Is Now Part of

ON Semiconductor®

To learn more about ON Semiconductor, please visit our website at
www.onsemi.com

June 2016

FGB3056_F085

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

Features

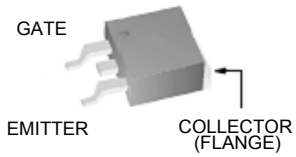
- SCIS Energy = 300mJ at T_J = 25°C
- Logic Level Gate Drive

Applications

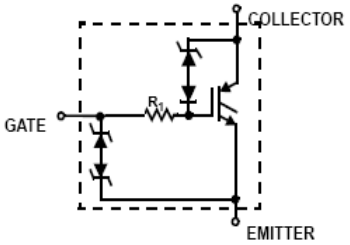
- Automotive Ignition Coil Driver Circuits
- Coil On Plug Applications

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

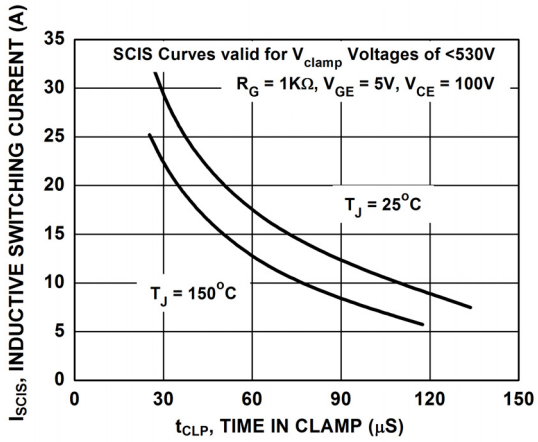


Figure 1. Self Clamped Inductive Switching Current vs. Time in Clamp

