FGD3245G2-F085C

EcoSPARK® 2 Ignition IGBT

320 mJ, 450 V, N−Channel Ignition IGBT

Features

- SCIS Energy = 320 mJ at T_J = 25°C
- Logic Level Gate Drive
- Low Saturation Voltage
- AEC−Q101 Qualified and PPAP Capable
- These Devices are Pb−Free and are RoHS Compliant

Applications

- Automotive Ignition Coil Driver Circuits
- High Current Ignition System
- Coil on Plug Application

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

Symbol	Parameter	Value	Unit
BV_{CER}	Collector to Emitter Breakdown Voltage (IC = 1 mA)	450	V
BV_{ECS}	Emitter to Collector Voltage − Reverse Battery Condition (IC = 10 mA)	28	V
E_{SCIS25}	ISCIS = 14.6 A, L = 3.0 mHy, RGE = 1 KΩ, T_C = 25°C (Note 1)	320	mJ
$E_{SCIS150}$	ISCIS = 10.9 A, L = 3.0 mHy, RGE = 1 KΩ, T_C = 150°C (Note 2)	180	mJ
IC25	Collector Current Continuous at VGE = 4.0 V, T_C = 25°C	23	A
IC110	Collector Current Continuous at VGE = 4.0 V, T_C = 110°C	23	A
V_{GEM}	Gate to Emitter Voltage Continuous	±10	V
PD	Power Dissipation Total, T_C = 25°C	150	W
	Power Dissipation Derating, T_C > 25°C	1.1	W/°C
T_J, T_{STG}	Operating Junction and Storage Temperature	−55 to +175	°C
T_L	Lead Temperature for Soldering Purposes (1/8" from case for 10 s)	300	°C
T_{PKG}	Reflow Soldering according to JESD020C	260	°C
ESD	HBM−Electrostatic Discharge Voltage at 100 pF, 1500 Ω	4	kV
	CDM−Electrostatic Discharge Voltage at 1 Ω	2	kV

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Self clamped inductive Switching Energy (ESCIS25) of 320 mJ is based on the test conditions that is starting T_J = 25°C, L = 3 mHy, ISCIS = 14.6 A, VCC = 100 V during inductor charging and VCC = 0 V during time in clamp.
2. Self Clamped inductive Switching Energy (ESCIS150) of 180 mJ is based on the test conditions that is starting T_J = 150°C, L = 3mHy, ISCIS = 10.9 A, VCC = 100 V during inductor charging and VCC = 0 V during time in clamp.

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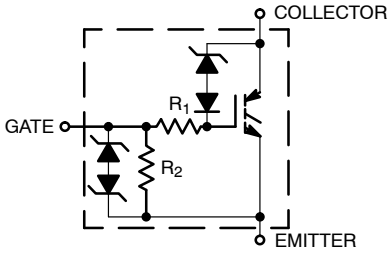

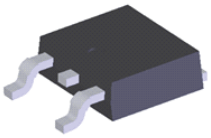

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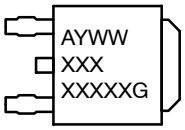
CASE 369AS

MARKING DIAGRAM



A	= Assembly Location
Y	= Year
WW	= Work Week
XXXX	= Device Code
G	= Pb−Free Package

ORDERING INFORMATION

See detailed ordering and shipping information on page 2 of this data sheet.

THERMAL RESISTANCE RATINGS

Characteristic	Symbol	Max	Units
Junction−to−Case − Steady State (Drain)	$R_{\theta JC}$	0.9	°C/W

ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise specified)

