Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

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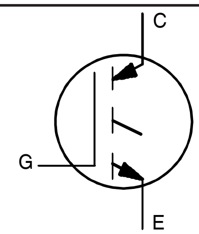
International
IOR Rectifier

PD - 91683B

IRG4PSC71K

INSULATED GATE BIPOLAR TRANSISTOR

Short Circuit Rated
UltraFast IGBT



n-channel

V_{CES} = 600V

$V_{CE(on)}$ typ. = 1.83V

@V_{GE} = 15V, I_C = 60A

Features

- Hole-less clip/pressure mount package compatible with TO-247 and TO-264, with reinforced pins
- High abort circuit rating IGBTs, optimized for motorcontrol
- Minimum switching losses combined with low conduction losses
- Tightest parameter distribution
- Creepage distance increased to 5.35mm

Benefits

- Highest current rating IGBT
- Maximum power density, twice the power handling of the TO-247, less space than TO-264


Super-247™

Absolute Maximum Ratings

	Parameter	Max.	Units
V_{CES}	Collector-to-Emitter Breakdown Voltage	600	V
I_C @ T_C = 25°C	Continuous Collector Current	85⑥	A
I_C @ T_C = 100°C	Continuous Collector Current	60	
I_{CM}	Pulsed Collector Current ①	200	
I_{LM}	Clamped Inductive Load Current ①	200	
t_{SC}	Short Circuit Withstand Time	10	µs
V_{GE}	Gate-to-Emitter Voltage	± 20	V
E_{ARV}	Reverse Voltage Avalanche Energy ①	180	mJ
P_D @ T_C = 25°C	Maximum Power Dissipation	350	W
P_D @ T_C = 100°C	Maximum Power Dissipation	140	
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 150	°C
	Soldering Temperature, for 10 seconds	300 (0.063 in. (1.6mm from case)	

Thermal Resistance\ Mechanical

	Parameter	Min.	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	–––	–––	0.36	°C/W
$R_{\theta CS}$	Case-to-Sink, flat, greased surface	–––	0.24	–––	
$R_{\theta JA}$	Junction-to-Ambient, typical socket mount	–––	–––	38	
	Recommended Clip Force	20.0(2.0)	–––	–––	N (kgf)
	Weight	–––	6 (0.21)	–––	g (oz)