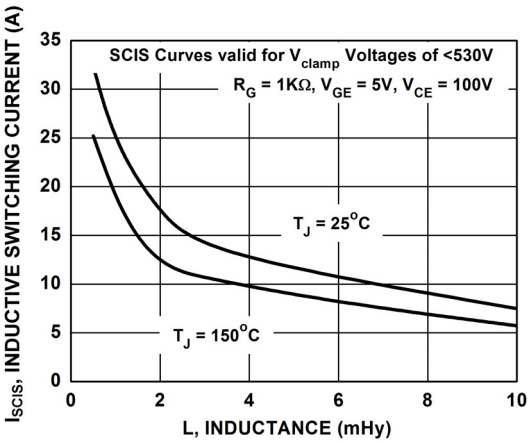


Figure 2. Self Clamped Inductive Switching Current vs. Inductance

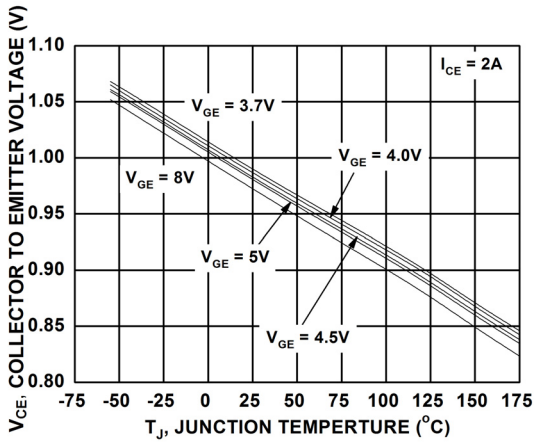


Figure 3. Collector to Emitter On-State Voltage vs. Junction Temperature

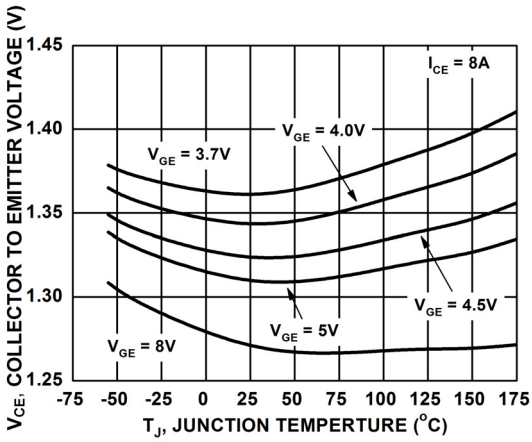


Figure 4. Collector to Emitter On-State Voltage vs. Junction Temperature

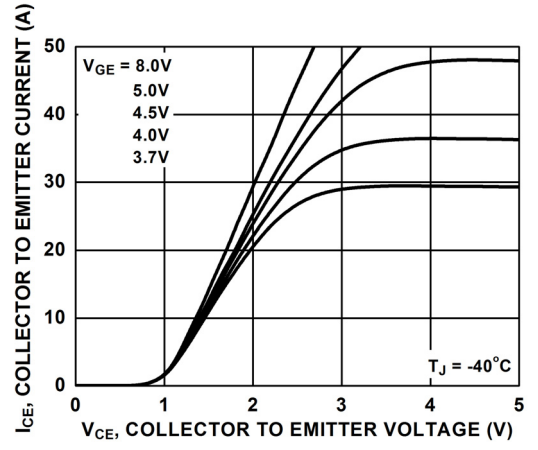


Figure 5. Collector to Emitter On-State Voltage vs. Collector Current

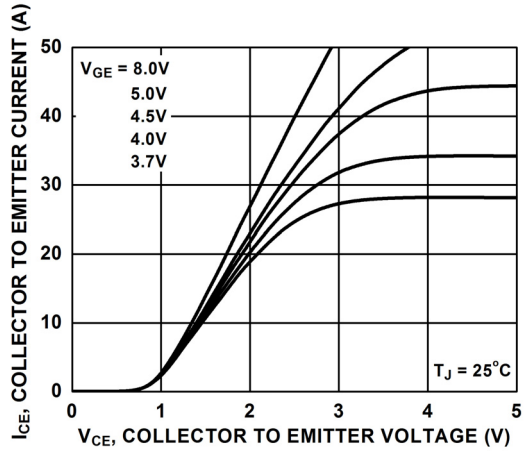


Figure 6. Collector to Emitter On-State Voltage vs. Collector Current

Typical Performance Curves (Continued)

