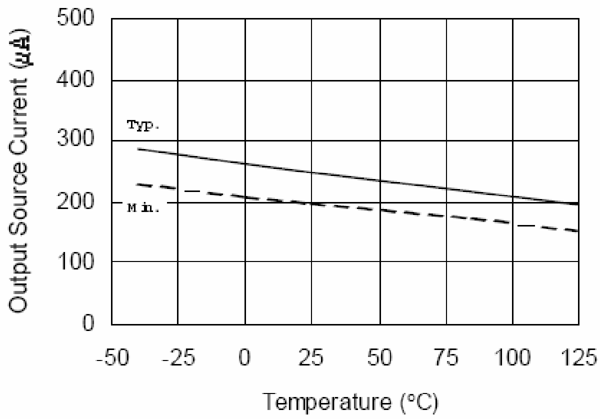


Figure 21A. Output Source Current vs. Temperature

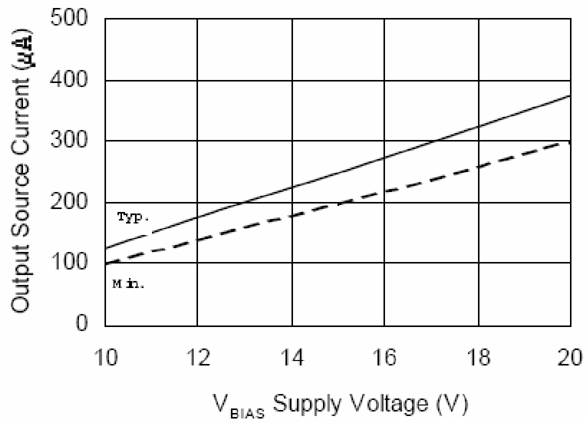


Figure 21B. Output Source Current vs. Supply Voltage

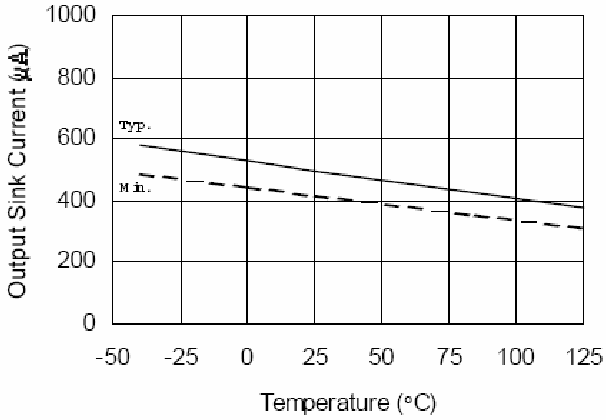


Figure 22A. Output Sink Current vs.Temperature

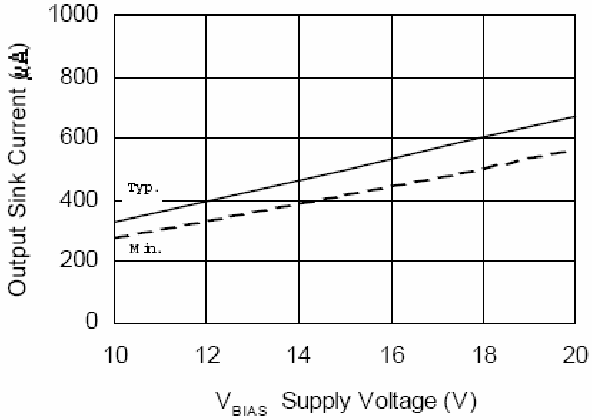


Figure 22B. Output Sink Current vs. Supply Voltage

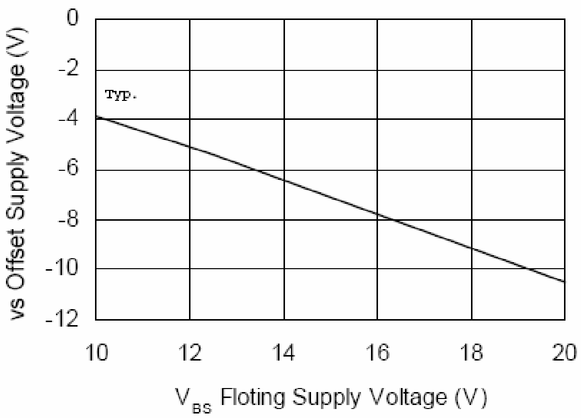


Figure 23B. Maximum VS Negative Offset vs. Supply Voltage

IR2117(S)/IR2118(S) & (PbF)

International IOR Rectifier

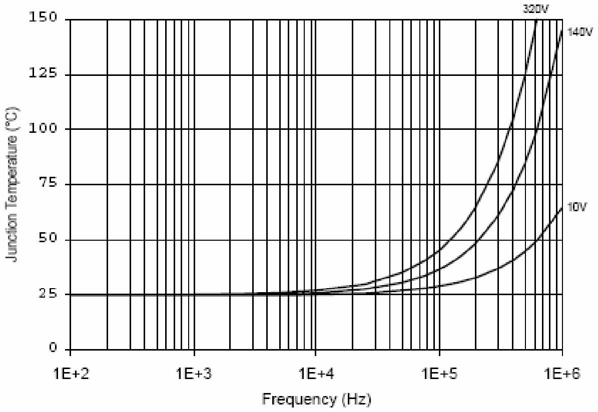


Figure 24. IR2117/IR2118 T_J vs. Frequency (IRFBC20) R_{GATE} = 33Ω, V_{CC} = 15V

