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Please note: As part of the Fairchild Semiconductor integration, some of the Fairchild orderable part numbers will need to change in order to meet ON Semiconductor's system requirements. Since the ON Semiconductor product management systems do not have the ability to manage part nomenclature that utilizes an underscore (_), the underscore (_) in the Fairchild part numbers will be changed to a dash (-). This document may contain device numbers with an underscore (_). Please check the ON Semiconductor website to verify the updated device numbers. The most current and up-to-date ordering information can be found at www.onsemi.com. Please email any questions regarding the system integration to Fairchild_questions@onsemi.com.

June 2016

FGB3056_F085

EcoSPARK® 300mJ, 560V, N-Channel Ignition IGBT

Features

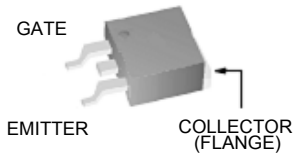
- SCIS Energy = 300mJ at T_J = 25°C
- Logic Level Gate Drive

Applications

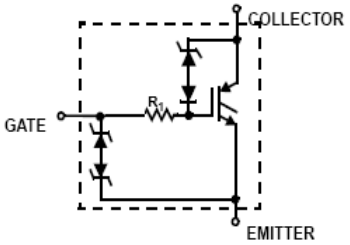
- Automotive Ignition Coil Driver Circuits
- Coil On Plug Applications

Package

JEDEC TO-263AB
D^2-Pak



Symbol



Absolute Maximum Ratings T_A = 25°C unless otherwise noted

Symbol	Parameter		Ratings	Units
BV_{CER}	Collector to Emitter Breakdown Voltage (I_C = 2mA)		560	V
BV_{ECS}	Emitter to Collector Voltage - Reverse Battery Condition (I_C = -20mA)		20	V
E_{SCIS25}	I_{SCIS} = 14.2A, L = 3.0mHy, R_{GE} = 1KΩ	T_C = 25°C	300	mJ
$E_{SCIS150}$	I_{SCIS} = 10.8A, L = 3.0mHy, R_{GE} = 1KΩ	T_C = 150°C	170	mJ
I_{C25}	Collector Current Continuous, at V_{GE} = 5V, T_C = 25°C		29	A
I_{C110}	Collector Current Continuous, at V_{GE} = 5V, T_C = 110°C		24	A
V_{GEM}	Gate to Emitter Voltage Continuous		±10	V
P_D	Power Dissipation Total, at T_C = 25°C	T_C = 25°C	200	W
	Power Dissipation Derating, for T_C > 25°C	T_C > 25°C	1.33	W/°C
T_J	Operating Junction Temperature Range		-40 to +175	°C
T_{STG}	Storage Junction Temperature Range		-40 to +175	°C
T_L	Max. Lead Temp. for Soldering (Leads at 1.6mm from case for 10s)		300	°C
T_{PKG}	Reflow soldering according to JESD020C		260	°C
ESD	HBM-Electrostatic Discharge Voltage at100pF, 1500Ω		4	kV