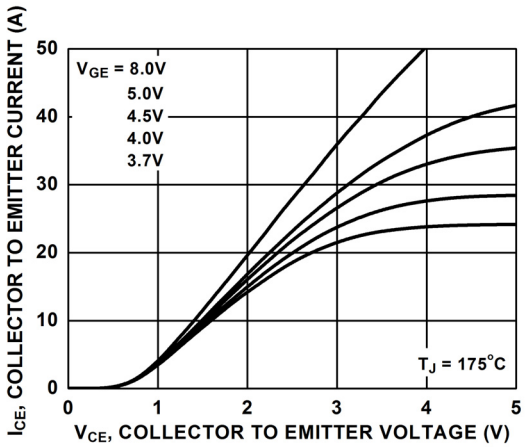


Figure 7. Collector to Emitter On-State Voltage vs. Collector Current

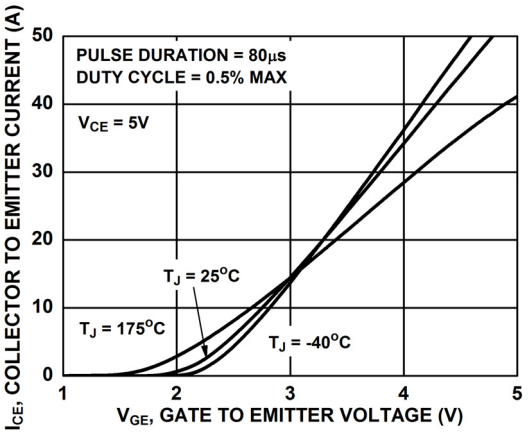


Figure 8. Transfer Characteristics

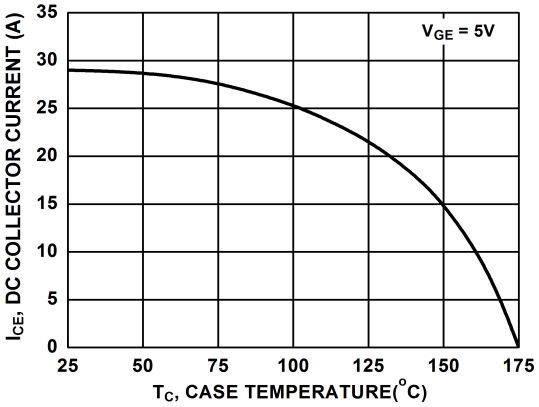


Figure 9. DC Collector Current vs. Case Temperature

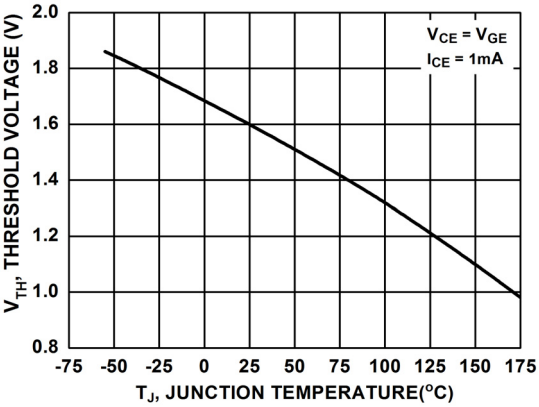


Figure 10. Threshold Voltage vs. Junction Temperature

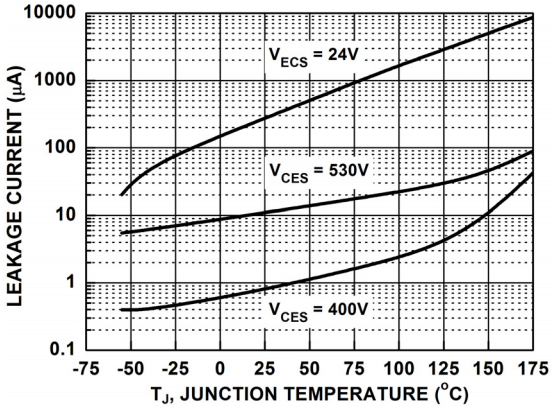


Figure 11. Leakage Current vs. Junction Temperature

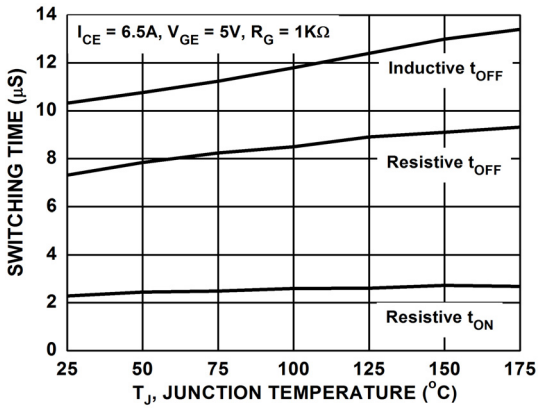


Figure 12. Switching Time vs. Junction Temperature

Typical Performance Curves (Continued)