Symbol	Parameter	Test Conditions		Min	Typ.	Max.	Units
OFF CHARACTERISTICS							
BV_{CER}	Collector to Emitter Breakdown Voltage	I_{CE} = 2 mA, V_{GE} = 0 V, R_{GE} = 1 kΩ, T_J = −40 to 150°C		420	–	480	V
BV_{CES}	Collector to Emitter Breakdown Voltage	I_{CE} = 10 mA, V_{GE} = 0 V, R_{GE} = 0, T_J = −40 to 150°C		440	–	500	V
BV_{ECS}	Emitter to Collector Breakdown Voltage	I_{CE} = −75 mA, V_{GE} = 0 V, T_J = 25°C		28	–	–	V
BV_{GES}	Gate to Emitter Breakdown Voltage	I_{GES} = ±2 mA		±12	±14	–	V
I_{CER}	Collector to Emitter Leakage Current	V_{CE} = 175 V, R_{GE} = 1 kΩ	T_J = 25°C	–	–	25	μA
			T_J = 150°C	–	–	1	mA
I_{ECS}	Emitter to Collector Leakage Current	V_{EC} = 24 V	T_J = 25°C	–	–	1	mA
			T_J = 150°C	–	–	40	
R_1	Series Gate Resistance			–	120	–	Ω
R_2	Gate to Emitter Resistance			10K	–	30K	Ω
ON CHARACTERISTICS							
$V_{CE(SAT)}$	Collector to Emitter Saturation Voltage	I_{CE} = 6 A, V_{GE} = 4 V, T_J = 25°C		–	1.13	1.25	V
$V_{CE(SAT)}$	Collector to Emitter Saturation Voltage	I_{CE} = 10 A, V_{GE} = 4.5 V, T_J = 150°C		–	1.32	1.50	V
$V_{CE(SAT)}$	Collector to Emitter Saturation Voltage	I_{CE} = 15 A, V_{GE} = 5 V, T_J = 150°C		–	1.64	1.85	V
DYNAMIC CHARACTERISTICS							
$Q_{G(ON)}$	Gate Charge	I_{CE} = 10 A, V_{CE} = 12 V, V_{GE} = 5 V		–	23	–	nC
$V_{GE(TH)}$	Gate to Emitter Threshold Voltage	I_{CE} = 1 mA, V_{CE} = V_{GE}	T_J = 25°C	1.3	1.6	2.2	V
			T_J = 150°C	0.75	1.1	1.8	
V_{GEP}	Gate to Emitter Plateau Voltage	V_{CE} = 12 V, I_{CE} = 10 A		–	2.7	–	V
SWITCHING CHARACTERISTICS							
$td_{(ON)R}$	Current Turn−On Delay Time−Resistive	V_{CE} = 14 V, R_L = 1 Ω, V_{GE} = 5 V, R_G = 470 Ω, T_J = 25°C		–	0.9	4	μs
t_{rR}	Current Rise Time−Resistive			–	2.6	7	
$td_{(OFF)L}$	Current Turn−Off Delay Time−Inductive	V_{CE} = 300 V, L = 1 mH, V_{GE} = 5 V, R_G = 470 Ω, I_{CE} = 6.5 A, T_J = 25°C		–	5.4	15	
t_{fL}	Current Fall Time−Inductive			–	2.7	15	

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

PACKAGE MARKING AND ORDERING INFORMATION

Device	Package	Shipping†
FGD3245G2−F085C	DPAK (Pb−Free)	2500 Units/Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