Thermal Characteristics

$R_{\theta JC}$	Thermal Resistance Junction to Case	0.75	°C/W

Electrical Characteristics of the IGBT T_A = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions		Min	Typ	Max	Units
Off State Characteristics							
BV_{CER}	Collector to Emitter Breakdown Voltage	V_{GE} = 0V,I_{CE} = 2mA, R_{GE} = 1KΩ, T_J = -40 to 150°C		530	560	600	V
BV_{CES}	Collector to Emitter Breakdown Voltage	V_{GE} = 0V, I_{CE} = 10mA, R_{GE} = 0Ω, T_J = -40 to 150°C		-	595	-	V
BV_{ECS}	Emitter to Collector Breakdown Voltage	V_{GE} = 0V, I_{CE} = -75mA, T_J = 25°C		20	26	-	V
BV_{GES}	Gate to Emitter Breakdown Voltage	I_{GES} = ±5mA		±12	±14	-	V
I_{CER}	Collector to Emitter Leakage Current	V_{CE} = 250V, R_{GE} = 1KΩ	T_J = 25°C	-	-	40	μA
			T_J = 150°C	-	-	1	mA
I_{ECS}	Emitter to Collector Leakage Current	V_{EC} = 20V	T_J = 25°C	-	-	1	mA
			T_J = 150°C	-	-	40	
R_1	Series Gate Resistance			-	100	-	Ω
On State Characteristics							
$V_{CE(SAT)}$	Collector to Emitter Saturation Voltage	V_{GE} = 5V, I_{CE} = 2A	T_J = 25°C	-	1.0	1.1	V
$V_{CE(SAT)}$	Collector to Emitter Saturation Voltage	V_{GE} = 5V, I_{CE} = 8A	T_J = 150°C	-	1.3	1.55	V
Dynamic Characteristics							
$Q_{G(ON)}$	Gate Charge	V_{GE} = 5V, V_{CE} = 12V, I_{CE} = 10A		-	15.6	20	nC
$V_{GE(TH)}$	Gate to Emitter Threshold Voltage	I_{CE} = 1mA, V_{CE} = V_{GE},	T_J = 25°C	1.3	1.6	2.2	V
			T_J = 150°C	-	1.1	-	
V_{GEP}	Gate to Emitter Plateau Voltage	V_{CE} = 12V, I_{CE} = 10A		-	2.8	-	V
Switching Characteristics							
$t_{d(ON)R}$	Current Turn-On Delay Time-Resistive	V_{CE} = 14V, R_L = 1Ω		-	0.8	1.3	μs
t_{rR}	Current Rise Time-Resistive	V_{GE} = 5V, R_G = 1KΩ		-	1.48	2.4	μs
$t_{d(OFF)L}$	Current Turn-Off Delay Time-Inductive	V_{CE} = 300V, L = 1mH, V_{GE} = 5V, R_G = 1KΩ		-	5.1	8.2	μs
t_{fL}	Current Fall Time-Inductive			-	1.1	1.8	μs

Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
FGB3056	FGB3056_F085	TO-263AB	330mm	24mm	800units