3/18/05

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

	Parameter	Min.	Typ.	Max.	Units	Conditions	
$V_{(BR)CES}$	Collector-to-Emitter Breakdown Voltage	600	—	—	V	V_{GE} = 0V, I_C = 250µA	
$V_{(BR)ECS}$	Emitter-to-Collector Breakdown Voltage ④	18	—	—	V	V_{GE} = 0V, I_C = 1.0A	
$\Delta V_{(BR)CES}/\Delta T_J$	Temperature Coeff. of Breakdown Voltage	—	0.5	—	V/°C	V_{GE} = 0V, I_C = 10mA	
$V_{CE(ON)}$	Collector-to-Emitter Saturation Voltage	—	1.83	2.3	V	I_C = 60A	V_{GE} = 15V
		—	2.20	—		I_C = 100A	See Fig.2, 5
		—	1.81	—		I_C = 60A , 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	—	-8.0	—	mV/°C	$V_{CE} = V_{GE}$, I_C = 1.5mA	
g_{fe}	Forward Transconductance ⑤	31	46	—	S	V_{CE} = 50V, I_C = 60A	
I_{CES}	Zero Gate Voltage Collector Current	—	—	500	µA	V_{GE} = 0V, V_{CE} = 600V	
		—	—	2.0		V_{GE} = 0V, V_{CE} = 10V, T_J = 25°C	
		—	—	5.0	mA	V_{GE} = 0V, V_{CE} = 600V, T_J = 150°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)	—	340	510	nC	I_C = 60A
Q_{ge}	Gate - Emitter Charge (turn-on)	—	44	66		V_{CC} = 400V See Fig.8
Q_{gc}	Gate - Collector Charge (turn-on)	—	160	240		V_{GE} = 15V
$t_{d(on)}$	Turn-On Delay Time	—	34	—	ns	
t_r	Rise Time	—	54	—		T_J = 25°C
$t_{d(off)}$	Turn-Off Delay Time	—	251	377		I_C = 60A, V_{CC} = 480V
t_f	Fall Time	—	89	133		V_{GE} = 15V, R_G = 5.0Ω
E_{on}	Turn-On Switching Loss	—	0.79	—	mJ	Energy losses include "tail"
