
**Is Now Part of**


**ON Semiconductor®**

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

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

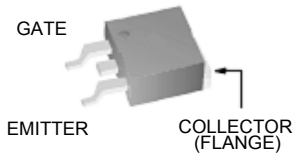
- SCIS Energy = 300mJ at $T_J$ = 25°C
- Logic Level Gate Drive

### Applications

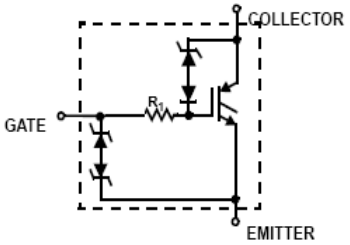
- Automotive Ignition Coil Driver Circuits
- Coil On Plug Applications

### 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

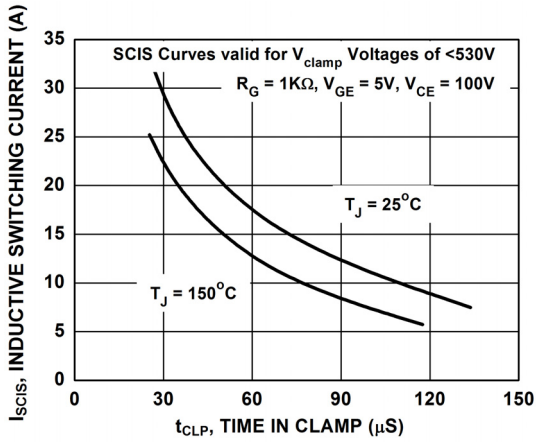



