

INSULATED GATE BIPOLAR TRANSISTOR

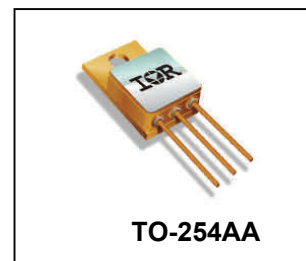
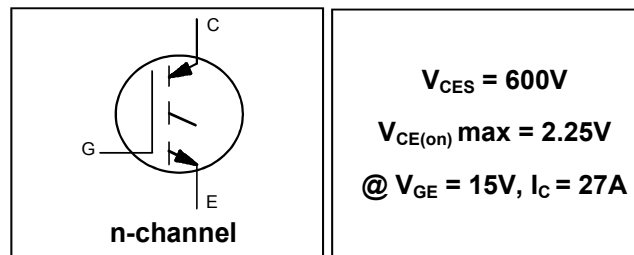
UltraFast Speed IGBT

Features

- Electrically Isolated and Hermetically Sealed
- Simple Drive Requirements
- Latch-proof
- Fast Speed Operation 3 kHz - 8 kHz
- High Operating Frequency
- Switching-loss Rating includes all "tail" Losses
- Ceramic Eyelets

Benefits

- Generation 4 IGBT's offer highest efficiency available
- IGBT's optimized for specified application conditions
- Designed to be a "drop-in" replacement for equivalent IR HiRel Generation 3 IGBT's



Insulated Gate Bipolar Transistors (IGBTs) from IR HiRel have higher usable current densities than comparable polar transistors, while at the same time having simpler gate-drive requirements of the familiar power MOSFET. They provide substantial benefits to a host of high-voltage, high-current applications.

Absolute Maximum Ratings

	Parameter		Units
V_{CES}	Collector-to-Emitter Breakdown Voltage	600	V
$I_C @ T_C = 25^\circ C$	Continuous Collector Current	35*	A
$I_C @ T_C = 100^\circ C$	Continuous Collector Current	27	
I_{CM}	Pulsed Collector Current ①	140	
I_{LM}	Clamped Inductive Load Current ②	140	
V_{GE}	Gate-to-Emitter Voltage	± 20	V
$P_D @ T_C = 25^\circ C$	Maximum Power Dissipation	150	W
$P_D @ T_C = 100^\circ C$	Maximum Power Dissipation	60	
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 150	°C
	Lead Temperature	300 (0.063 in. /1.6 mm from case for 10s)	
	Weight	9.3 (Typical)	

Thermal Resistance

	Parameter	Min.	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	—	—	0.83	°C/W

* Current is limited by package.