E_{off}	Turn-Off Switching Loss	—	1.98	—		and diode reverse recovery
E_{ts}	Total Switching Loss	—	2.77	3.1		See Fig. 9,10,18
t_{sc}	Short Circuit Withstand Time	10	—	—	µs	V_{CC} = 360V, T_J = 125°C V_{GE} = 15V, R_G = 5.0Ω
$t_{d(on)}$	Turn-On Delay Time	—	37	—	ns	T_J = 150°C, See Fig. 10,11,18
t_r	Rise Time	—	56	—		I_C = 60A, V_{CC} = 480V
$t_{d(off)}$	Turn-Off Delay Time	—	356	—		V_{GE} = 15V, R_G = 5.0Ω,
t_f	Fall Time	—	177	—		Energy losses include "tail"
E_{ts}	Total Switching Loss	—	5.5	—	mJ	and diode reverse recovery
L_E	Internal Emitter Inductance	—	13	—	nH	Measured 5mm from package
C_{ies}	Input Capacitance	—	6900	—	pF	V_{GE} = 0V
C_{oes}	Output Capacitance	—	730	—		V_{CC} = 30V See Fig. 7
C_{res}	Reverse Transfer Capacitance	—	190	—		ƒ = 1.0MHz

Notes:

① Repetitive rating; V_{GE} = 20V, pulse width limited by max. junction temperature. (See fig. 13b)

② V_{CC} = 80%(V_{CES}), V_{GE} = 20V, L = 10µH, R_G = 5.0Ω, (See fig. 13a)

③ Repetitive rating; pulse width limited by maximum junction temperature.

④ Pulse width ≤ 80µs; duty factor ≤ 0.1%.

⑤ Pulse width 5.0µs, single shot.

⑥ Current limited by the package, (Die current = 100A)

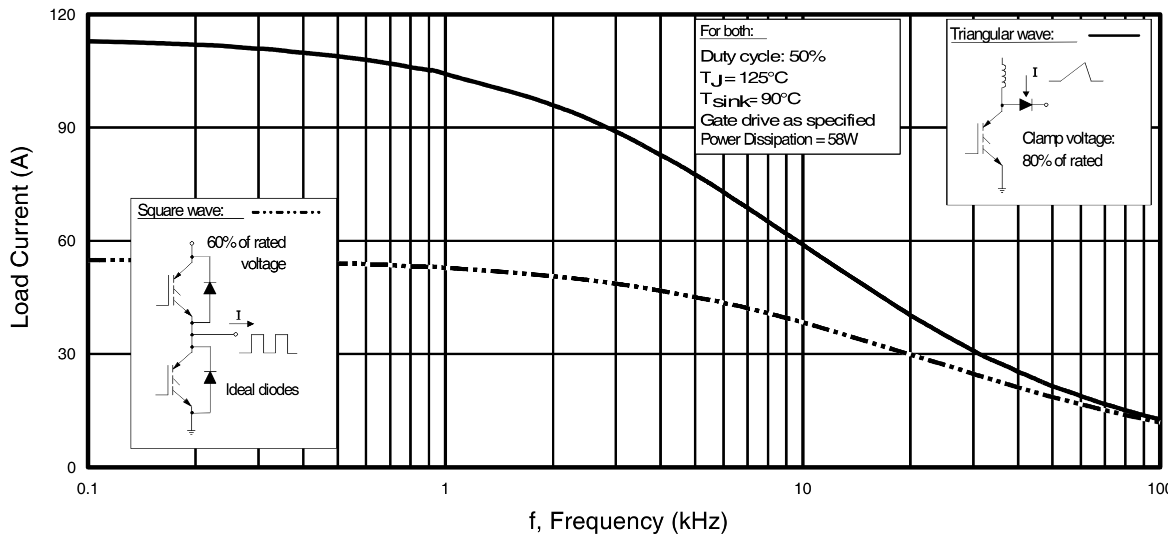


Fig. 1 - Typical Load Current vs. Frequency
(For square wave, $I=I_{RMS}$ of fundamental; for triangular wave, $I=I_{PK}$)