TYPICAL CHARACTERISTICS

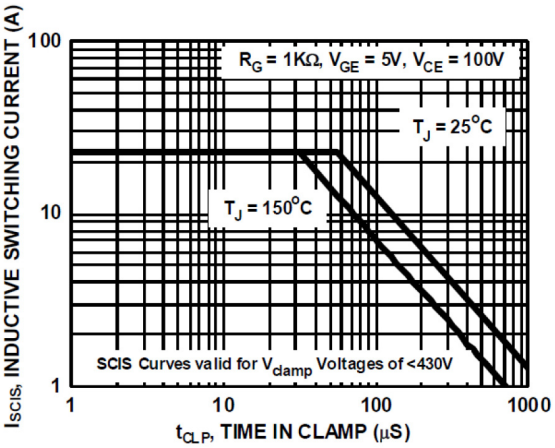


Figure 1. Self Clamped Inductive Switching Current vs. Time in Clamp

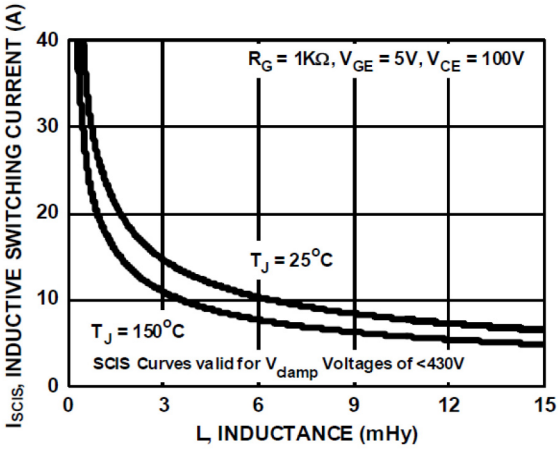


Figure 2. Self Clamped Inductive Switching Current vs. Inductance

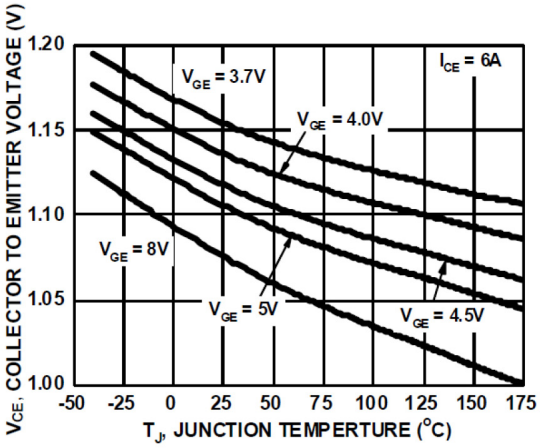


Figure 3. Collector to Emitter On−State Voltage vs. Junction Temperature

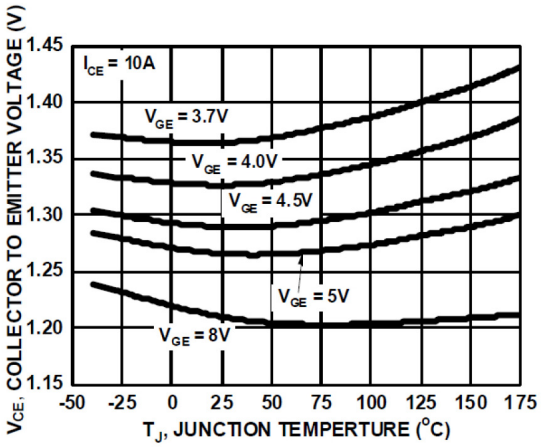


Figure 4. Collector to Emitter On−State Voltage vs. Junction Temperature

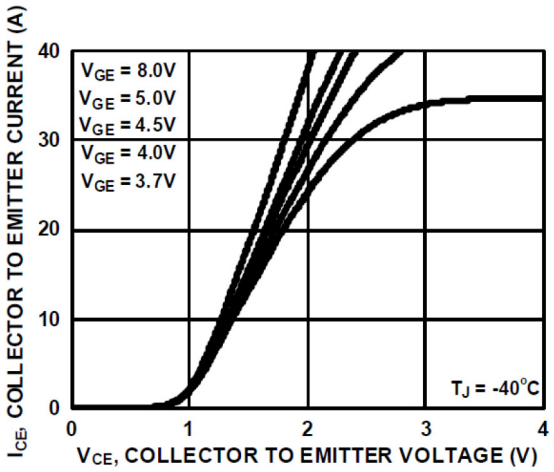


Figure 5. Collector to Emitter On−State Voltage vs. Collector Current

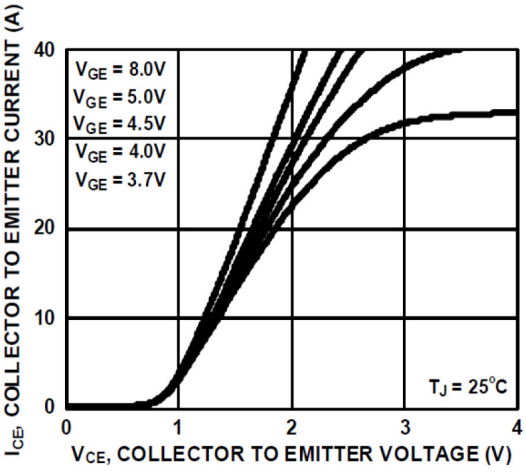


Figure 6. Collector to Emitter On−State Voltage vs. Collector Current

TYPICAL CHARACTERISTICS (continued)