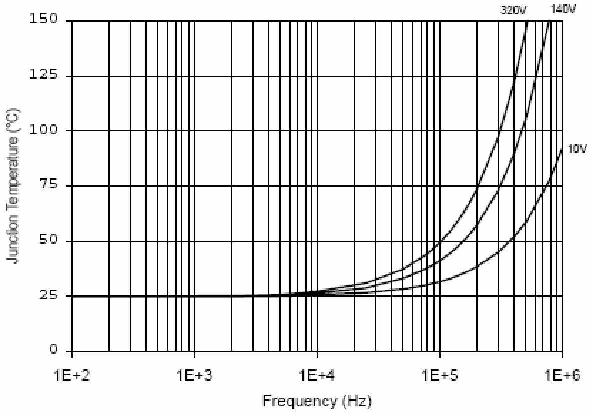


Figure 25. IR2117/IR2118 T_J vs. Frequency (IRFBC30) R_{GATE} = 22Ω, V_{CC} = 15V

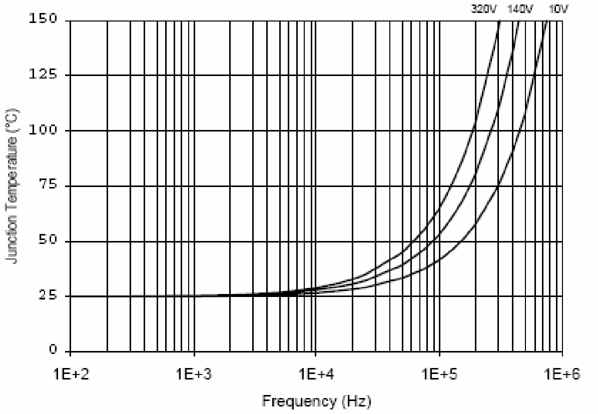


Figure 26. IR2117/IR2118 T_J vs. Frequency (IRFBC40) R_{GATE} = 15Ω, V_{CC} = 15V

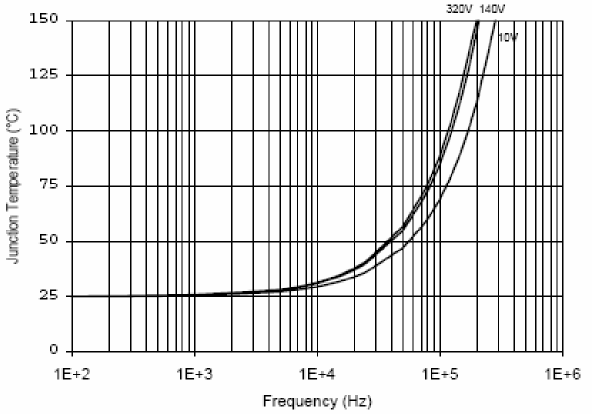
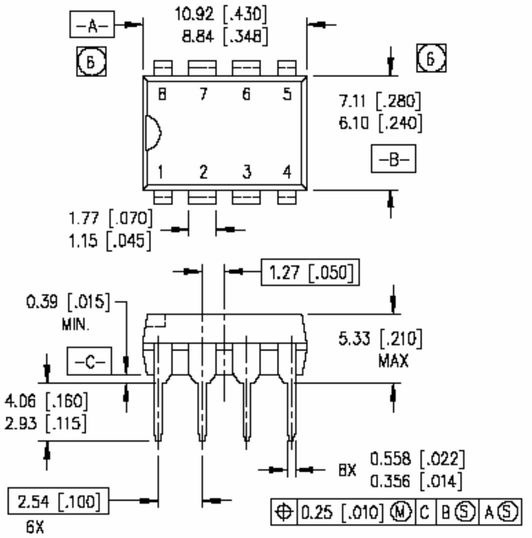


Figure 27. IR2117/IR2118 T_J vs. Frequency (IRFPE50) R_{GATE} = 10Ω, V_{CC} = 15V

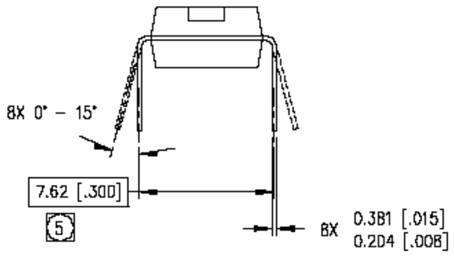
International
IOR Rectifier

IR2117(S)/IR2118(S) & (PbF)

Case outlines

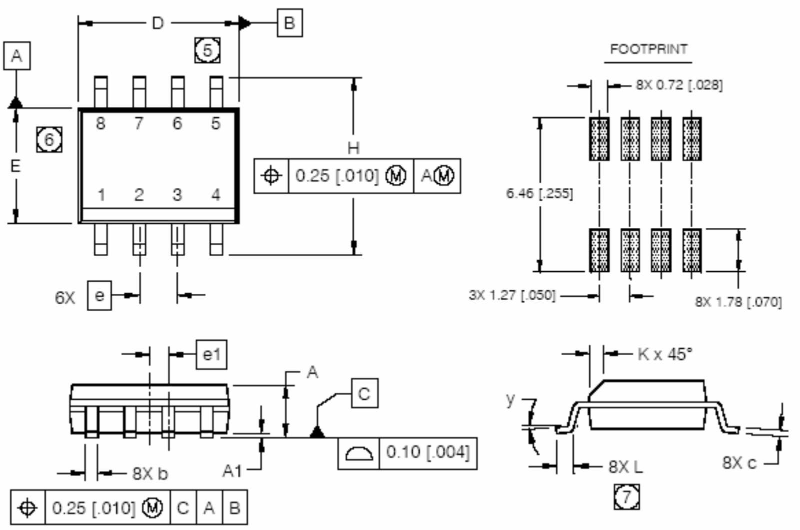


NOTES:
1. DIMENSIONING & TOLERANCING PER ANSI Y14.5M-1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-001AB.
5. MEASURED WITH THE LEADS CONSTRAINED TO BE PERPENDICULAR TO DATUM PLANE C.
6. DIMENSION DOES NOT INCLUDE MOLD PROTUSIONS. MOLD PROTUSIONS SHALL NOT EXCEED 0.25 [.010].