**Figure 1. Self Clamped Inductive Switching Current vs. Time in Clamp**

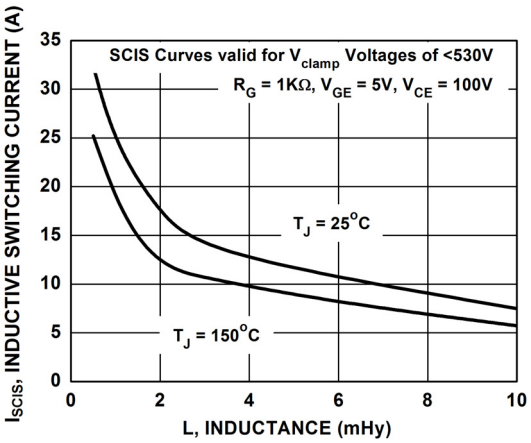



**Figure 2. Self Clamped Inductive Switching Current vs. Inductance**

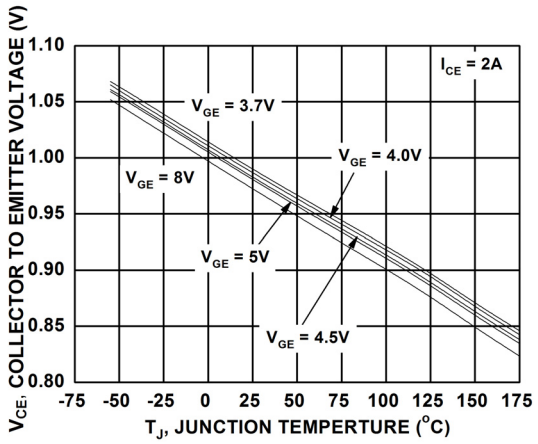



**Figure 3. Collector to Emitter On-State Voltage vs. Junction Temperature**

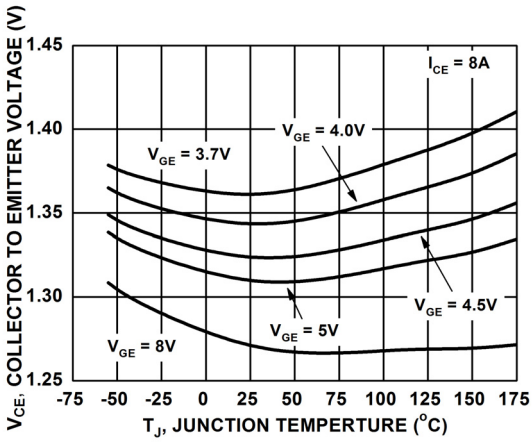



**Figure 4. Collector to Emitter On-State Voltage vs. Junction Temperature**

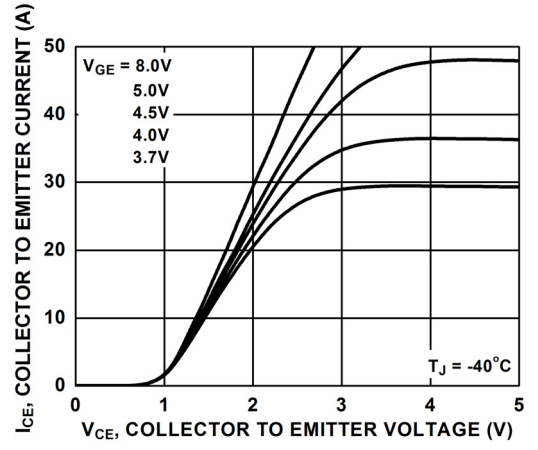