Typical Performance Curves

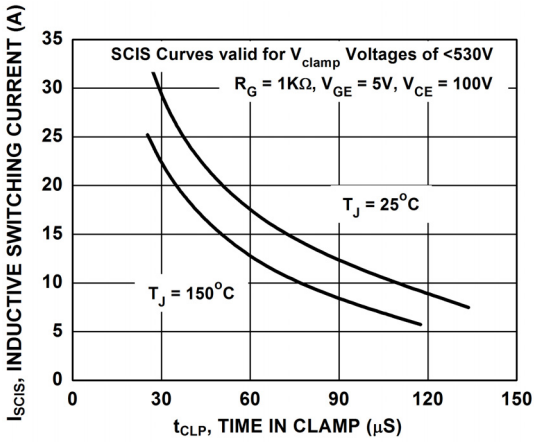


Figure 1. Self Clamped Inductive Switching Current vs. Time in Clamp

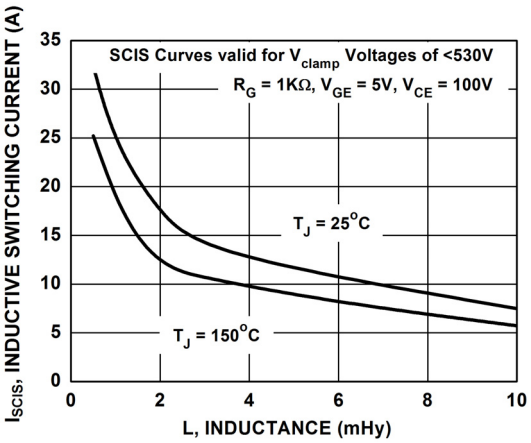


Figure 2. Self Clamped Inductive Switching Current vs. Inductance

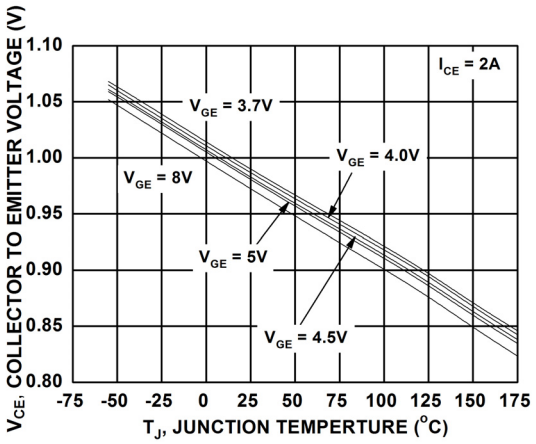


Figure 3. Collector to Emitter On-State Voltage vs. Junction Temperature

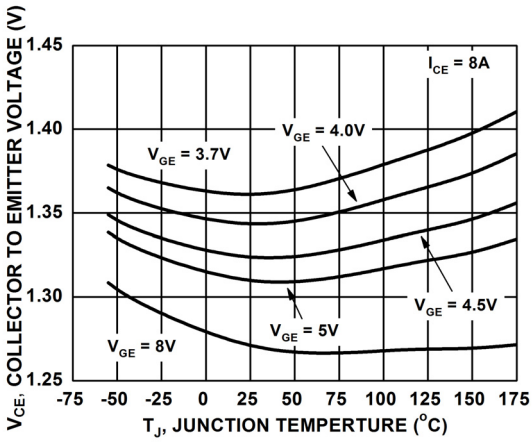


Figure 4. Collector to Emitter On-State Voltage vs. Junction Temperature

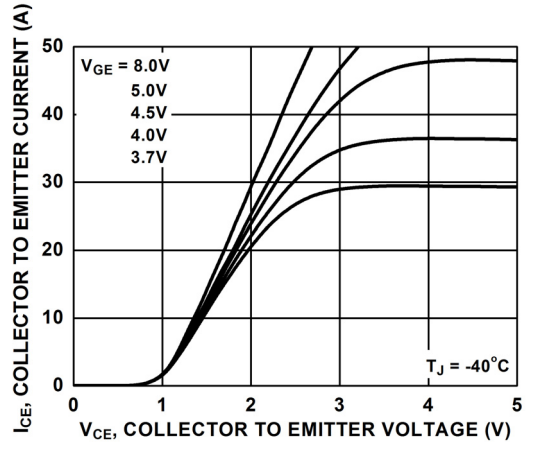


Figure 5. Collector to Emitter On-State Voltage vs. Collector Current

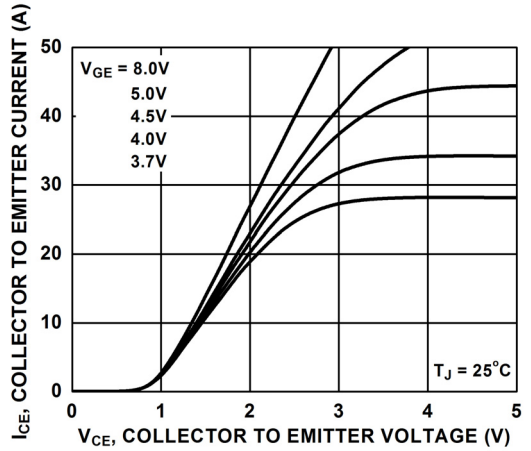


Figure 6. Collector to Emitter On-State Voltage vs. Collector Current

Typical Performance Curves (Continued)