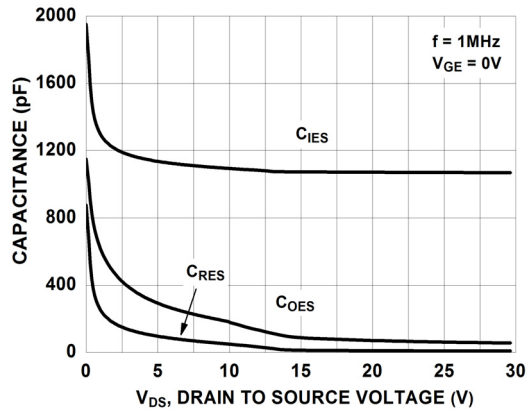


Figure 13. Capacitance vs. Collector to Emitter Voltage

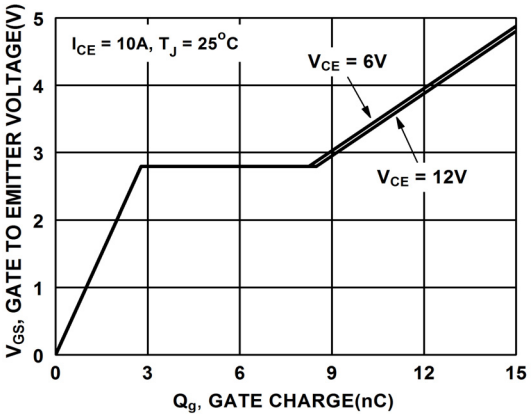


Figure 14. Gate Charge

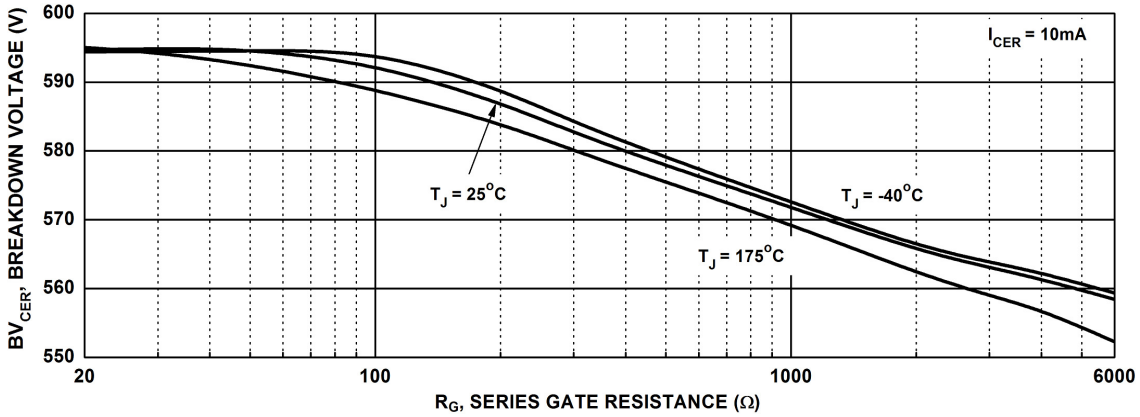


Figure 15. Break down Voltage vs. Series Gate Resistance