01-6014
01-3003 01 (MS-001AB)

8-Lead PDIP



DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0532	.0688	1.35	1.75
A1	.0040	.0098	0.10	0.25
b	.013	.020	0.33	0.51
c	.0075	.0098	0.19	0.25
D	.189	.1968	4.80	5.00
E	.1497	.1574	3.80	4.00
e	.050 BASIC		1.27 BASIC	
e 1	.025 BASIC		0.635 BASIC	
H	.2284	.2440	5.80	6.20
K	.0099	.0196	0.25	0.50
L	.016	.050	0.40	1.27
y	0°	8°	0°	8°

NOTES:
1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. CONTROLLING DIMENSION: MILLIMETER
3. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA.

5. DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.15 [.006].
6. DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.25 [.010].
7. DIMENSION IS THE LENGTH OF LEAD FOR SOLDERING TO A SUBSTRATE.

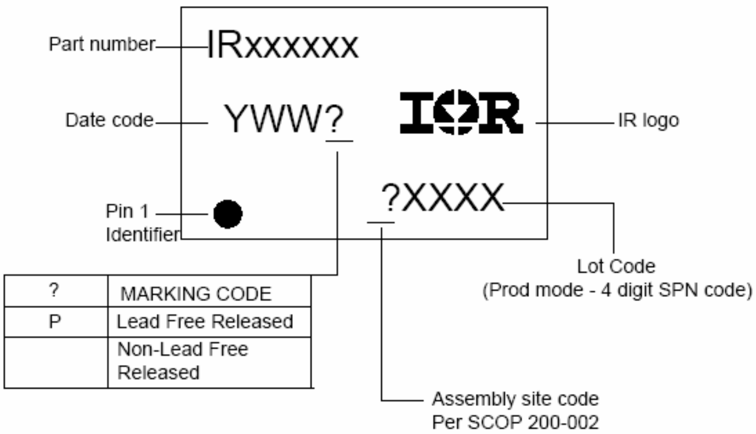
01-6027

8-Lead SOIC

IR2117(S)/IR2118(S) & (PbF)

International IOR Rectifier

LEADFREE PART MARKING INFORMATION



ORDER INFORMATION

Basic Part (Non-Lead Free)
8-Lead PDIP IR2117 order IR2117
8-Lead PDIP IR2118 order IR2118
8-Lead SOIC IR2117S order IR2117S
8-Lead SOIC IR2118S order IR2118S

Leadfree Part
8-Lead PDIP IR2117 order IR2117PbF
8-Lead PDIP IR2118 order IR2118PbF
8-Lead SOIC IR2117S order IR2117SPbF
8-Lead SOIC IR2118S order IR2118SPbF

International IOR Rectifier

IR WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245 Tel: (310) 252-7105
This product has been qualified per industrial level
Data and specifications subject to change without notice. 4/2/2004

4. H11L1.

FAIRCHILD SEMICONDUCTOR™

GlobalOptoisolator™

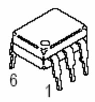
VDE | UL | CSA | SETI | SEMKO | DEMKO | NEMKO | BABT

6-Pin DIP Optoisolators Logic Output

H11L1
H11L2

The H11L1 and H11L2 have a gallium arsenide IRED optically coupled to a high–speed integrated detector with Schmitt trigger output. Designed for applications requiring electrical isolation, fast response time, noise immunity and digital logic compatibility.

- Guaranteed Switching Times — t_{on}, t_{off} < 4 µs
- Built–In On/Off Threshold Hysteresis
- High Data Rate, 1 MHz Typical (NRZ)
- Wide Supply Voltage Capability
- Microprocessor Compatible Drive
- ***To order devices that are tested and marked per VDE 0884 requirements, the suffix "V" must be included at end of part number. VDE 0884 is a test option.***

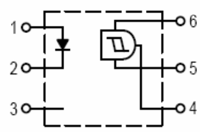


STANDARD THRU HOLE

Applications

- Interfacing Computer Terminals to Peripheral Equipment
- Digital Control of Power Supplies
- Line Receiver — Eliminates Noise
- Digital Control of Motors and Other Servo Machine Applications
- Logic to Logic Isolator
- Logic Level Shifter — Couples TTL to CMOS

SCHEMATIC



PIN 1. ANODE
2. CATHODE
3. NC
4. OPEN COLLECTOR OUTPUT
5. GND
6. V_{CC}

MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)

Rating	Symbol	Value	Unit
INPUT LED			
Reverse Voltage	V_R	6	Volts
Forward Current — Continuous — Peak Pulse Width = 300 µs, 2% Duty Cycle	I_F	60 1.2	mA Amp
LED Power Dissipation @ T_A = 25°C Derate above 25°C	P_D	120 1.41	mW mW/°C
OUTPUT DETECTOR			
Output Voltage Range	V_o	0–16	Volts
Supply Voltage Range	V_{CC}	3–16	Volts
Output Current	I_O	50	mA
Detector Power Dissipation @ T_A = 25°C Derate above 25°C	P_D	150 1.76	mW mW/°C
TOTAL DEVICE			
Total Device Dissipation @ T_A = 25°C Derate above 25°C	P_D	250 2.94	mW mW/°C
Maximum Operating Temperature	T_A	–40 to +85	°C
Storage Temperature Rang	T_{stg}	–55 to +150	°C
Soldering Temperature (10 s)	T_L	260	°C
Isolation Surge Voltage (Pk ac Voltage, 60 Hz, 1 Second Duration)(1)	V_{ISO}	7500	Vac(pk)

1. Isolation surge voltage is an internal device dielectric breakdown rating.
For this test, Pins 1 and 2 are common, and Pins 4, 5 and 6 are common.