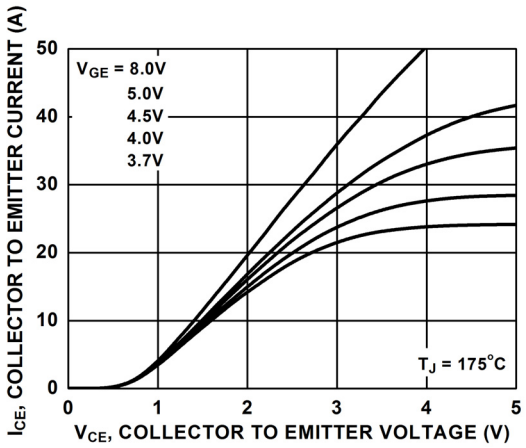


Figure 7. Collector to Emitter On-State Voltage vs. Collector Current

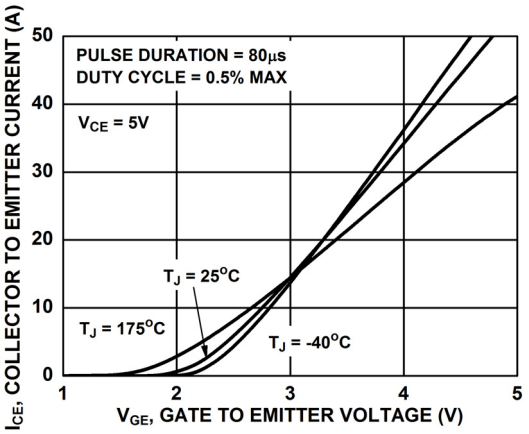


Figure 8. Transfer Characteristics

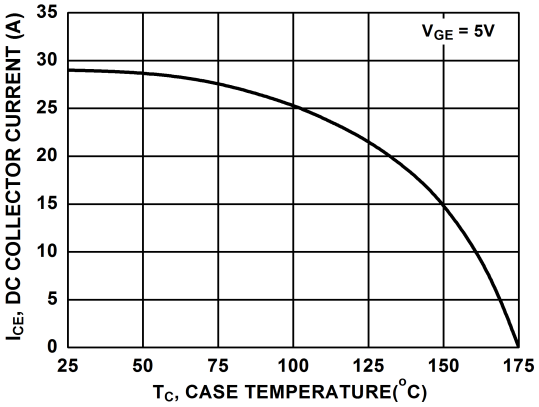


Figure 9. DC Collector Current vs. Case Temperature

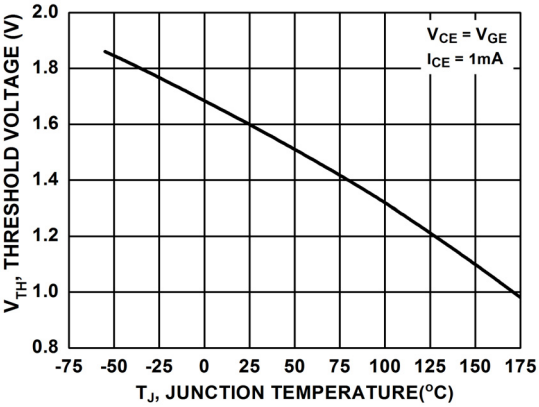


Figure 10. Threshold Voltage vs. Junction Temperature

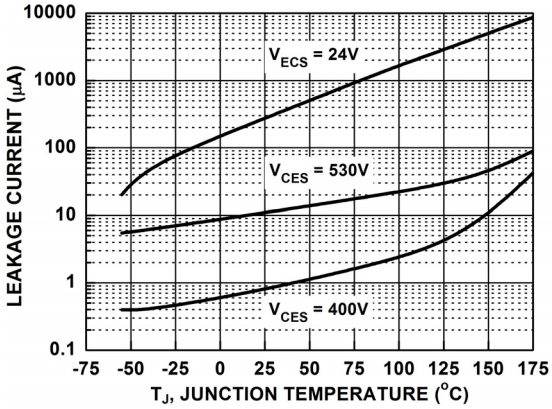


Figure 11. Leakage Current vs. Junction Temperature

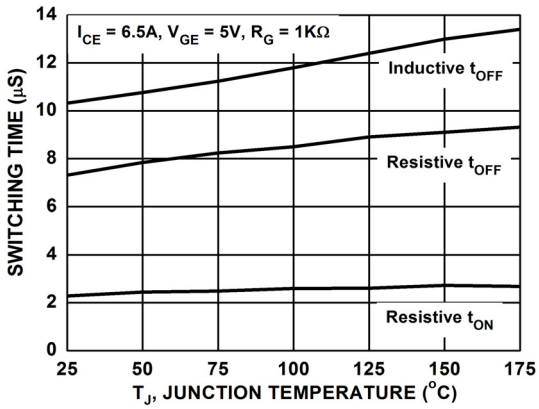


Figure 12. Switching Time vs. Junction Temperature

Typical Performance Curves (Continued)