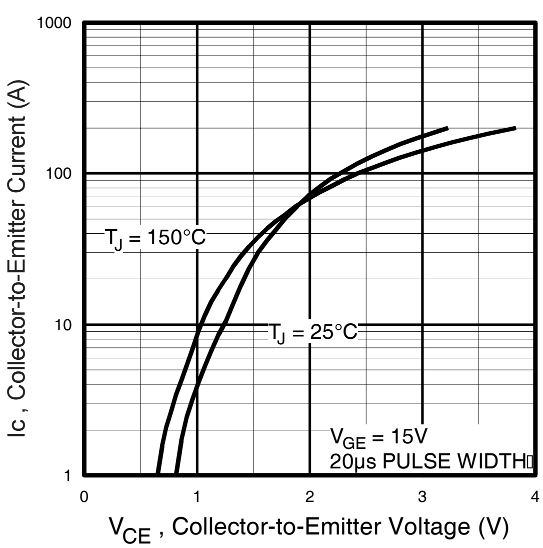


Fig. 2 - Typical Output Characteristics

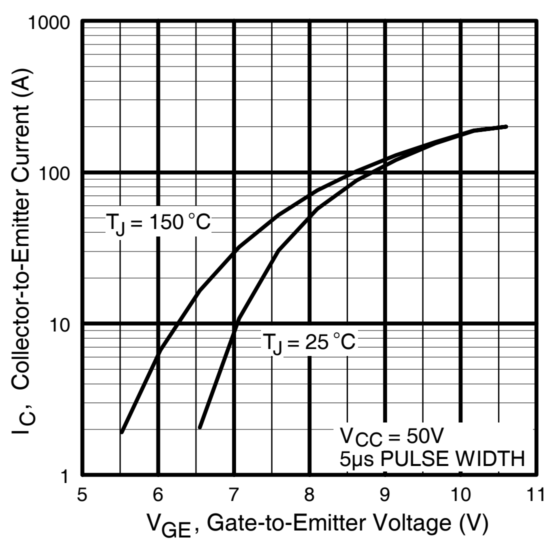


Fig. 3 - Typical Transfer Characteristics

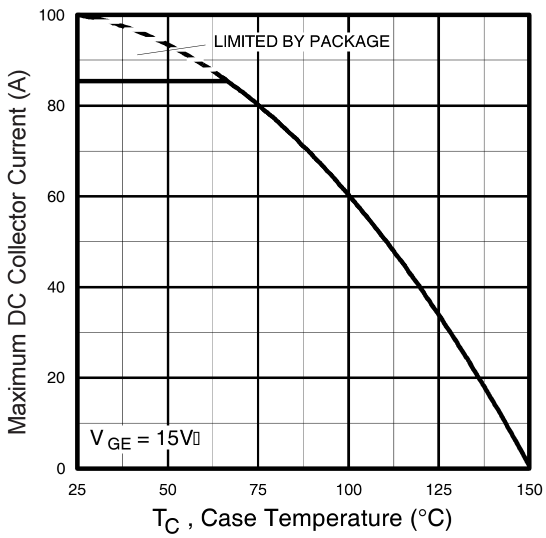


Fig. 4 - Maximum Collector Current vs. Case Temperature

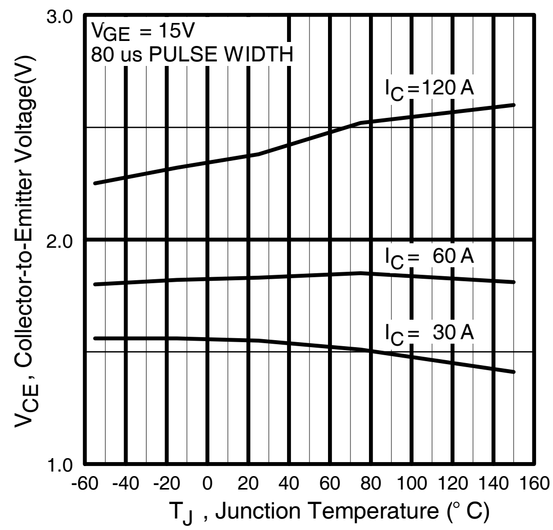


Fig. 5 - Collector-to-Emitter Voltage vs. Junction Temperature

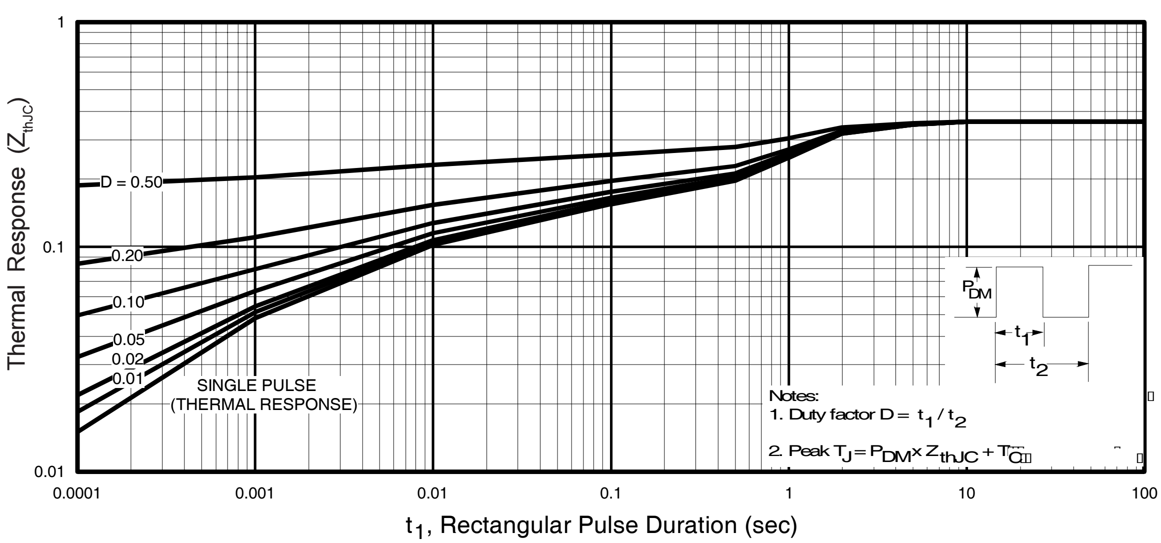