FAIRCHILD SEMICONDUCTOR™

H11L1, H11L2

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)(1)

Characteristic	Symbol	Min	Typ(1)	Max	Unit
INPUT LED					
Reverse Leakage Current (V_R = 3 V, R_L = 1 MΩ)	I_R	—	0.05	10	μA
Forward Voltage (I_F = 10 mA) (I_F = 0.3 mA)	V_F	— 0.75	1.2 0.95	1.5 —	Volts
Capacitance (V_R = 0 V, f = 1 MHz)	C	—	18	—	pF
OUTPUT DETECTOR					
Operating Voltage	V_{CC}	3	—	15	Volts
Supply Current (I_F = 0, V_{CC} = 5 V)	$I_{CC(off)}$	—	1	5	mA
Output Current, High (I_F = 0, V_{CC} = V_o = 15 V)	I_{OH}	—	—	100	μA
COUPLED					
Supply Current (I_F = $I_{F(on)}$, V_{CC} = 5 V)	$I_{CC(on)}$	—	1.6	5	mA
Output Voltage, Low (R_L = 270 Ω, V_{CC} = 5 V, I_F = $I_{F(on)}$)	V_{OL}	—	0.2	0.4	Volts
Threshold Current, ON (R_L = 270 Ω, V_{CC} = 5 V) H11L1 H11L2	$I_{F(on)}$	— —	1.2 —	1.6 10	mA
Threshold Current, OFF (R_L = 270 Ω, V_{CC} = 5 V) H11L1 H11L2	$I_{F(off)}$	0.3 0.3	0.75 —	— —	mA
Hysteresis Ratio (R_L = 270 Ω, V_{CC} = 5 V)	$\frac{I_{F(off)}}{I_{F(on)}}$	0.5	0.75	0.9	
Isolation Voltage(2) 60 Hz, AC Peak, 1 second, T_A = 25°C	V_{ISO}	7500	—	—	Vac(pk)
Turn–On Time (R_L = 270 Ω(3), V_{CC} = 5 V, I_F = $I_{F(on)}$, T_A = 25°C)	t_{on}	—	1.2	4	μs
Fall Time	t_f	—	0.1	—	μs
Turn–Off Time	t_{off}	—	1.2	4	μs
Rise Time	t_r	—	0.1	—	μs

1. Always design to the specified minimum/maximum electrical limits (where applicable).
2. For this test, IRED Pins 1 and 2 are common and Output Gate Pins 4, 5, 6 are common.
3. R_L value effect on switching time is negligible.