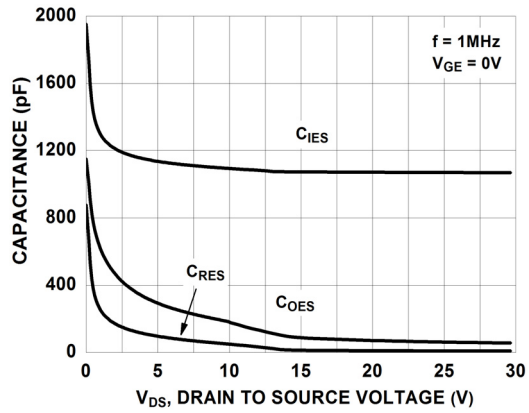


Figure 13. Capacitance vs. Collector to Emitter Voltage

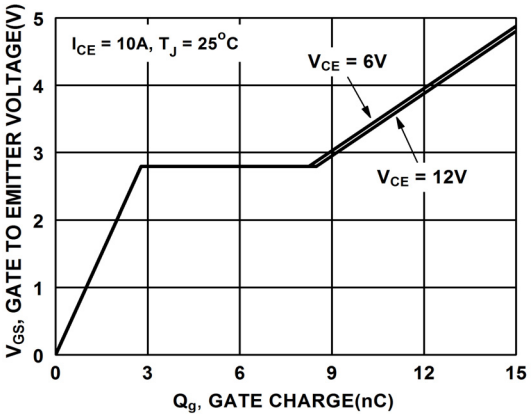


Figure 14. Gate Charge

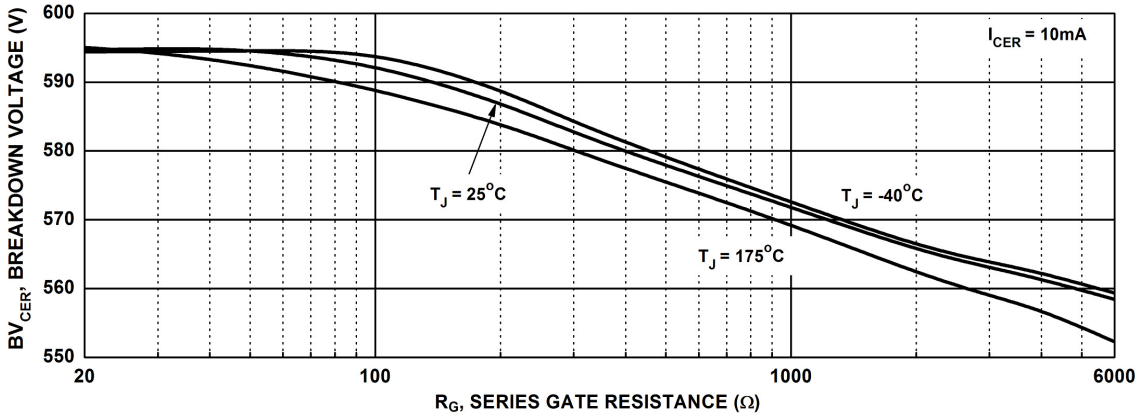


Figure 15. Break down Voltage vs. Series Gate Resistance