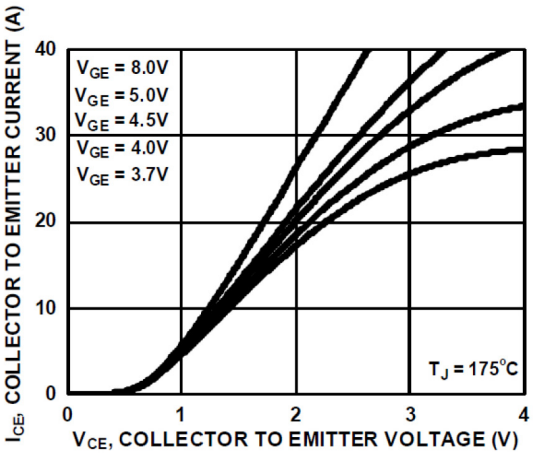


Figure 7. Collector to Emitter On−State Voltage vs. Collector Current

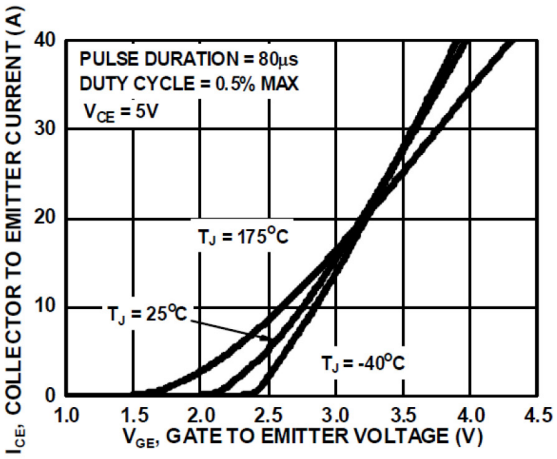


Figure 8. Transfer Characteristics

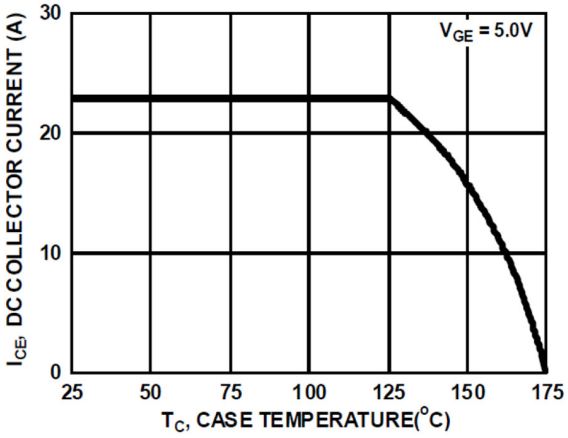


Figure 9. DC Collector Current vs. Case Temperature

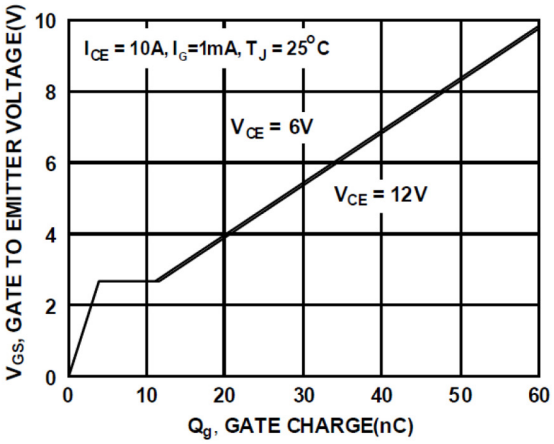


Figure 10. Gate Charge

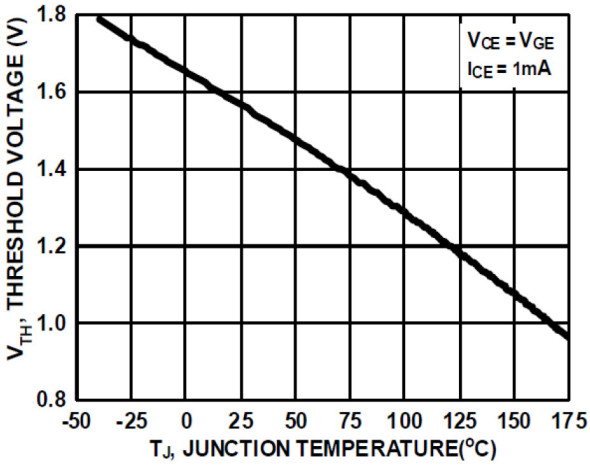


Figure 11. Threshold Voltage vs. Junction Temperature

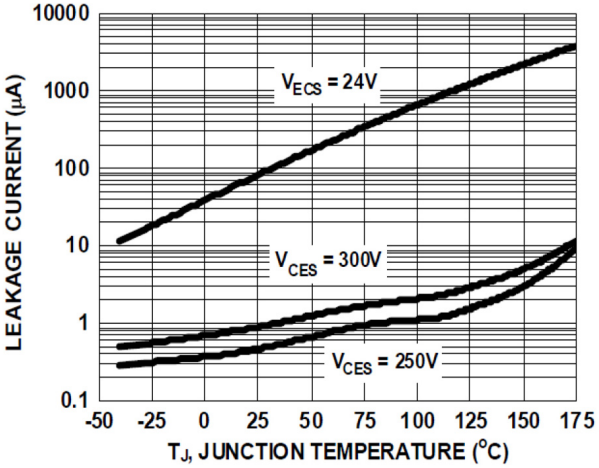


Figure 12. Leakage Current vs. Junction Temperature

TYPICAL CHARACTERISTICS (continued)