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 = 1.0mA
V _{(BR)ECS}	Emitter-to-Collector Breakdown Voltage ③	17	—	—	V	V _{GE} = 0V, I _C = 1.0A
ΔV _{(BR)CES} /ΔT _J	Temperature Coeff. of Breakdown Voltage	—	0.56	—	V/°C	V _{GE} = 0V, I _C = 1.0mA
V _{CE(on)}	Collector-to-Emitter Saturation Voltage	—	—	2.25	V	I _C = 27A, V _{GE} = 15V, See Fig. 2,5
		—	—	2.75		I _C = 35A, V _{GE} = 15V, See Fig. 2,5
		—	—	2.0		I _C = 27A, V _{GE} = 15V, T _J = 125°C
V _{GE(th)}	Gate Threshold Voltage	3.0	—	6.0	V	V _{CE} = V _{GE} , I _C = 1.0mA
ΔV _{GE(th)} /ΔT _J	Temperature Coeff. of Threshold Voltage	—	-14	—	mV/°C	V _{CE} = V _{GE} , I _C = 250μA
g _{fe}	Forward Transconductance ④	16	—	—	S	V _{CE} = 15V, I _C = 27A
I _{CES}	Collector-to-Emitter Leakage Current	—	—	50	μA	V _{GE} = 0V, V _{CE} = 480V
		—	—	2000		V _{GE} = 0V, V _{CE} = 480V, 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)	—	—	270	nC	I _C = 27A
Q _{ge}	Gate-to-Emitter Charge (turn-on)	—	—	38		V _{GE} = 15V See Fig. 8
Q _{gc}	Gate-to-Collector Charge (turn-on)	—	—	90		V _{CC} = 480V
t _{d(on)}	Turn-On delay time	—	—	75	ns	T _J = 25°C
t _r	Rise time	—	—	75		I _C = 27A, V _{CC} = 480V
t _{d(off)}	Turn-Off delay time	—	—	150		V _{GE} = 15V, R _G = 2.35Ω,
t _f	Fall time	—	—	100		Energy losses include tail
E _{total}	Total Switching Loss	—	—	0.9	mJ	See Fig. 10, 11, 13, 14
t _{d(on)}	Turn-On delay time	—	—	75	ns	T _J = 125°C
t _r	Rise time	—	—	75		I _C = 27A, V _{CC} = 480V
t _{d(off)}	Turn-Off delay time	—	—	200		V _{GE} = 15V, R _G = 2.35Ω
t _f	Fall time	—	—	150		Energy losses include tail
E _{total}	Total Switching Loss	—	—	2.0	mJ	See Fig. 10, 11, 13, 14
L _C +L _E	Total Inductance	—	6.8	—	nH	Measured from Collector lead (6mm / 0.25in. from package) to Emitter lead (6mm / 0.25in. from package)
C _{ies}	Input Capacitance	—	4150	—	pF	V _{GE} = 0V
C _{oes}	Output Capacitance	—	250	—		V _{CC} = 30V See Fig. 7
C _{res}	Reverse Transfer Capacitance	—	45	—		f = 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 = 100μH, R_G = 2.35Ω, (See Fig. 13a).
- ③ Pulse width ≤ 80μs; duty factor ≤ 0.1%.
- ④ Pulse width 5.0μs, single shot.