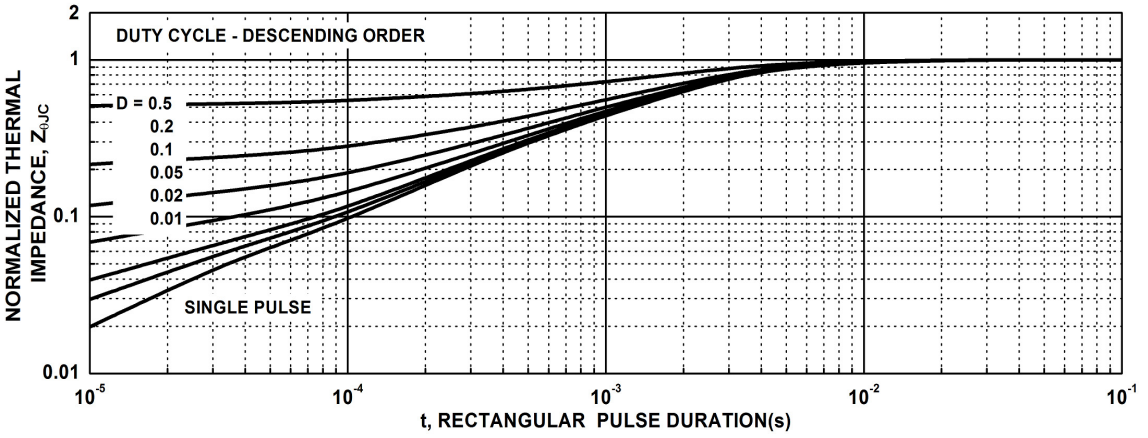


Figure 16. IGBT Normalized Transient Thermal Impedance, Junction to Case

Typical Performance Curves

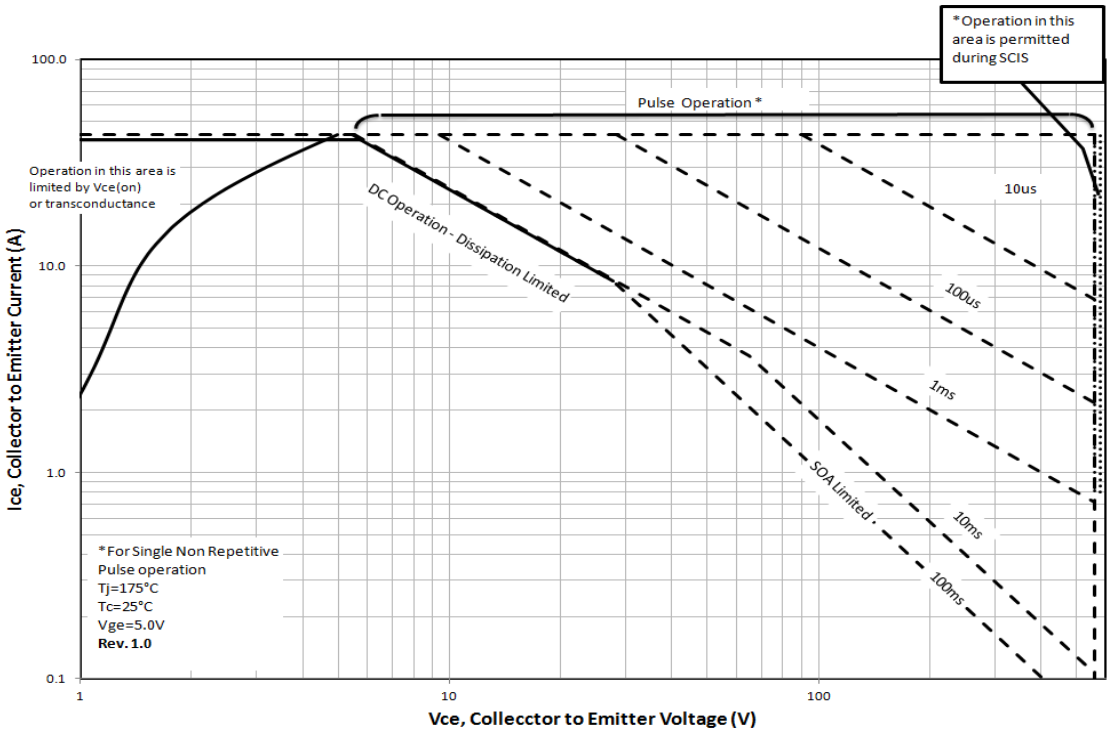
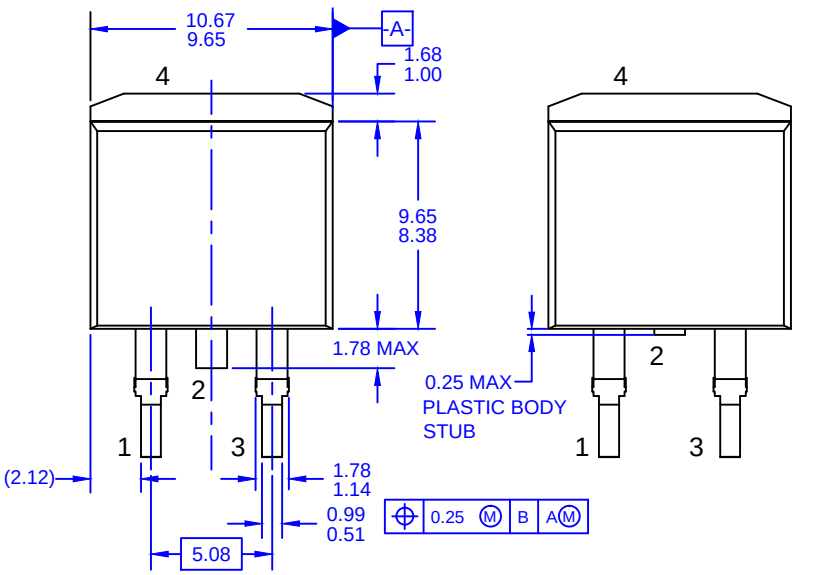
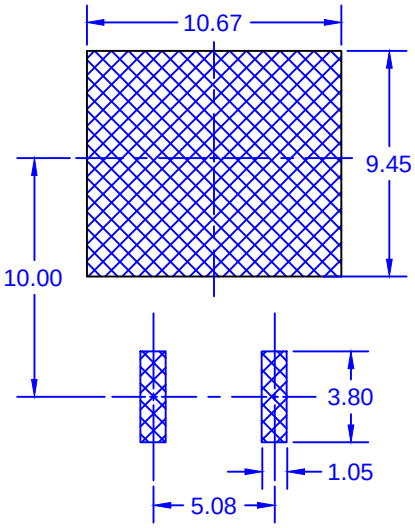