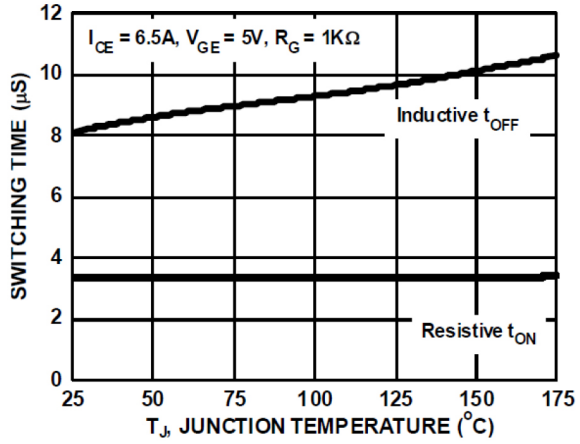


Figure 13. Switching Time vs. Junction Temperature

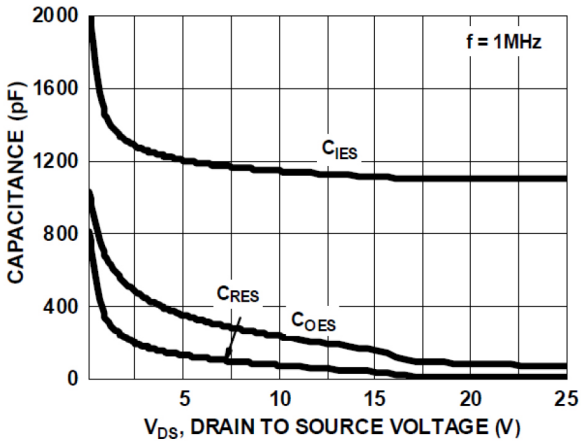


Figure 14. Capacitance vs. Collector to Emitter

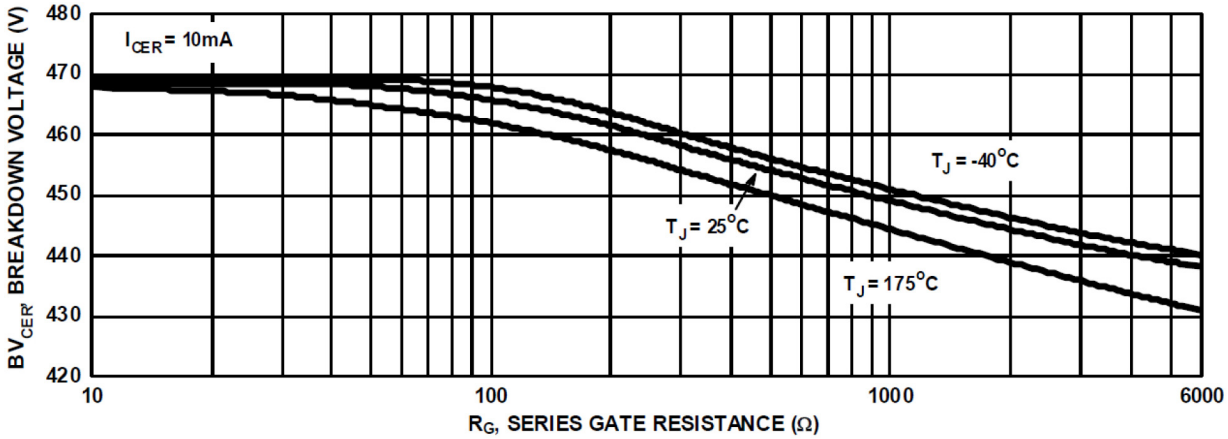


Figure 15. Break Down Voltage vs. Series Resistance

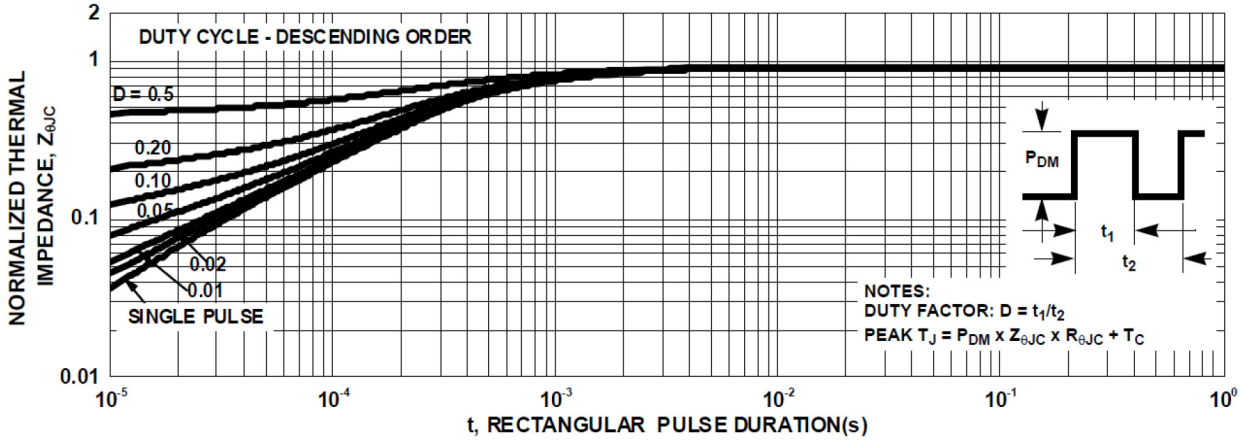