Fig. 6 - Maximum Effective Transient Thermal Impedance, Junction-to-Case

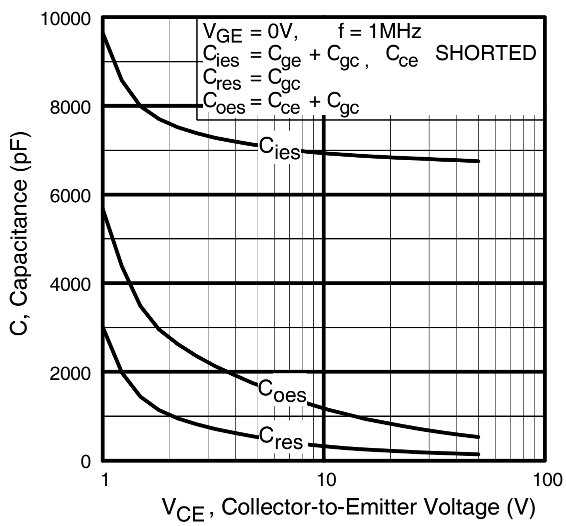


Fig. 7 - Typical Capacitance vs. Collector-to-Emitter Voltage

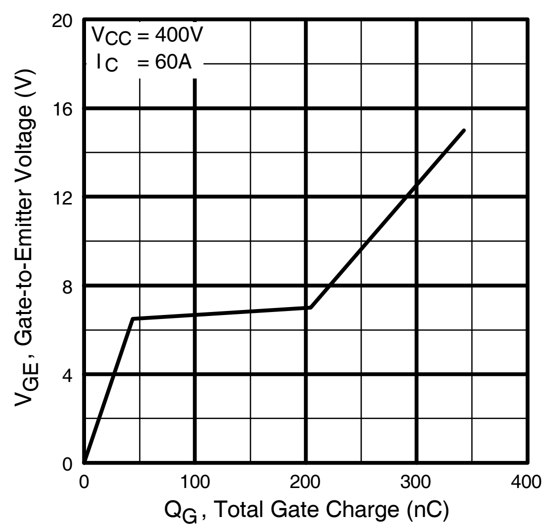


Fig. 8 - Typical Gate Charge vs. Gate-to-Emitter Voltage

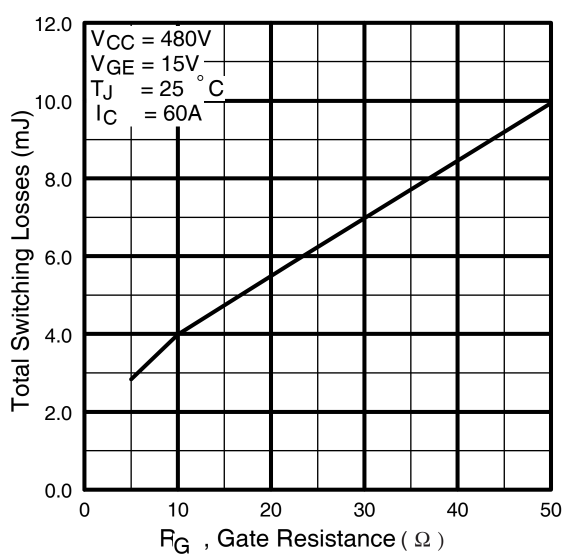


Fig. 9 - Typical Switching Losses vs. Gate Resistance

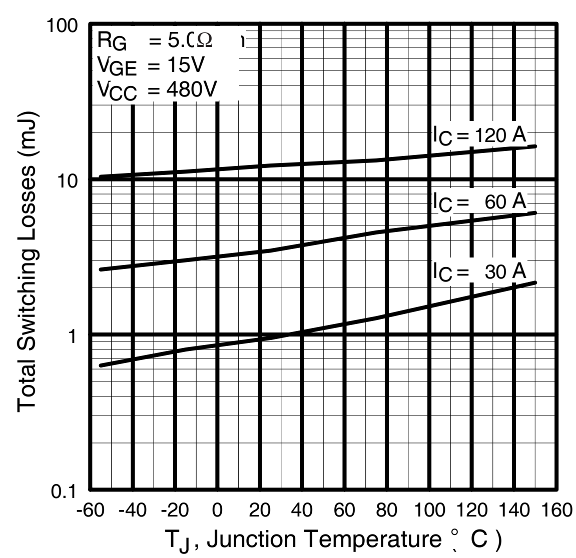