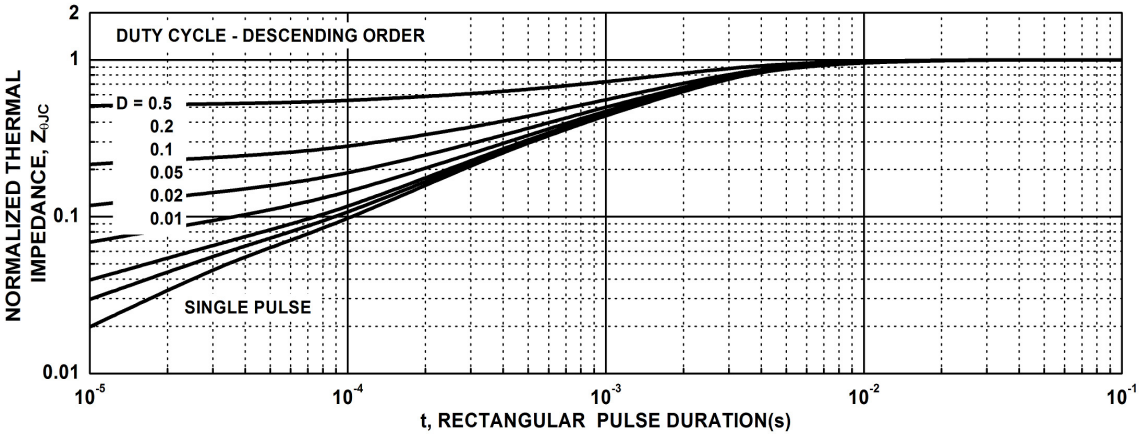


Figure 16. IGBT Normalized Transient Thermal Impedance, Junction to Case

Typical Performance Curves

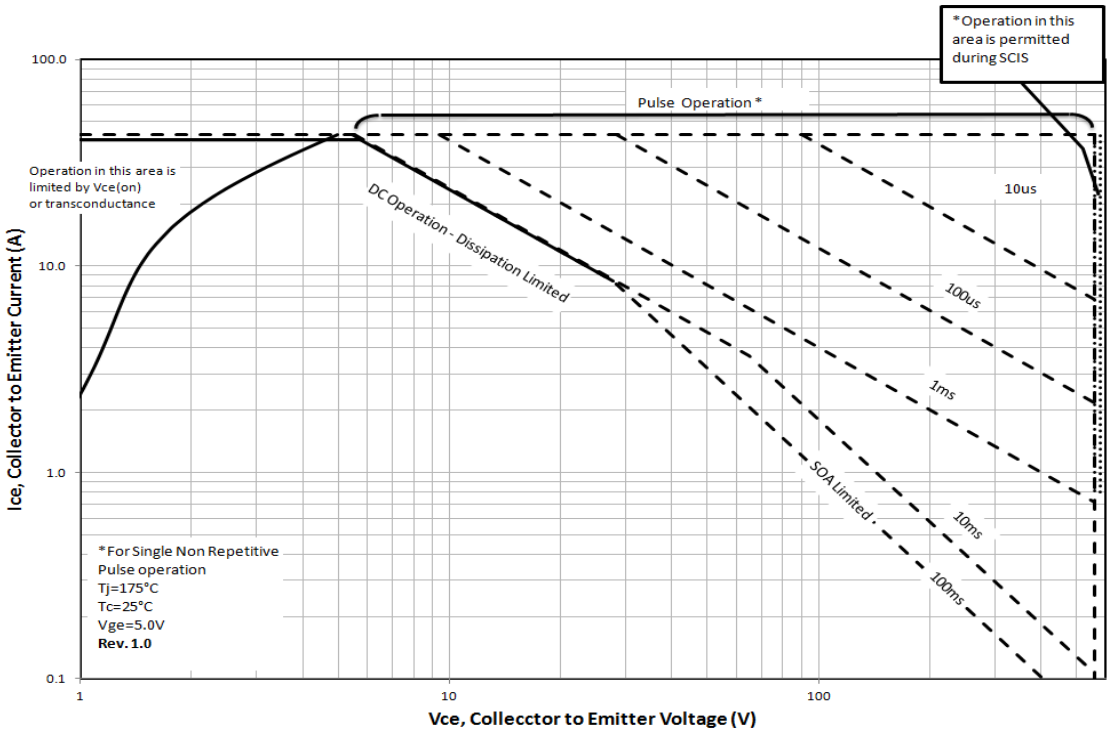
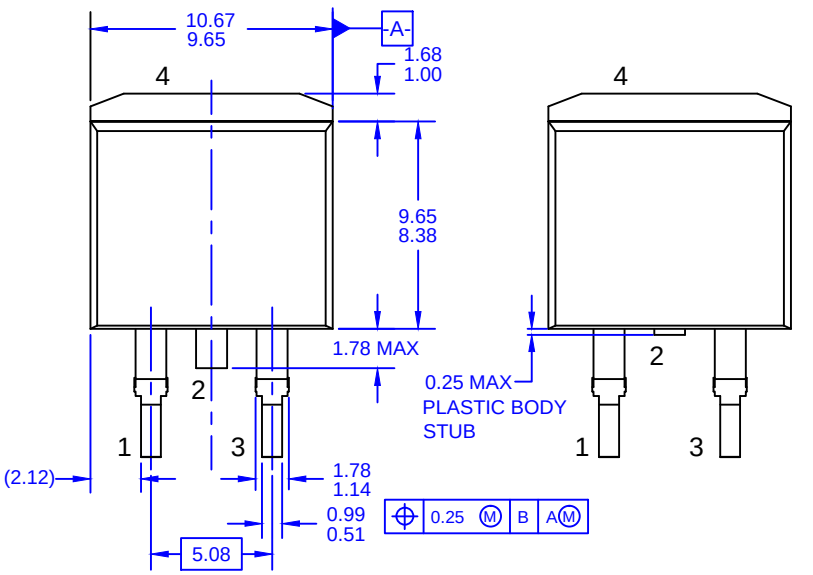
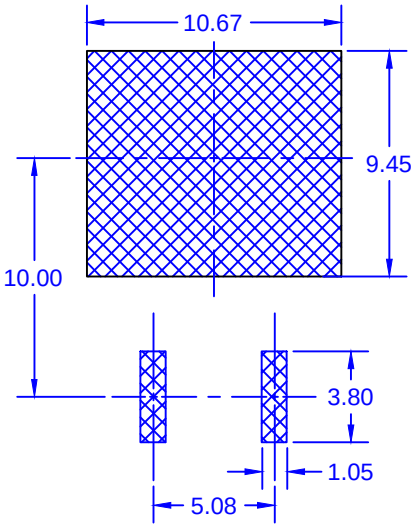