Figure 16. IGBT Normalized Transient Thermal Impedance, Junction to Case

TEST CIRCUIT AND WAVEFORMS

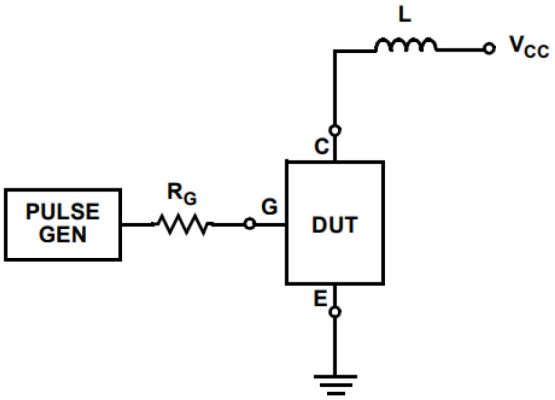


Figure 17. Inductive Switching Test Circuit

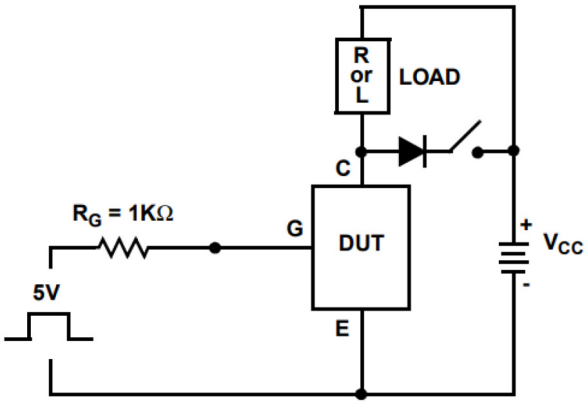


Figure 18. t_{ON} and t_{OFF} Switching Test Circuit