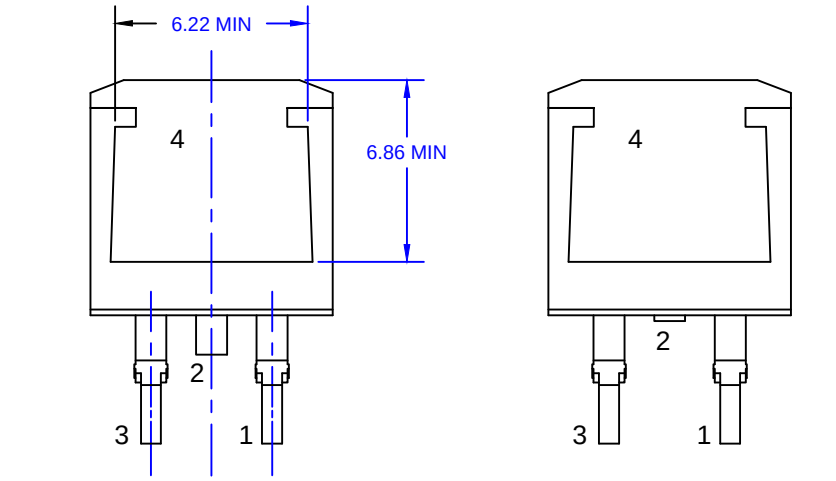
Figure 17. Forward Safe Operating Area



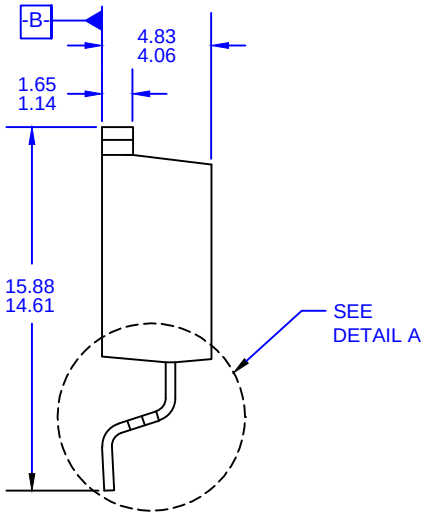
FRONT VIEW - DIODE PRODUCTS VERSION
ALTERNATIVE SUPPLIER DETAIL



LAND PATTERN RECOMMENDATION
UNLESS NOTED, ALL DIMS TYPICAL

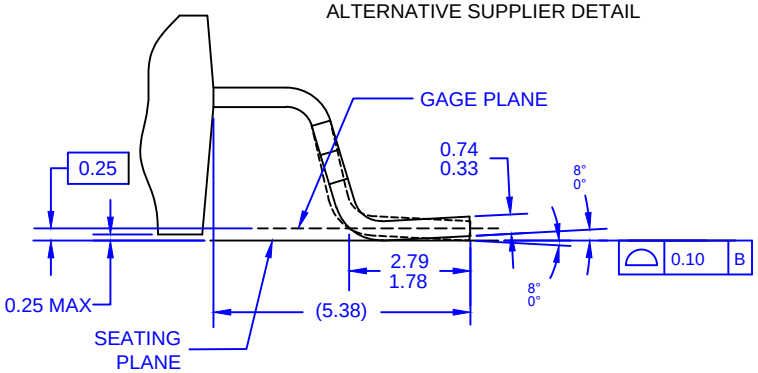


BACK VIEW - DIODE PRODUCTS VERSION
ALTERNATIVE SUPPLIER DETAIL



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.

TRADEMARKS

The following includes registered and unregistered trademarks and service marks, owned by Fairchild Semiconductor and/or its global subsidiaries, and is not intended to be an exhaustive list of all such trademarks.