Fig. 10 - Typical Switching Losses vs. Junction Temperature

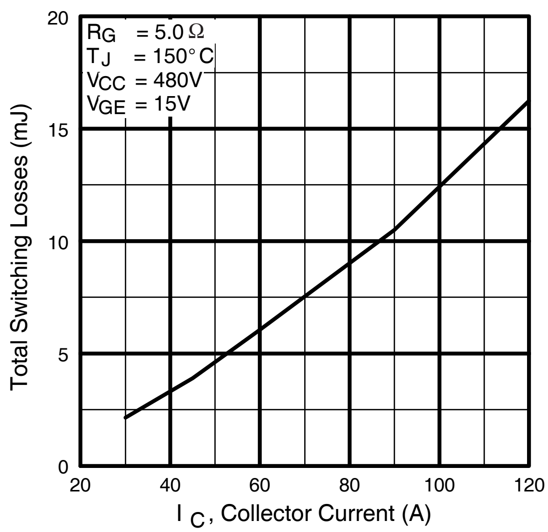


Fig. 11 - Typical Switching Losses vs. Collector-to-Emitter Current

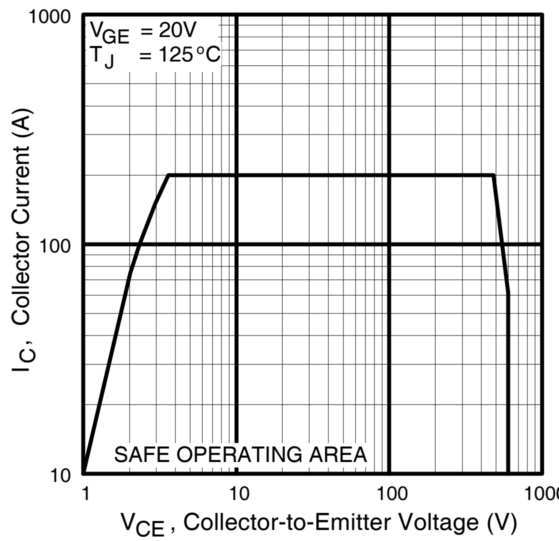
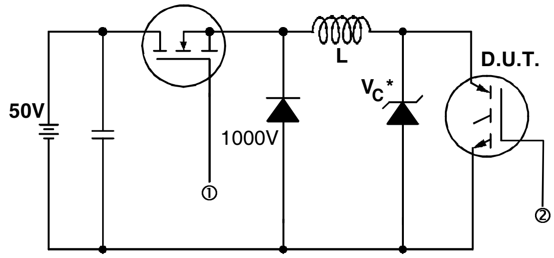


Fig. 12 - Turn-Off SOA



* Driver same type as D.U.T.; Vc = 80% of Vce(max)
* Note: Due to the 50V power supply, pulse width and inductor will increase to obtain rated Id.