**Figure 5. Collector to Emitter On-State Voltage vs. Collector Current**

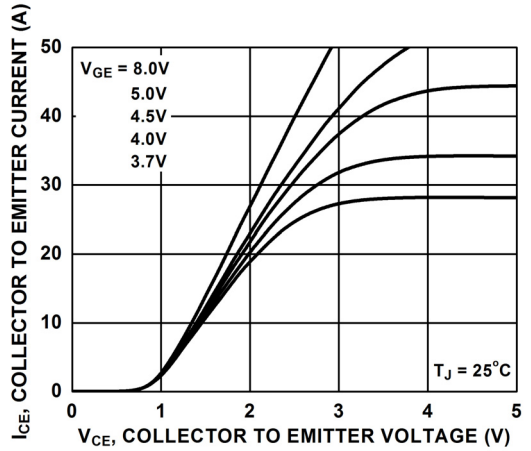



**Figure 6. Collector to Emitter On-State Voltage vs. Collector Current**

## Typical Performance Curves (Continued)

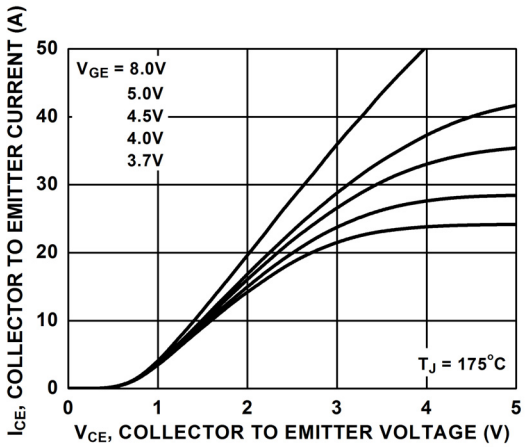



**Figure 7. Collector to Emitter On-State Voltage vs. Collector Current**

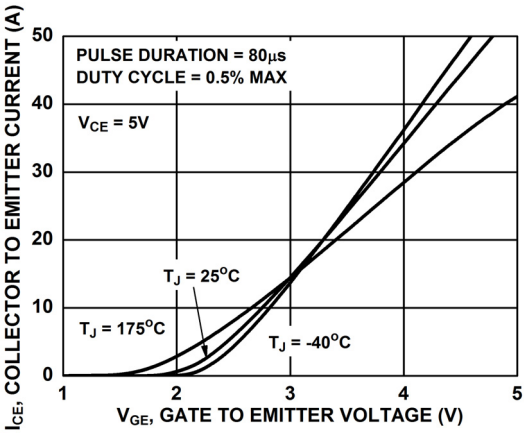



**Figure 8. Transfer Characteristics**

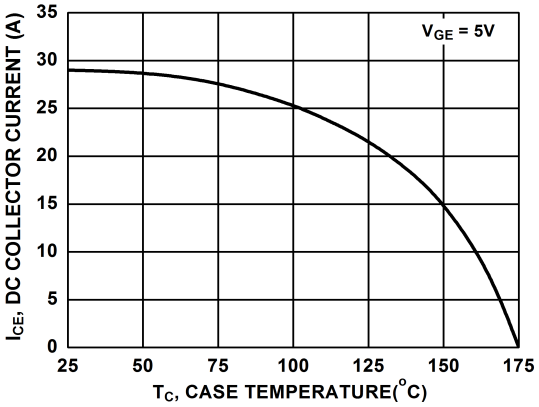