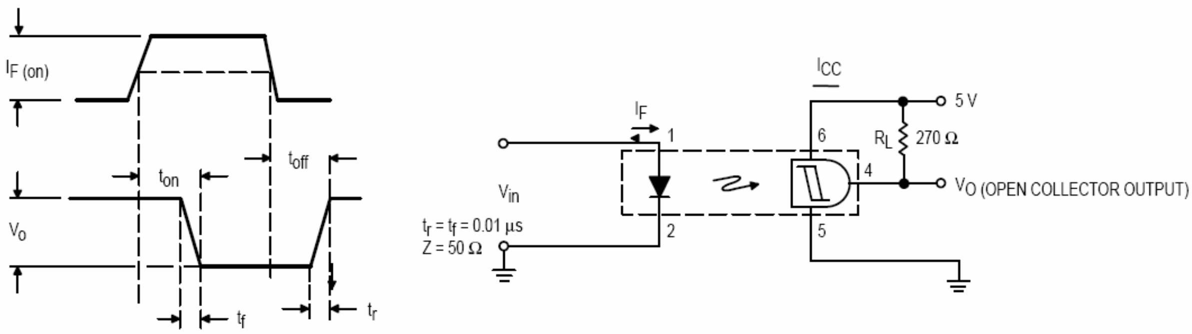


Figure 1. Switching Test Circuit

FAIRCHILD SEMICONDUCTOR™

H11L1, H11L2

TYPICAL CHARACTERISTICS

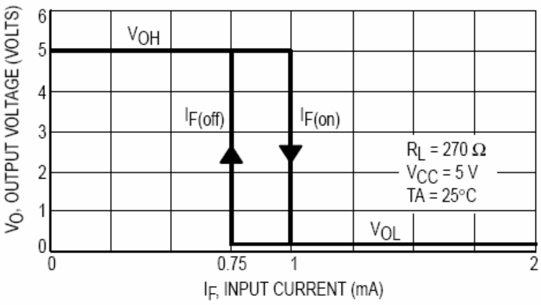


Figure 2. Transfer Characteristics for H11L1

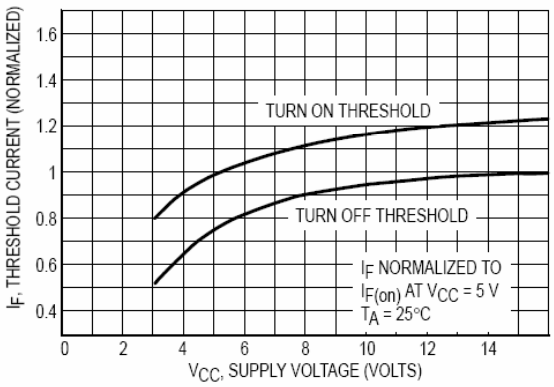


Figure 3. Threshold Current versus Supply Voltage

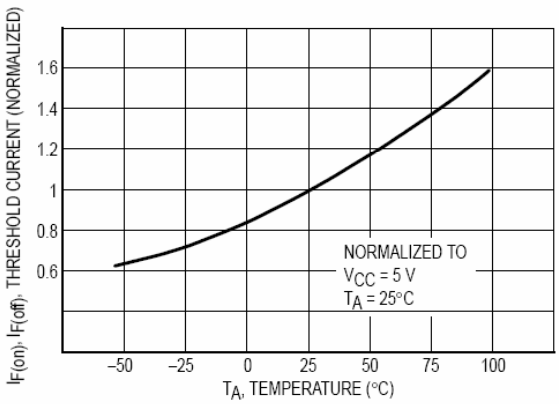


Figure 4. Threshold Current versus Temperature

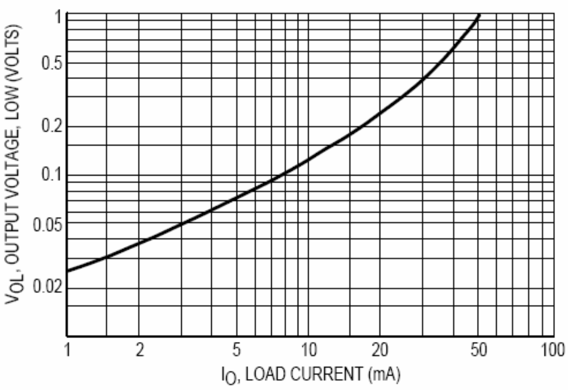


Figure 5. Output Voltage, Low versus Load Current

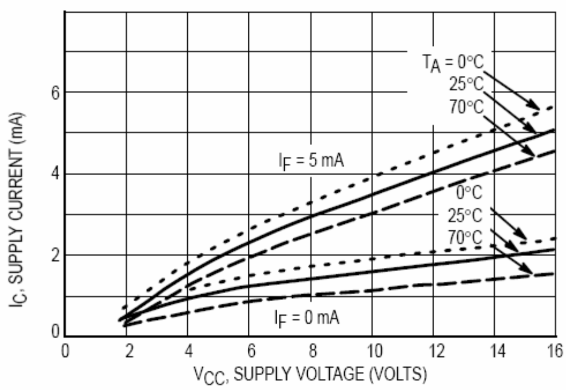
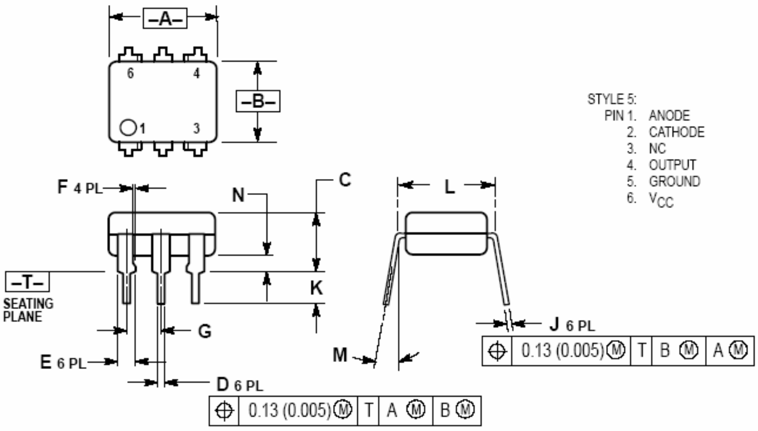


Figure 6. Supply Current versus Supply Voltage

FAIRCHILD SEMICONDUCTOR™

H11L1, H11L2

PACKAGE DIMENSIONS

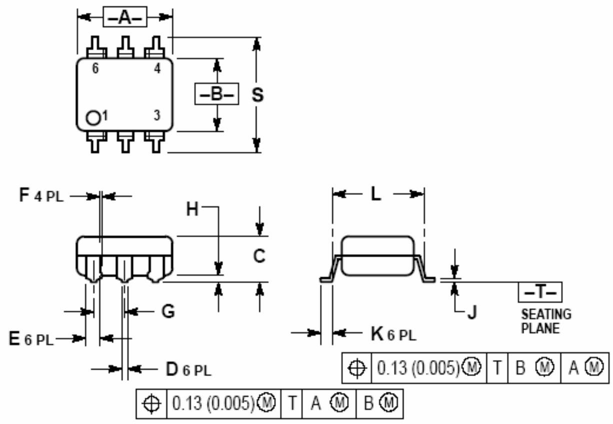


STYLE 5:
PIN 1. ANODE
2. CATHODE
3. NC
4. OUTPUT
5. GROUND
6. V_{CC}

NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION L TO CENTER OF LEAD WHEN FORMED PARALLEL.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.320	0.350	8.13	8.89
B	0.240	0.260	6.10	6.60
C	0.115	0.200	2.93	5.08
D	0.016	0.020	0.41	0.50
E	0.040	0.070	1.02	1.77
F	0.010	0.014	0.25	0.36
G	0.100 BSC		2.54 BSC	
J	0.008	0.012	0.21	0.30
K	0.100	0.150	2.54	3.81
L	0.300 BSC		7.62 BSC	
M	0°	15°	0°	15°
N	0.015	0.100	0.38	2.54

THRU HOLE



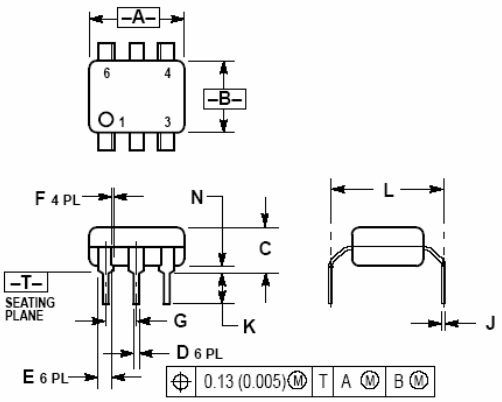
NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.320	0.350	8.13	8.89
B	0.240	0.260	6.10	6.60
C	0.115	0.200	2.93	5.08
D	0.016	0.020	0.41	0.50
E	0.040	0.070	1.02	1.77
F	0.010	0.014	0.25	0.36
G	0.100 BSC		2.54 BSC	
H	0.020	0.025	0.51	0.63
J	0.008	0.012	0.20	0.30
K	0.006	0.035	0.16	0.88
L	0.320 BSC		8.13 BSC	
S	0.332	0.390	8.43	9.90

SURFACE MOUNT

FAIRCHILD SEMICONDUCTOR™

H11L1, H11L2



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION L TO CENTER OF LEAD WHEN FORMED PARALLEL.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.320	0.350	8.13	8.89
B	0.240	0.260	6.10	6.60
C	0.115	0.200	2.93	5.08
D	0.016	0.020	0.41	0.50
E	0.040	0.070	1.02	1.77
F	0.010	0.014	0.25	0.36
G	0.100 BSC		2.54 BSC	
J	0.008	0.012	0.21	0.30
K	0.100	0.150	2.54	3.81
L	0.400	0.425	10.16	10.80
N	0.015	0.040	0.38	1.02

0.4" LEAD SPACING

FAIRCHILD SEMICONDUCTOR™

DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE PRESIDENT OF FAIRCHILD SEMICONDUCTOR CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury of the user.
2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

www.fairchildsemi.com

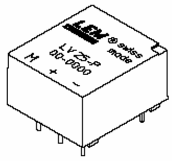
5. LV 25-P.