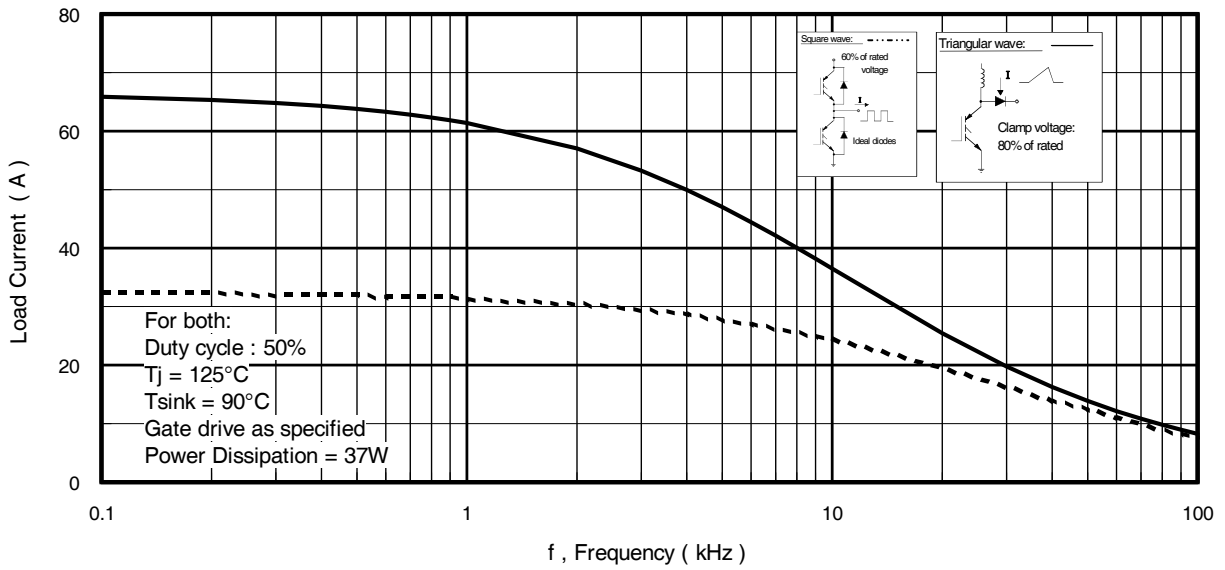


Fig. 1 - Typical Load Current vs. Frequency

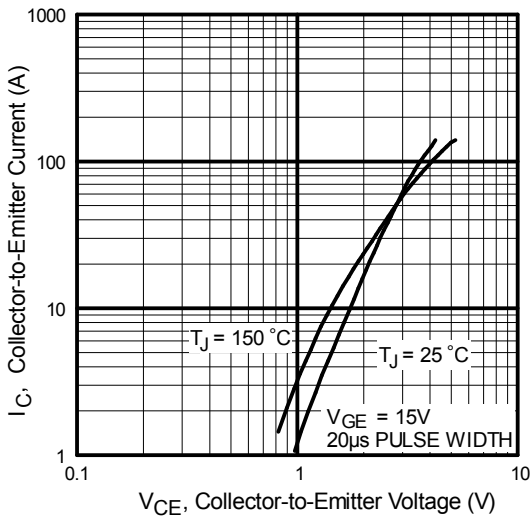


Fig 2. Typical Output Characteristics

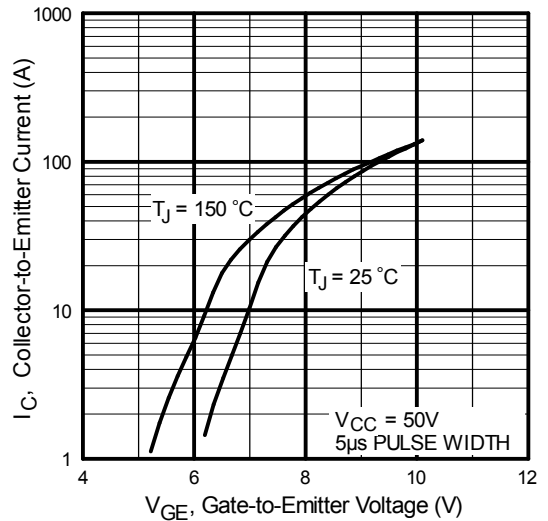


Fig 3. Typical Transfer Characteristics

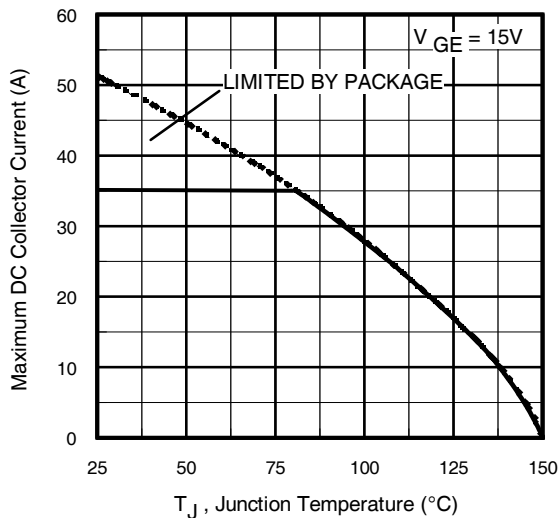


Fig 4. Maximum Collector Current Vs. Case Temperature

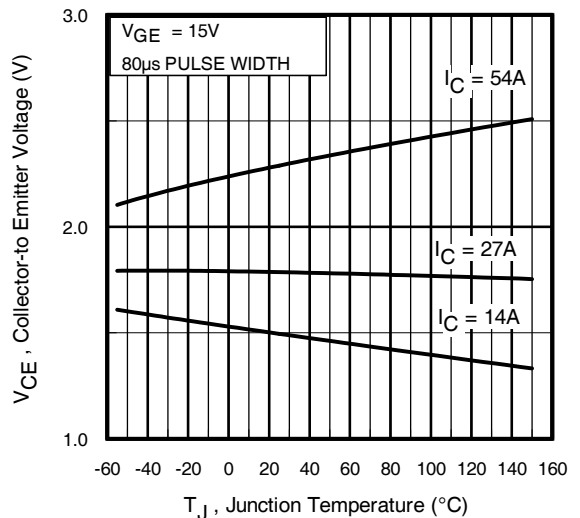


Fig 5. Collector-to-Emitter Voltage Vs. Junction Temperature

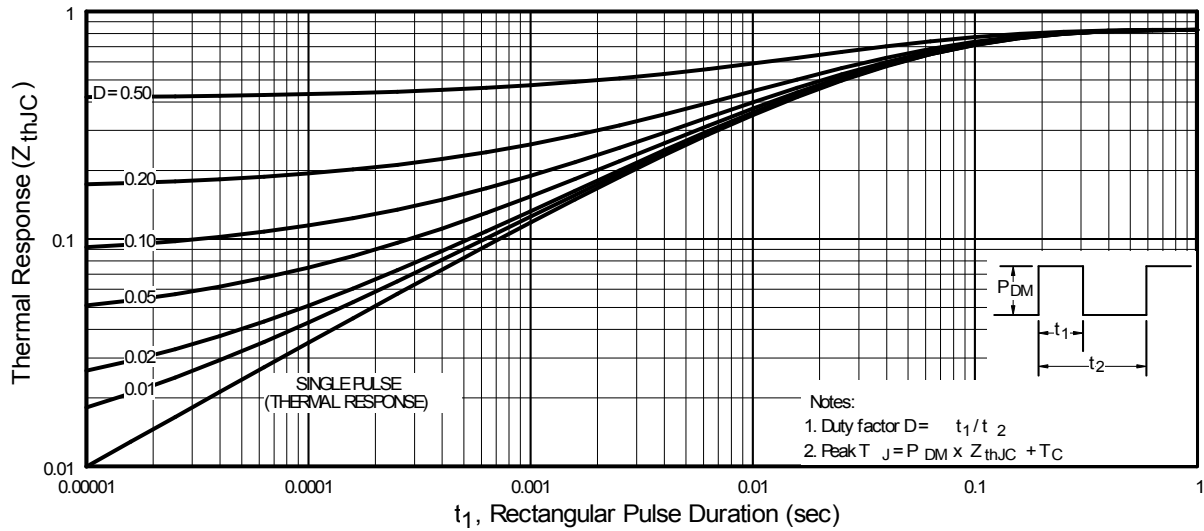


Fig 6. Maximum Effective Transient Thermal Impedance, Junction-to-Case

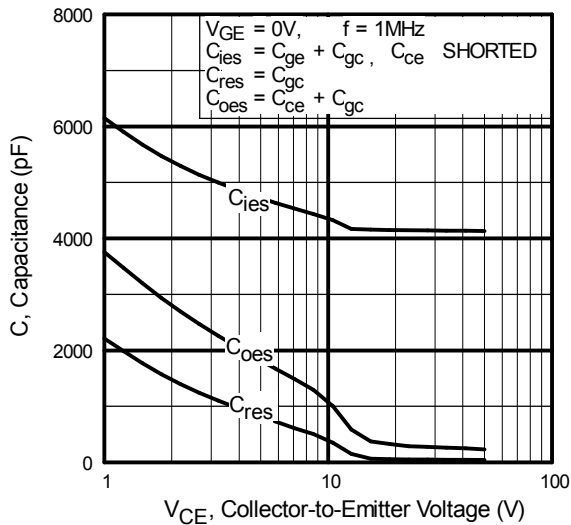


Fig 7. Typical Capacitance Vs. Collector-to-Emitter Voltage

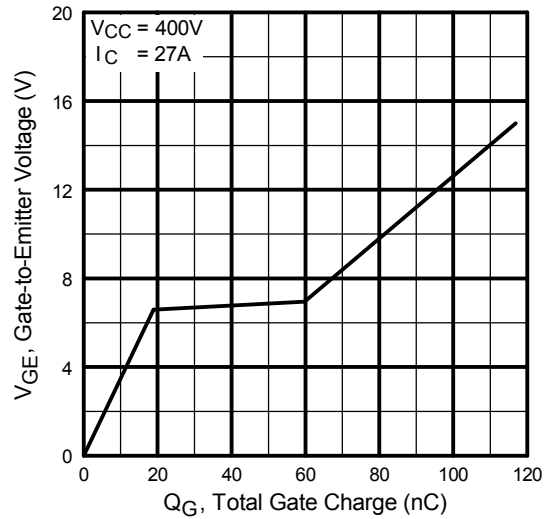


Fig 8. Typical Gate Charge Vs. Gate-to-Emitter Voltage