Fig. 13a - Clamped Inductive Load Test Circuit

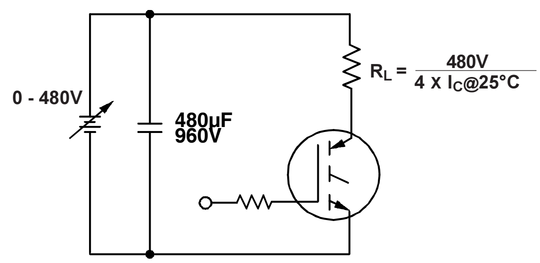


Fig. 13b - Pulsed Collector Current Test Circuit

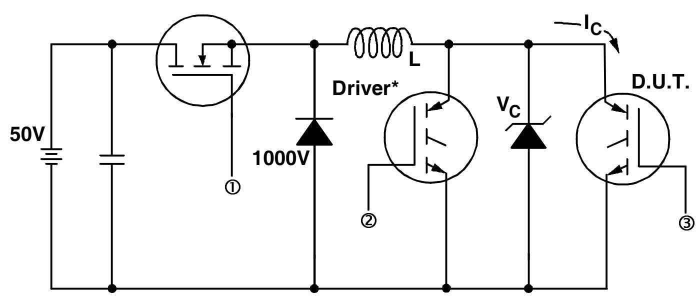


Fig. 14a - Switching Loss Test Circuit

* Driver same type as D.U.T., VC = 480V

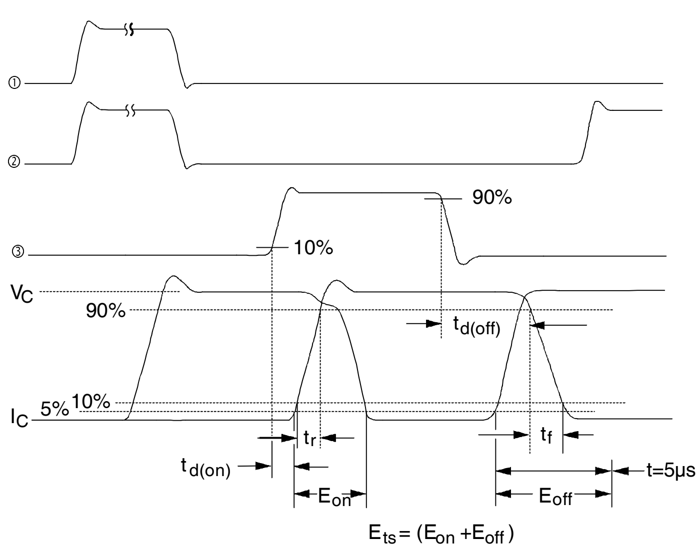
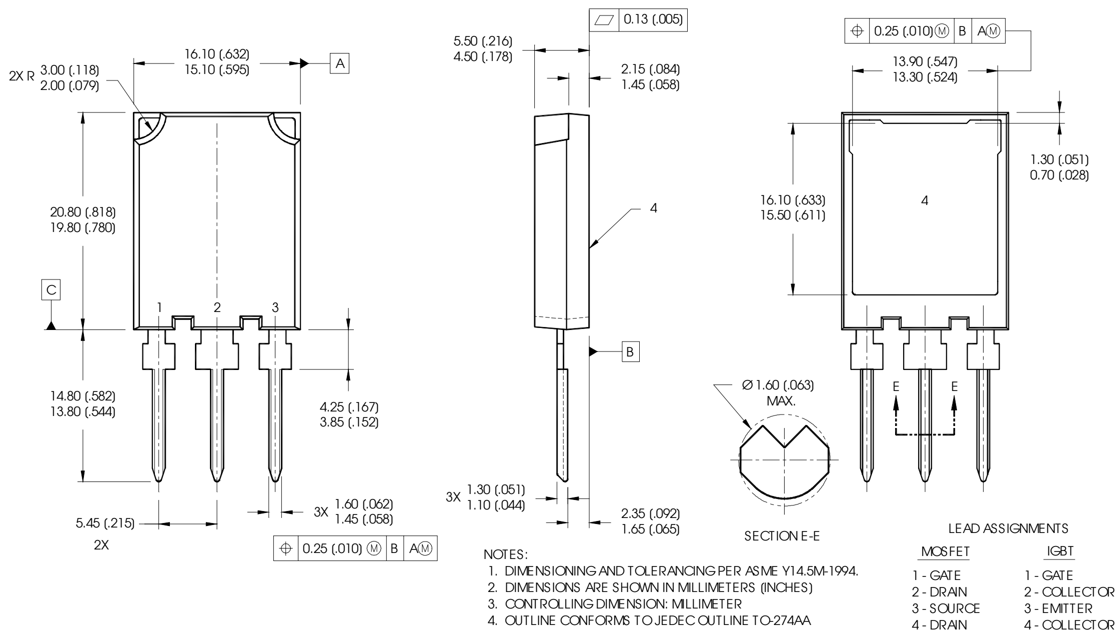


Fig. 14b - Switching Loss Waveforms

Super-247™ (TO-274AA) Package Outline

Dimensions are shown in millimeters

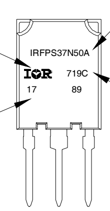


Super-247™ (TO-274AA) Part Marking Information

EXAMPLE: THIS IS AN IRFPS37N50A WITH
ASSEMBLY LOT CODE 1789
ASSEMBLED ON WW 19, 1997
IN THE ASSEMBLY LINE "C"

PART NUMBER

INTERNATIONAL RECTIFIER
LOGO



DATE CODE
YEAR 7 = 1997
WEEK 19
LINE C

ASSEMBLY LOT CODE

Note: "P" in assembly line position
indicates "Lead-Free"

TOP

International
IOR Rectifier

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