LEM

Voltage Transducer LV 25-P

For the electronic measurement of voltages : DC, AC, pulsed..., with a galvanic isolation between the primary circuit (high voltage) and the secondary circuit (electronic circuit).

I_{PN} = 10 mA
V_{PN} = 10 .. 500 V



LEM TRANSDUCERS 5 YEARS WARRANTY

CE

Electrical data

I_{PN}	Primary nominal r.m.s. current		10		mA
I_P	Primary current, measuring range		0 .. ± 14		mA
R_M	Measuring resistance		$R_{M\,min}$	$R_{M\,max}$	
	with ± 12 V	@ ± 10 mA $_{max}$	30	190	Ω
		@ ± 14 mA $_{max}$	30	100	Ω
	with ± 15 V	@ ± 10 mA $_{max}$	100	350	Ω
		@ ± 14 mA $_{max}$	100	190	Ω
I_{SN}	Secondary nominal r.m.s. current		25		mA
K_N	Conversion ratio		2500 : 1000		
V_C	Supply voltage (± 5 %)		± 12 .. 15		V
I_C	Current consumption		10 (@±15V)+I_S		mA
V_d	R.m.s. voltage for AC isolation test [1], 50 Hz, 1 mn		2.5		kV

Accuracy - Dynamic performance data

X_G	Overall Accuracy @ I_{PN} , T_A = 25°C	@ ± 12 .. 15 V	± 0.9		%
		@ ± 15 V (± 5 %)	± 0.8		%
ε_L	Linearity		< 0.2		%
			Typ	Max	
I_O	Offset current @ I_P = 0, T_A = 25°C			± 0.15	mA
I_{OT}	Thermal drift of I_O	0°C .. + 25°C	± 0.06	± 0.25	mA
		+ 25°C .. + 70°C	± 0.10	± 0.35	mA
t_r	Response time [2] @ 90 % of $V_{P\,max}$		40		μs

General data

T_A	Ambient operating temperature	0 .. + 70	°C
T_S	Ambient storage temperature	- 25 .. + 85	°C
R_P	Primary coil resistance @ T_A = 70°C	250	Ω
R_S	Secondary coil resistance @ T_A = 70°C	110	Ω
m	Mass	22	g
	Standards [3]	EN 50178	

Features

- Closed loop (compensated) voltage transducer using the Hall effect
- Insulated plastic case recognized according to UL 94-V0.

Principle of use

- For voltage measurements, a current proportional to the measured voltage must be passed through an external resistor R_1 which is selected by the user and installed in series with the primary circuit of the transducer.

Advantages

- Excellent accuracy
- Very good linearity
- Low thermal drift
- Low response time
- High bandwidth
- High immunity to external interference
- Low disturbance in common mode.

Applications

- AC variable speed drives and servo motor drives
- Static converters for DC motor drives
- Battery supplied applications
- Uninterruptible Power Supplies (UPS)
- Power supplies for welding applications.

Notes : [1] Between primary and secondary
[2] R_1 = 25 kΩ (L/R constant, produced by the resistance and inductance of the primary circuit)
[3] A list of corresponding tests is available

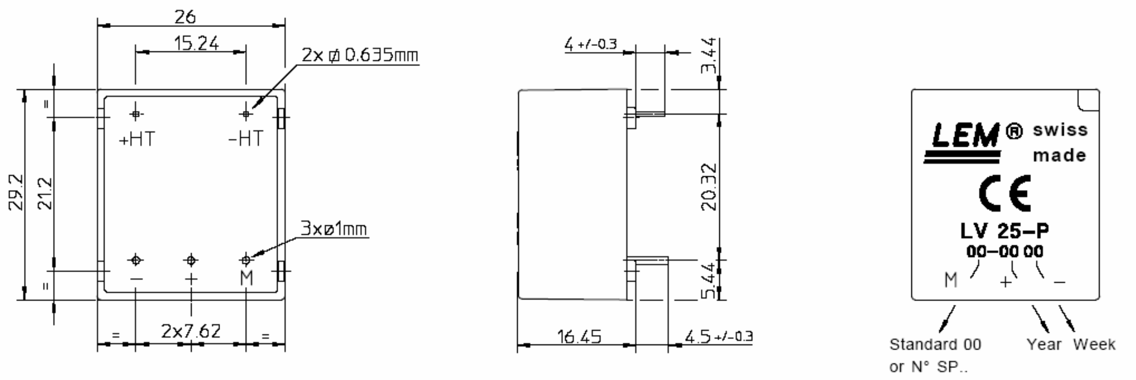
981125/14

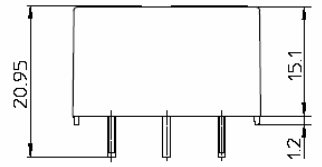
LEM Components www.lem.com
Tope Co., Ltd. Tel: (02) 8228-0658 Fax: (02) 8228-0659 http://www.sensor.com.tw e-mail: tope@ms1.hinet.net

LEM

Dimensions LV 25-P (in mm. 1 mm = 0.0394 inch)

Bottom view **Right view** **Top view**



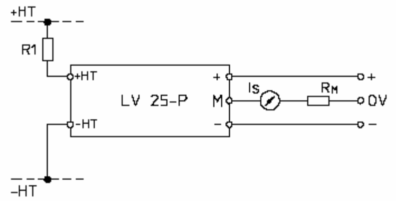


Back view

Secondary terminals

Terminal + : supply voltage + 12 .. 15 V
Terminal M : measure
Terminal - : supply voltage - 12 .. 15 V

Connection



Mechanical characteristics

- General tolerance ± 0.2 mm
- Fastening & connection of primary 2 pins 0.635 x 0.635 mm
- Fastening & connection of secondary 3 pins ∅ 1 mm
- Recommended PCB hole 1.2 mm

Remarks

- I_S is positive when V_P is applied on terminal +HT.
- This is a standard model. For different versions (supply voltages, turns ratios, unidirectional measurements...), please contact us.