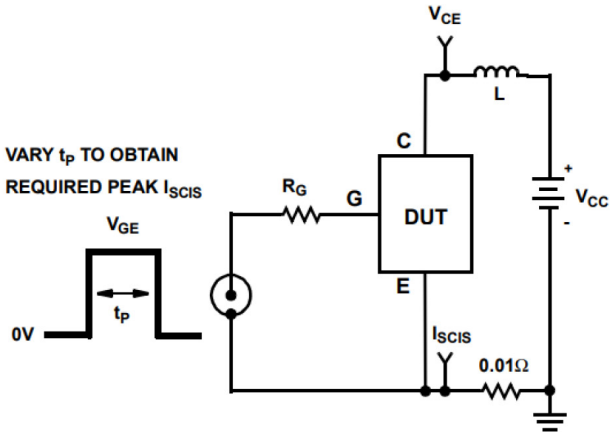


Figure 19. Energy Test Circuit

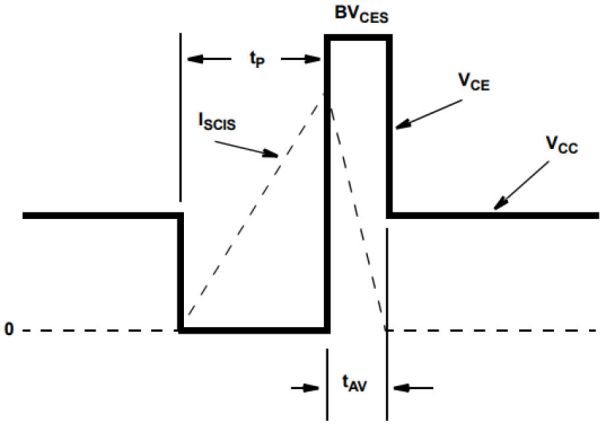


Figure 20. Energy Waveforms

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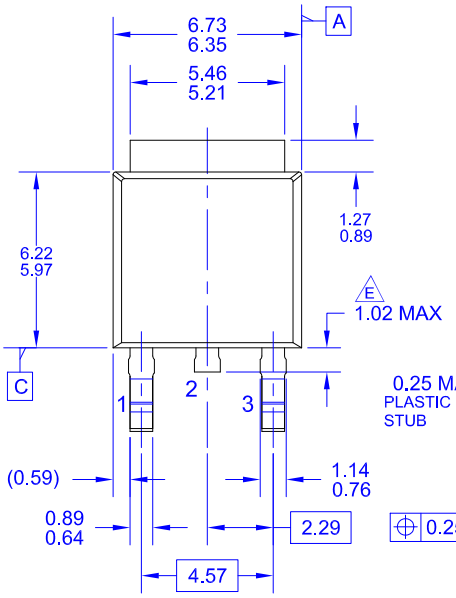
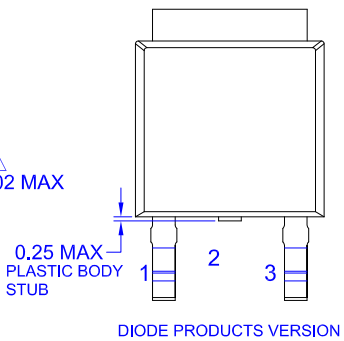
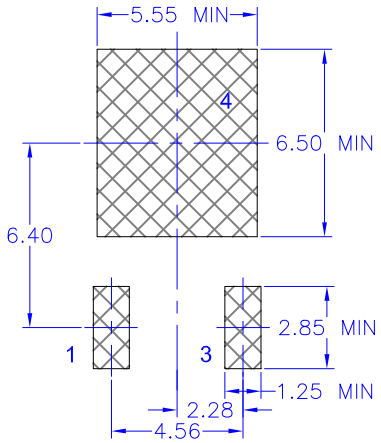