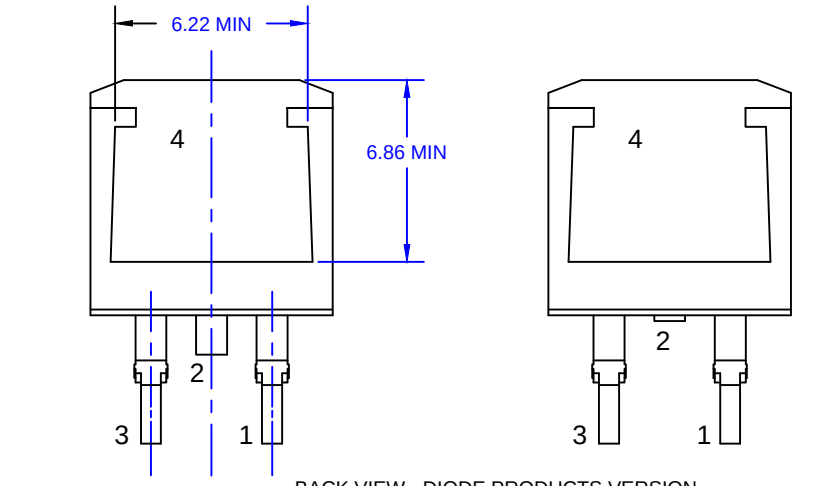
Figure 17. Forward Safe Operating Area



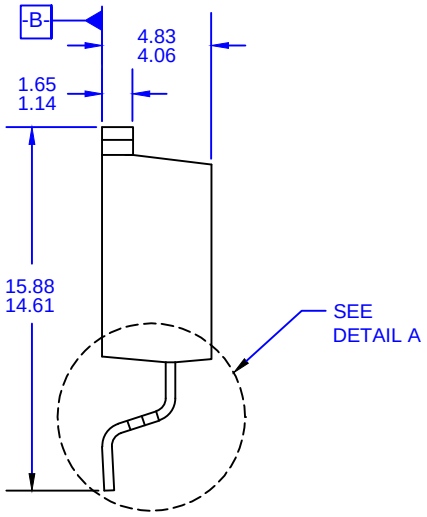
FRONT VIEW - DIODE PRODUCTS VERSION
ALTERNATIVE SUPPLIER DETAIL



LAND PATTERN RECOMMENDATION
UNLESS NOTED, ALL DIMS TYPICAL

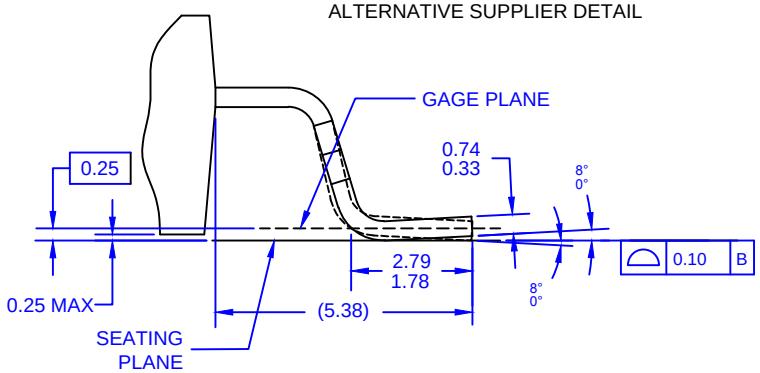


BACK VIEW - DIODE PRODUCTS VERSION
ALTERNATIVE SUPPLIER DETAIL



NOTES: UNLESS OTHERWISE SPECIFIED

A) ALL DIMENSIONS ARE IN MILLIMETERS.
B) REFERENCE JEDEC, TO-263, VARIATION AB.
C) DIMENSIONING AND TOLERANCING PER DIMENSIONING AND TOLERANCING PER ASME Y14.5 - 2009.
D) LOCATION OF THE PIN HOLE MAY VARY (LOWER LEFT CORNER, LOWER CENTER AND CENTER OF THE PACKAGE).
E) LANDPATTERN RECOMMENDATION PER IPC TO254P1524X482-3N
F) FILENAME: TO263A02REV8



DETAIL A, ROTATED 90°
SCALE: 2X

FAIRCHILD.

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