Instructions for use of the voltage transducer model LV 25-P

Primary resistor R_1 : the transducer's optimum accuracy is obtained at the nominal primary current. As far as possible, R_1 should be calculated so that the nominal voltage to be measured corresponds to a primary current of 10 mA.

Example: Voltage to be measured V_{PN} = 250 V
a) R_1 = 25 kΩ/2.5 W, I_P = 10 mA Accuracy = ± 0.8 % of V_{PN} (@ T_A = + 25°C)
b) R_1 = 50 kΩ/1.25 W, I_P = 5 mA Accuracy = ± 1.6 % of V_{PN} (@ T_A = + 25°C)

Operating range (recommended) : taking into account the resistance of the primary windings (which must remain low compared to R_1, in order to keep thermal deviation as low as possible) and the isolation, this transducer is suitable for measuring nominal voltages from 10 to 500 V.

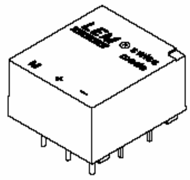
6. LA 25-NP.

Current Transducer LA 25-NP

I_{PN} = 5-6-8-12-25 A

For the electronic measurement of currents : DC, AC, pulsed, mixed, with a galvanic isolation between the primary circuit (high power) and the secondary circuit (electronic circuit).

16080



Electrical data

I_{PN}	Primary nominal r.m.s. current		25				At
I_P	Primary current, measuring range		0 .. ± 36				At
R_M	Measuring resistance @		T_A = 70°C		T_A = 85°C		
			$R_{M\,min}$	$R_{M\,max}$	$R_{M\,min}$	$R_{M\,max}$	
	with ± 15 V	@ ± 25 At $_{max}$	100	320	100	315	Ω
		@ ± 36 At $_{max}$	100	190	100	185	Ω
I_{SN}	Secondary nominal r.m.s. current		25				mA
K_N	Conversion ratio		1-2-3-4-5 : 1000				
V_C	Supply voltage (± 5 %)		± 15				V
I_C	Current consumption		10 + I_S				mA
V_d	R.m.s. voltage for AC isolation test, 50 Hz, 1 mn		2.5				kV
V_b	R.m.s. rated voltage [1], safe separation		600				V
	basic isolation		1700				V

Accuracy - Dynamic performance data

X	Typical accuracy @ I_{PN} , T_A = 25°C		± 0.5		%
ε_L	Linearity error		< 0.2		%
			Typ	Max	
I_O	Offset current [2] @ I_P = 0, T_A = 25°C		± 0.05	± 0.15	mA
I_{OM}	Residual current [3] @ I_P = 0, after an overload of 3 x I_{PN}		± 0.05	± 0.15	mA
I_{OT}	Thermal drift of I_O	0°C .. + 25°C	± 0.06	± 0.25	mA
		+ 25°C .. + 70°C	± 0.10	± 0.35	mA
		- 25°C .. + 85°C		± 0.5	mA
		- 40°C .. + 85°C		± 1.2	mA
t_r	Response time [4] @ 90 % of I_{PN}		< 1		μs
di/dt	di/dt accurately followed		> 50		A/μs
f	Frequency bandwidth (- 1 dB)		DC .. 150		kHz

General data

T_A	Ambient operating temperature		- 40 .. + 85	°C
T_S	Ambient storage temperature		- 45 .. + 90	°C
R_P	Primary resistance per turn	@ T_A = 25°C	< 1.25	mΩ
R_S	Secondary coil resistance	@ T_A = 70°C	110	Ω
		@ T_A = 85°C	115	Ω
R_{IS}	Isolation resistance @ 500 V, T_A = 25°C		> 1500	MΩ
m	Mass		22	g
	Standards		EN 50178 : 1997	

Notes : 1) Pollution class 2
2) Measurement carried out after 15 mn functioning
3) The result of the coercive field of the magnetic circuit
4) With a di/dt of 100 A/μs.

Features

- Closed loop (compensated) multi-range current transducer using the Hall effect
- Insulated plastic case recognized according to UL 94-V0.