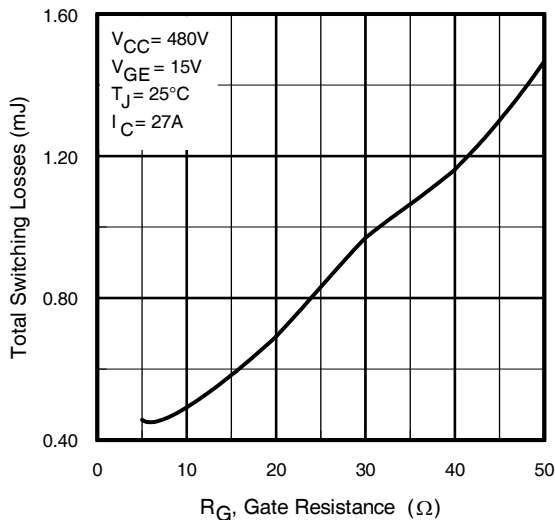


Fig 9. Typical Switching Losses Vs. Gate Resistance

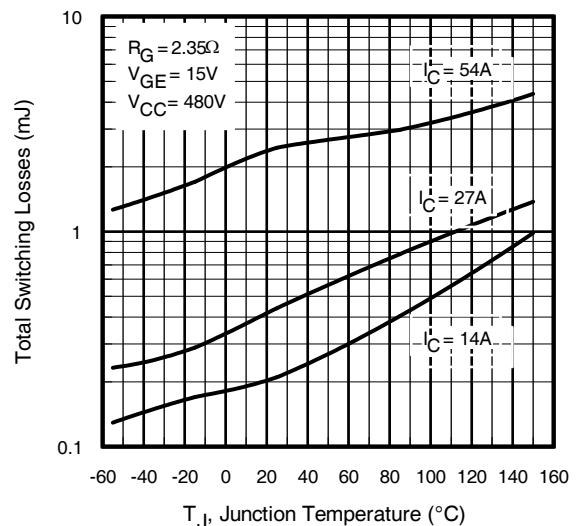


Fig 10. Typical Switching Losses Vs. Junction Temperature

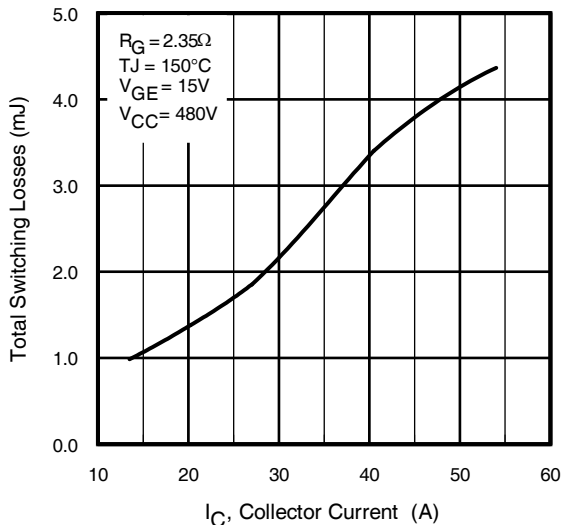


Fig 11. Typical Switching Losses Vs. Collector-to-Emitter Current

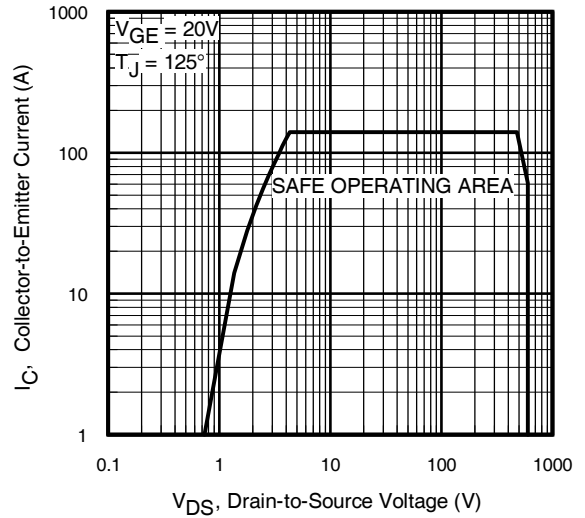


Fig 12. Turn-Off SOA

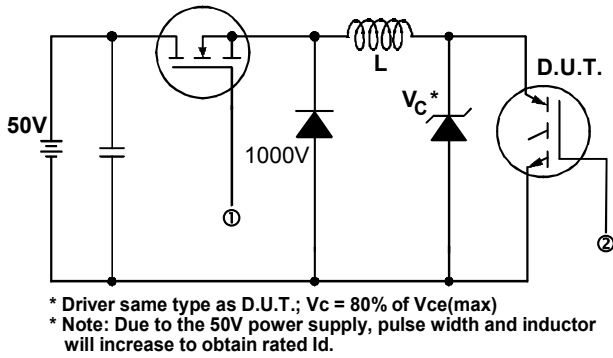


Fig 13a. Clamped Inductive Load Test Circuit

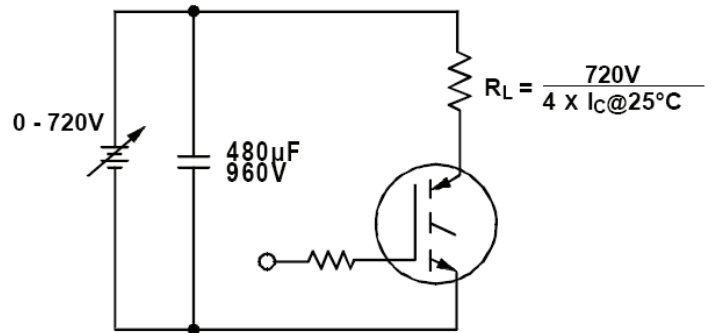


Fig 13b. Pulsed Collector Current Test Circuit

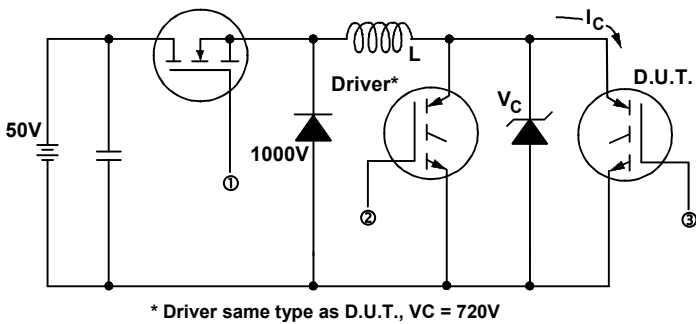


Fig 14a. Switching Loss Test Circuit

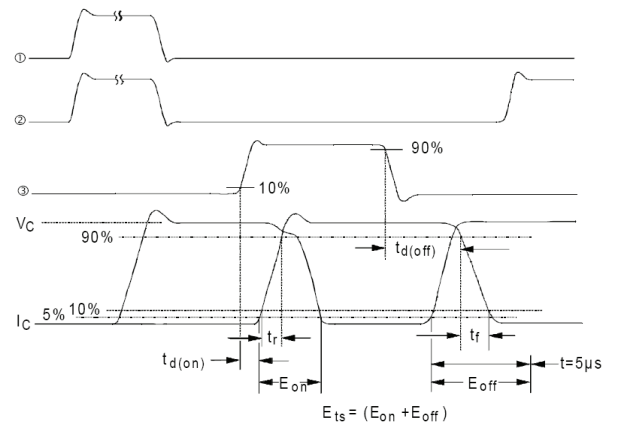
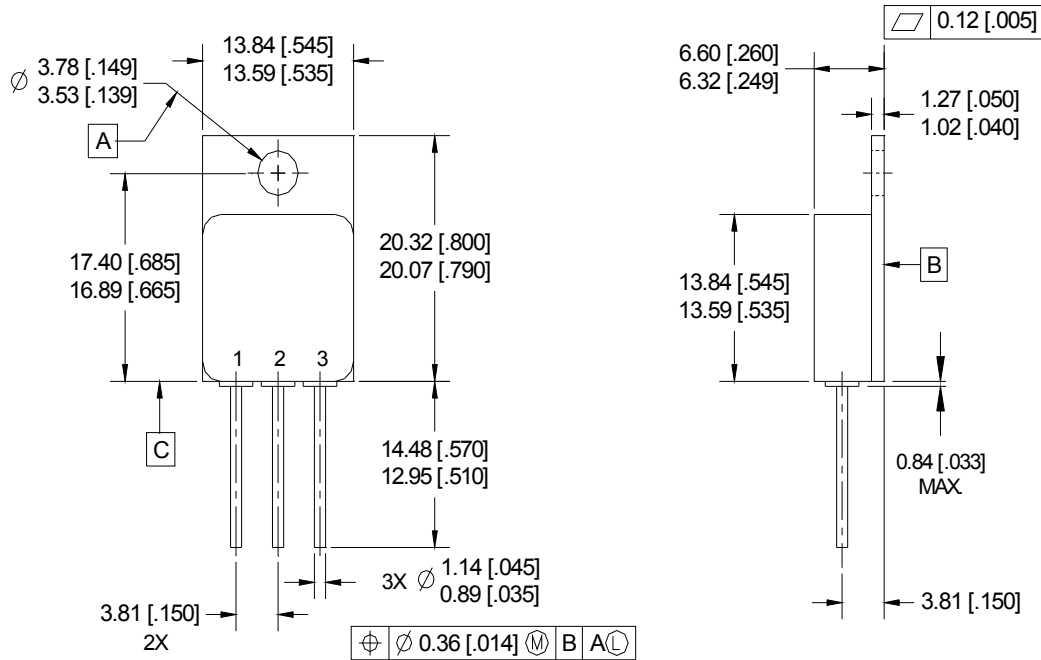


Fig 14b. Switching Loss Waveforms

Case Outline and Dimensions — TO-254AA



NOTES:

1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. ALL DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
3. CONTROLLING DIMENSION: INCH.
4. CONFORMS TO JEDEC OUTLINE TO-254AA.

PIN ASSIGNMENTS

- 1 = COLLECTOR
- 2 = EMITTER
- 3 = GATE

BERYLLIA WARNING PER MIL-PRF-19500

Package containing beryllia shall not be ground, sandblasted, machined, or have other operations performed on them which will produce beryllia or beryllium dust. Furthermore, beryllium oxide packages shall not be placed in acids that will produce fumes containing beryllium.

IMPORTANT NOTICE

The information given in this document shall be in no event regarded as guarantee of conditions or characteristic. The data contained herein is a characterization of the component based on internal standards and is intended to demonstrate and provide guidance for typical part performance. It will require further evaluation, qualification and analysis to determine suitability in the application environment to confirm compliance to your system requirements.

With respect to any example hints or any typical values stated herein and/or any information regarding the application of the product, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind including without limitation warranties on non- infringement of intellectual property rights and any third party.

In addition, any information given in this document is subject to customer's compliance with its obligations stated in this document and any applicable legal requirements, norms and standards concerning customer's product and any use of the product of Infineon Technologies in customer's applications.

The data contained in this document is exclusively intended for technically trained staff. It is the responsibility of any customer's technical departments to evaluate the suitability of the product for the intended applications and the completeness of the product information given in this document with respect to applications.

For further information on the product, technology, delivery terms and conditions and prices, please contact your local sales representative or go to (www.infineon.com/hirel).

WARNING

Due to technical requirements products may contain dangerous substances. For information on the types in question, please contact your nearest Infineon Technologies office.

单击下面可查看定价，库存，交付和生命周期等信息

[>>Infineon Technologies\(英飞凌\)](#)