NON-DIODE PRODUCTS VERSION

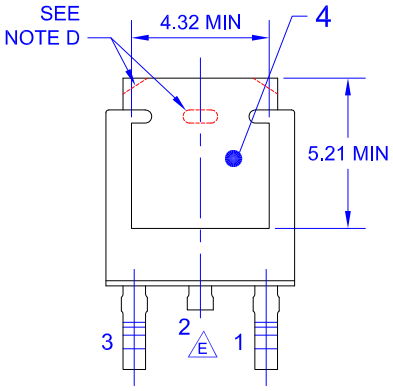


DIODE PRODUCTS VERSION

0.25 Ⓜ A Ⓜ C



LAND PATTERN RECOMMENDATION



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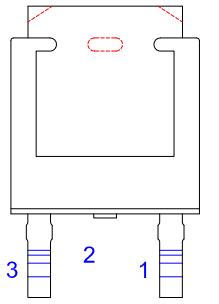

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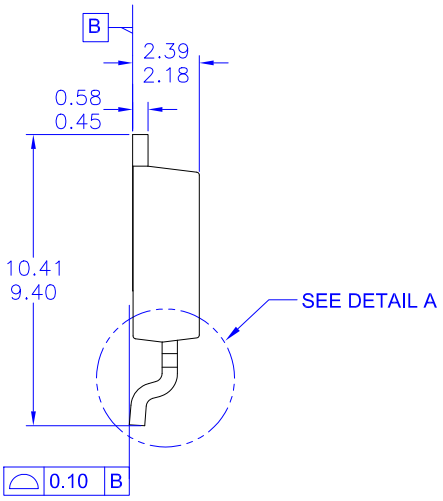
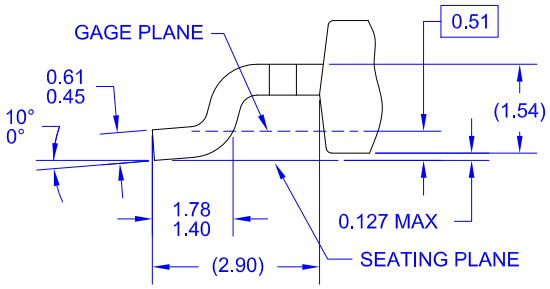


NOTES: UNLESS OTHERWISE SPECIFIED
A) THIS PACKAGE CONFORMS TO JEDEC, TO-252, ISSUE C, VARIATION AA.
B) ALL DIMENSIONS ARE IN MILLIMETERS.
C) DIMENSIONING AND TOLERANCING PER ASME Y14.5M-2009.
D) SUPPLIER DEPENDENT MOLD LOCKING HOLES OR CHAMFERED CORNERS OR EDGE PROTRUSION.
E) TRIMMED CENTER LEAD IS PRESENT ONLY FOR DIODE PRODUCTS
F) DIMENSIONS ARE EXCLUSSIVE OF BURSS, MOLD FLASH AND TIE BAR EXTRUSIONS.
G) LAND PATTERN RECOMENDATION IS BASED ON IPC7351A STD TO228P991X239-3N.



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PUBLICATION ORDERING INFORMATION

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