**Figure 9. DC Collector Current vs. Case Temperature**

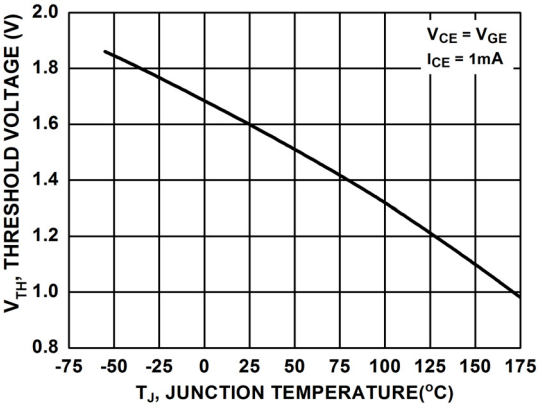



**Figure 10. Threshold Voltage vs. Junction Temperature**

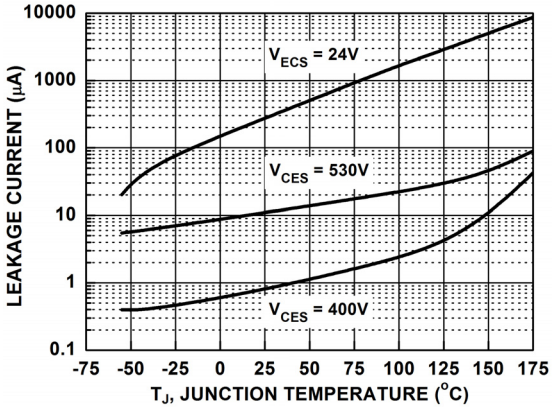



**Figure 11. Leakage Current vs. Junction Temperature**

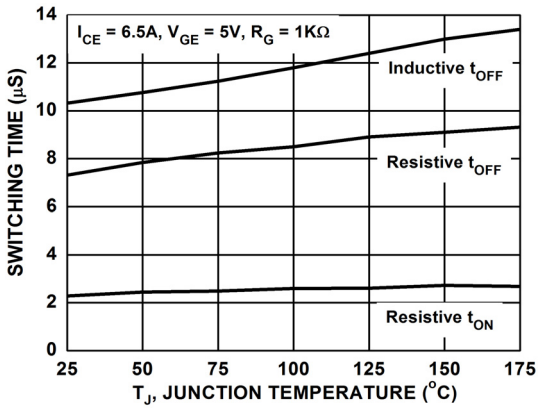



**Figure 12. Switching Time vs. Junction Temperature**

## Typical Performance Curves (Continued)

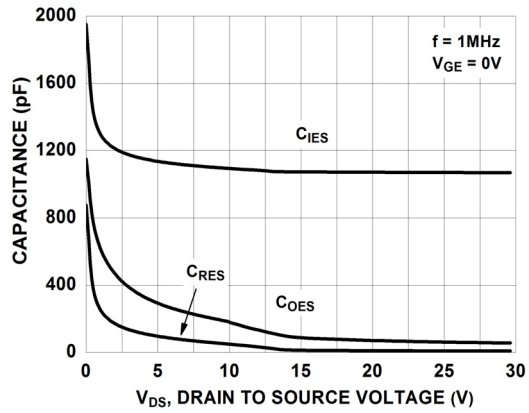