AccuPower™
AttitudeEngine™
Awinda®
AX-CAP®*
BitSiC™
Build it Now™
CorePLUS™
CorePOWER™
CROSSVOLT™
CTL™
Current Transfer Logic™
DEUXPEED®
Dual Cool™
EcoSPARK®
EfficientMax™
ESBC™
Fairchild®
Fairchild Semiconductor®
FACT Quiet Series™
FACT®
FastvCore™
FETBench™
FPS™
F-PFS™
FRFET®
Global Power Resource SM
GreenBridge™
Green FPS™
Green FPS™ e-Series™
G*max*™
GTO™
IntelliMAX™
ISOPLANAR™
Making Small Speakers Sound Louder and Better™
MegaBuck™
MICROCOUPLER™
MicroFET™
MicroPak™
MicroPak2™
MillerDrive™
MotionMax™
MotionGrid®
MTi®
MTx®
MVN®
mWSaver®
OptoHiT™
OPTOLOGIC®
OPTOPLANAR®
®
Power Supply WebDesigner™
PowerTrench®
PowerXS™
Programmable Active Droop™
QFET®
QS™
Quiet Series™
RapidConfigure™
™
Saving our world, 1mW/W/kW at a time™
SignalWise™
SmartMax™
SMART START™
Solutions for Your Success™
SPM®
STEALTH™
SuperFET®
SuperSOT™-3
SuperSOT™-6
SuperSOT™-8
SupreMOS®
SyncFET™
Sync-Lock™
SYSTEM GENERAL®*
TinyBoost®
TinyBuck®
TinyCalc™
TinyLogic®
TINYOPTO™
TinyPower™
TinyPWM™
TinyWire™
TranSiC™
TriFault Detect™
TRUECURRENT®*
µSerDes™
SerDes™
UHC®
Ultra FRFET™
UniFET™
VCX™
VisualMax™
VoltagePlus™
XS™
Xsens™
仙童®

* Trademarks of System General Corporation, used under license by Fairchild Semiconductor.

DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION, OR DESIGN. TO OBTAIN THE LATEST, MOST UP-TO-DATE DATASHEET AND PRODUCT INFORMATION, VISIT OUR WEBSITE AT HTTP://WWW.FAIRCHILDSEMI.COM. 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. THESE SPECIFICATIONS DO NOT EXPAND THE TERMS OF FAIRCHILD'S WORLDWIDE TERMS AND CONDITIONS, SPECIFICALLY THE WARRANTY THEREIN, WHICH COVERS THESE PRODUCTS.

AUTHORIZED USE

Unless otherwise specified in this data sheet, this product is a standard commercial product and is not intended for use in applications that require extraordinary levels of quality and reliability. This product may not be used in the following applications, unless specifically approved in writing by a Fairchild officer: (1) automotive or other transportation, (2) military/aerospace, (3) any safety critical application – including life critical medical equipment – where the failure of the Fairchild product reasonably would be expected to result in personal injury, death or property damage. Customer's use of this product is subject to agreement of this Authorized Use policy. In the event of an unauthorized use of Fairchild's product, Fairchild accepts no liability in the event of product failure. In other respects, this product shall be subject to Fairchild's Worldwide Terms and Conditions of Sale, unless a separate agreement has been signed by both Parties.

ANTI-COUNTERFEITING POLICY

Fairchild Semiconductor Corporation's Anti-Counterfeiting Policy. Fairchild's Anti-Counterfeiting Policy is also stated on our external website, www.fairchildsemi.com, under Terms of Use

Counterfeiting of semiconductor parts is a growing problem in the industry. All manufacturers of semiconductor products are experiencing counterfeiting of their parts. Customers who inadvertently purchase counterfeit parts experience many problems such as loss of brand reputation, substandard performance, failed applications, and increased cost of production and manufacturing delays. Fairchild is taking strong measures to protect ourselves and our customers from the proliferation of counterfeit parts. Fairchild strongly encourages customers to purchase Fairchild parts either directly from Fairchild or from Authorized Fairchild Distributors who are listed by country on our web page cited above. Products customers buy either from Fairchild directly or from Authorized Fairchild Distributors are genuine parts, have full traceability, meet Fairchild's quality standards for handling and storage and provide access to Fairchild's full range of up-to-date technical and product information. Fairchild and our Authorized Distributors will stand behind all warranties and will appropriately address any warranty issues that may arise. Fairchild will not provide any warranty coverage or other assistance for parts bought from Unauthorized Sources. Fairchild is committed to combat this global problem and encourage our customers to do their part in stopping this practice by buying direct or from authorized distributors.

PRODUCT STATUS DEFINITIONS

Definition of Terms

Datasheet Identification	Product Status	Definition
Advance Information	Formative / In Design	Datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	Datasheet contains preliminary data; supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
No Identification Needed	Full Production	Datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve the design.
Obsolete	Not In Production	Datasheet contains specifications on a product that is discontinued by Fairchild Semiconductor. The datasheet is for reference information only.

Rev. I77

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Fairchild Semiconductor:

FGB3056_F085