Advantages

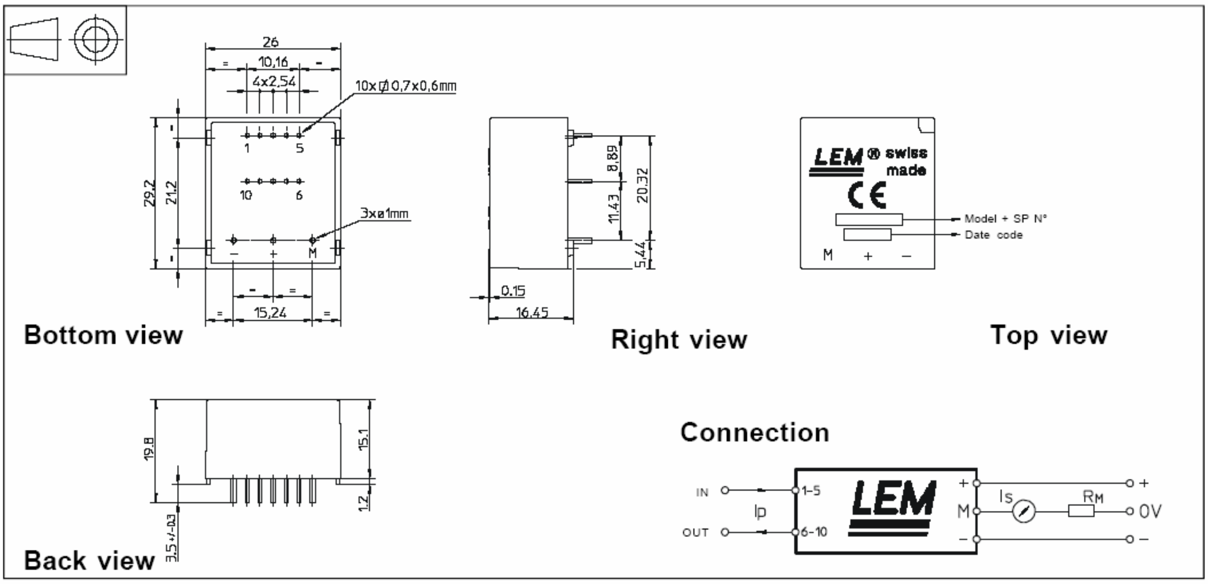
- Excellent accuracy
- Very good linearity
- Low temperature drift
- Optimized response time
- Wide frequency bandwidth
- No insertion losses
- High immunity to external interference
- Current overload capability.

Applications

- AC variable speed drives and servo motor drives
- Static converters for DC motor drives
- Battery supplied applications
- Uninterruptible Power Supplies (UPS)
- Switched Mode Power Supplies (SMPS)
- Power supplies for welding applications.

060327/13

Dimensions LA 25-NP (in mm. 1 mm = 0.0394 inch)



Number of primary turns	Primary current nominal I_{PN} [A]	Primary current maximum I_P [A]	Nominal output current I_{SN} [mA]	Turns ratio K_N	Primary resistance R_P [mΩ]	Primary insertion inductance L_P [µH]	Recommended connections
1	25	36	25	1/1000	0.3	0.023	5 4 3 2 1 IN / OUT 6 7 8 9 10
2	12	18	24	2/1000	1.1	0.09	5 4 3 2 1 IN / OUT 6 7 8 9 10
3	8	12	24	3/1000	2.5	0.21	5 4 3 2 1 IN / OUT 6 7 8 9 10
4	6	9	24	4/1000	4.4	0.37	5 4 3 2 1 IN / OUT 6 7 8 9 10
5	5	7	25	5/1000	6.3	0.58	5 4 3 2 1 IN / OUT 6 7 8 9 10

Mechanical characteristics

- General tolerance ± 0.2 mm
- Fastening & connection of primary 10 pins 0.7 x 0.6 mm
- Fastening & connection of secondary 3 pins ∅ 1 mm
- Recommended PCB hole 1.2 mm

Remarks

- I_S is positive when I_P flows from terminals 1, 2, 3, 4, 5 to terminals 10, 9, 8, 7, 6
- This is a standard model. For different versions (supply voltages, turns ratios, unidirectional measurements...), please contact us.

060327/13
Page 2/2

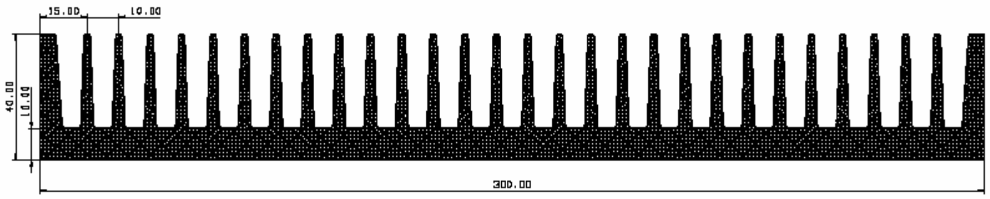
7. RG14092.

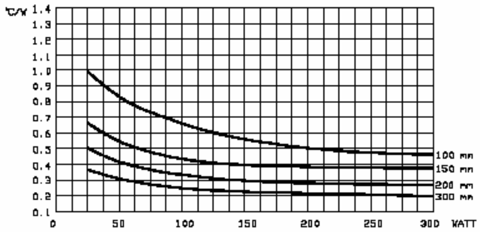
GUASCH COMPONENTES Y ELECTRONICA DE POTENCIA

RG14092

Radiador especialmente diseñado para el montaje de módulos de potencia estándar y componentes diversos.

Peso: 15.73 Kgrs./metro.
Perímetro: 2310 mm.
Sección: 5823 mm².





ANOTACIONES DE USUARIO, EQUIVALENCIAS.			
FABRICANTE	REFERENCIA	FABRICANTE	REFERENCIA

RG14092

DISIPADORES/03/01

121

GUASCH COMPONENTES Y ELECTRONICA DE POTENCIA

RG14092/ST

Radiador RG14092 con mecanizados y acabados estándar para su aplicación directa. Las dimensiones (longitud L) normalizadas son de 100, 150, 200 y 300 mm.

Las opciones de suministro son: N (anodizado negro), R (superficie fresada).

Resistencia térmica (valores prácticos)

RG14092/100N : 0.50 ºC/W.	RG14092/100 : 0.165 ºC/W.	(Ventilación forzada con una velocidad de 6 m/s.)
RG14092/150N : 0.38 ºC/W.	RG14092/150 : 0.126 ºC/W.	
RG14092/200N : 0.27 ºC/W.	RG14092/200 : 0.09 ºC/W.	
RG14092/300N : 0.21 ºC/W.	RG14092/300 : 0.07 ºC/W.	

Relación de referencias estándar:

RG14092/100, RG14092/100R, RG14092/100N, RG14092/100NR.
RG14092/150, RG14092/150R, RG14092/150N, RG14092/150NR.
RG14092/200, RG14092/200R, RG14092/200N, RG14092/200NR.
RG14092/300, RG14092/300R, RG14092/300N, RG14092/300NR.