**Figure 13. Capacitance vs. Collector to Emitter Voltage**

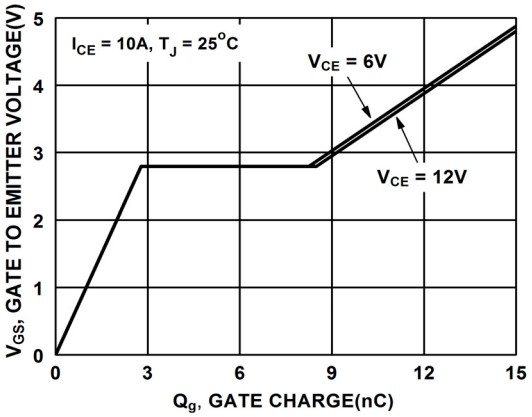



**Figure 14. Gate Charge**

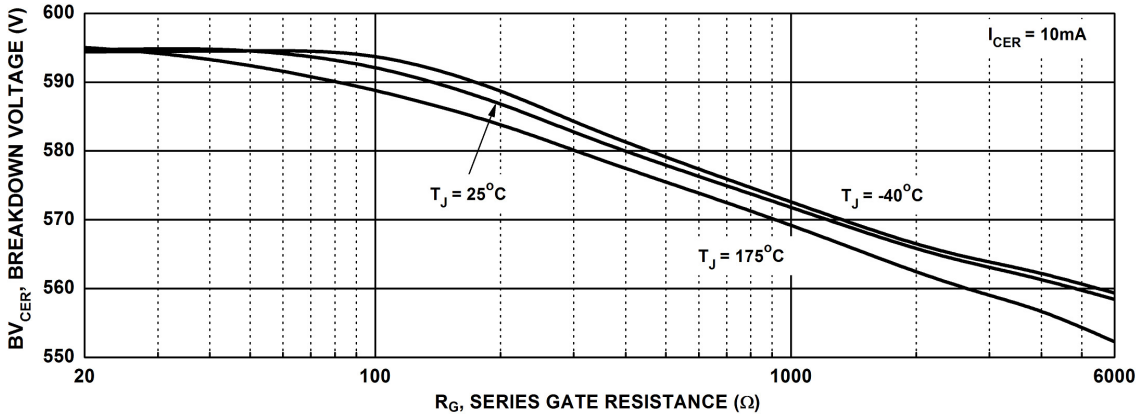



**Figure 15. Break down Voltage vs. Series Gate Resistance**

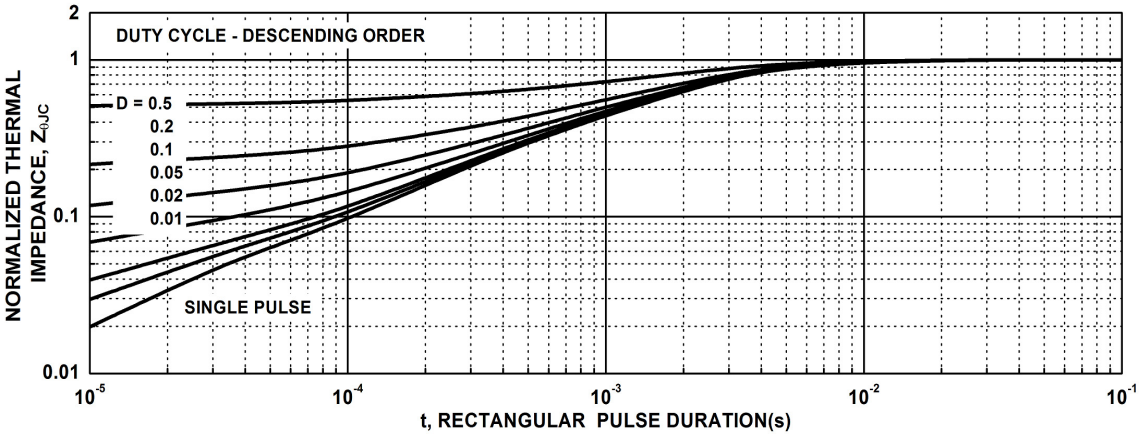



**Figure 16. IGBT Normalized Transient Thermal Impedance, Junction to Case**

## Typical Performance Curves

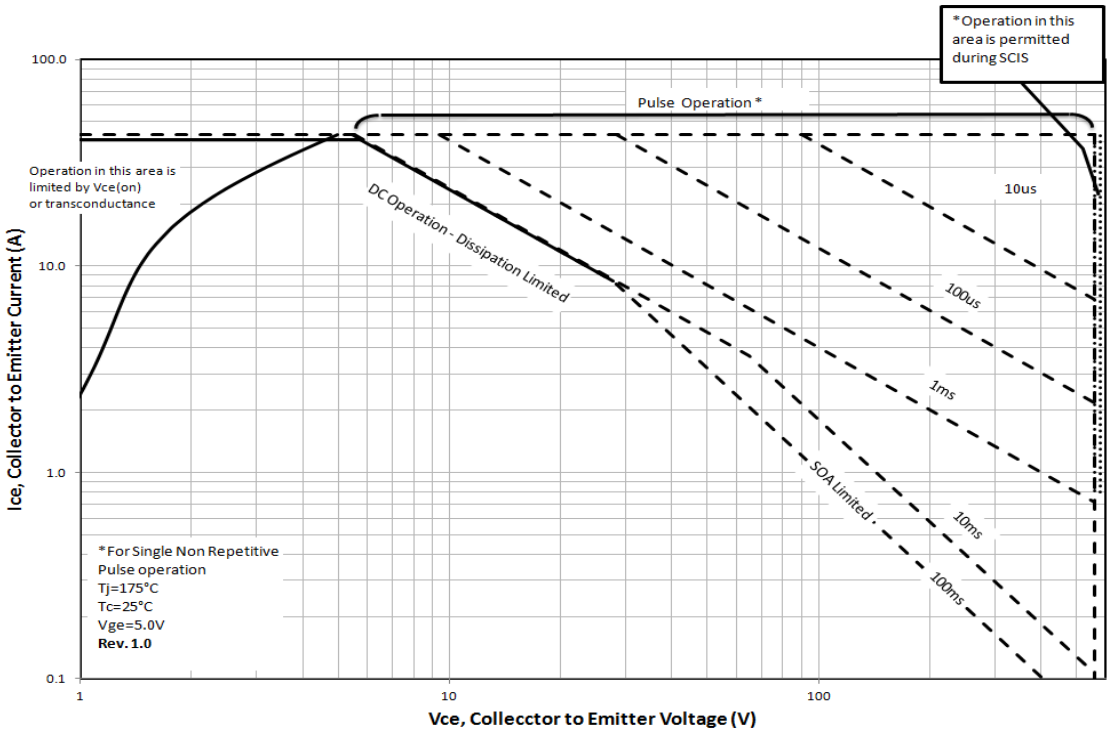
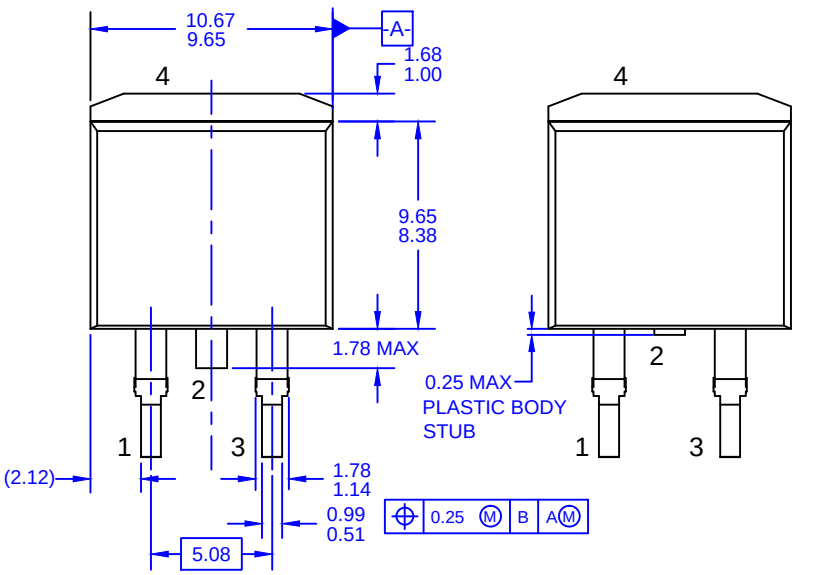
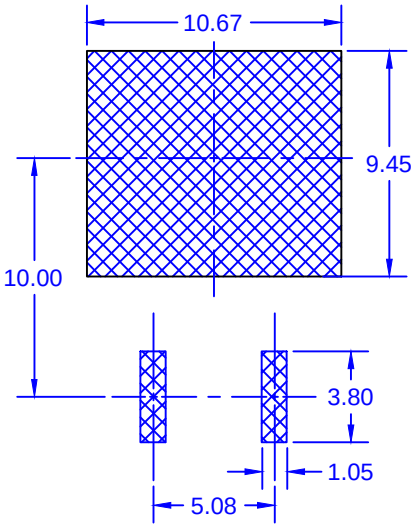


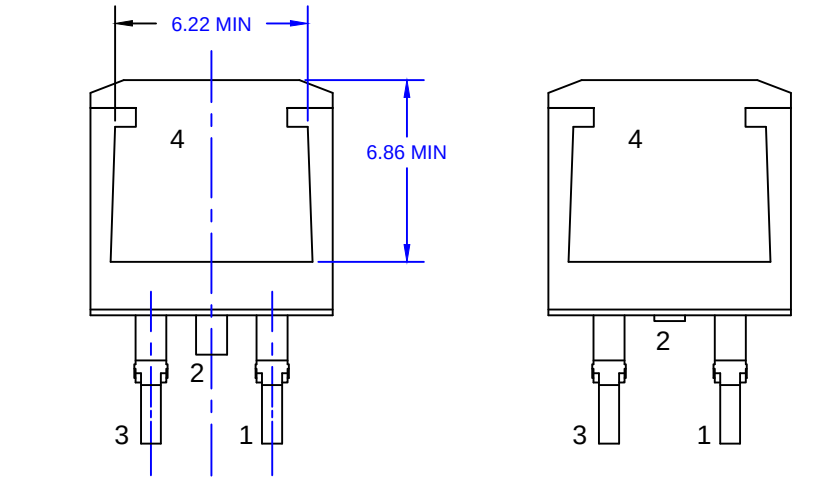

**Figure 17. Forward Safe Operating Area**



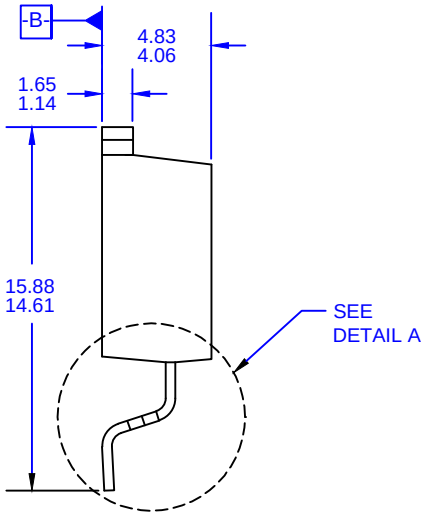

FRONT VIEW - DIODE PRODUCTS VERSION
ALTERNATIVE SUPPLIER DETAIL




LAND PATTERN RECOMMENDATION
UNLESS NOTED, ALL DIMS TYPICAL

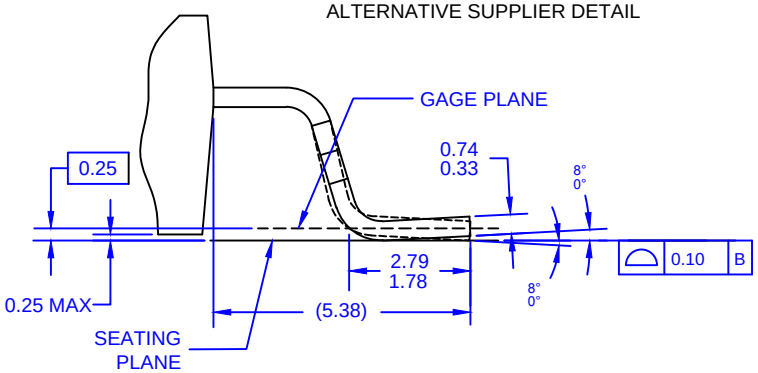



BACK VIEW - DIODE PRODUCTS VERSION
ALTERNATIVE SUPPLIER DETAIL




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.

## PUBLICATION ORDERING INFORMATION

**LITERATURE FULFILLMENT**:
Literature Distribution Center for ON Semiconductor
19521 E. 32nd Pkwy, Aurora, Colorado 80011 USA
**Phone**: 303−675−2175 or 800−344−3860 Toll Free USA/Canada
**Fax**: 303−675−2176 or 800−344−3867 Toll Free USA/Canada
**Email**: orderlit@onsemi.com

**N. American Technical Support**: 800−282−9855 Toll Free USA/Canada
**Europe, Middle East and Africa Technical Support:**
Phone: 421 33 790 2910
**Japan Customer Focus Center**
Phone: 81−3−5817−1050

**ON Semiconductor Website**: **www.onsemi.com**

**Order Literature**: http://www.onsemi.com/orderlit

For additional information, please contact your local Sales Representative

# Mouser Electronics

Authorized Distributor

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

ON Semiconductor:

FGB3056_F085

Общество с ограниченной ответственностью «МосЧип» ИНН 7719860671 / КПП 771901001
Адрес: 105318, г.Москва, ул.Щербаковская д.3, офис 1107

**Данный компонент на территории Российской Федерации**

**Вы можете приобрести в компании MosChip.**

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

http://moschip.ru/get-element

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

**Офис по работе с юридическими лицами:**

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:
moschip.ru
moschip.ru_4
moschip.ru_6
moschip.ru_9