



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of "Quality Parts,Customers Priority,Honest Operation,and Considerate Service",our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



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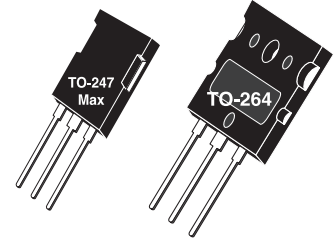
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Ultra Fast NPT - IGBT®

The Ultra Fast NPT - IGBT® is a new generation of high voltage power IGBTs. Using Non-Punch-Through Technology, the Ultra Fast NPT-IGBT® offers superior ruggedness and ultrafast switching speed.



Features

- Low Saturation Voltage
- Low Tail Current
- RoHS Compliant 
- Short Circuit Withstand Rated
- High Frequency Switching
- Ultra Low Leakage Current

Unless stated otherwise, Microsemi discrete IGBTs contain a single IGBT die. This device is recommended for applications such as induction heating (IH), motor control, general purpose inverters and uninterruptible power supplies (UPS).



MAXIMUM RATINGS

All Ratings: $T_C = 25^\circ\text{C}$ unless otherwise specified.

| Symbol | Parameter | Ratings | Unit |
|----------------|--|------------|------------------|
| V_{ces} | Collector Emitter Voltage | 1200 | V |
| V_{GE} | Gate-Emitter Voltage | ± 30 | |
| I_{C1} | Continuous Collector Current @ $T_C = 25^\circ\text{C}$ | 160 | A |
| I_{C2} | Continuous Collector Current @ $T_C = 110^\circ\text{C}$ | 70 | |
| I_{CM} | Pulsed Collector Current ^① | 280 | |
| SCWT | Short Circuit Withstand Time: $V_{CE} = 600V, V_{GE} = 15V, T_C = 125^\circ\text{C}$ | 10 | μs |
| P_D | Total Power Dissipation @ $T_C = 25^\circ\text{C}$ | 961 | W |
| T_J, T_{STG} | Operating and Storage Junction Temperature Range | -55 to 150 | $^\circ\text{C}$ |
| T_L | Max. Lead Temp. for Soldering: 0.063" from Case for 10 Sec. | 300 | |

STATIC ELECTRICAL CHARACTERISTICS

| Symbol | Parameter | Min | Typ | Max | Unit |
|---------------|---|------|-----|-----------|---------------|
| $V_{(BR)CES}$ | Collector-Emitter Breakdown Voltage ($V_{GE} = 0V, I_C = 1.0mA$) | 1200 | | | Volts |
| $V_{GE(TH)}$ | Gate Threshold Voltage ($V_{CE} = V_{GE}, I_C = 2.5mA, T_J = 25^\circ\text{C}$) | 3.5 | 5.0 | 6.5 | |
| $V_{CE(ON)}$ | Collector-Emitter On Voltage ($V_{GE} = 15V, I_C = 70A, T_J = 25^\circ\text{C}$) | | 2.5 | 3.2 | |
| | Collector-Emitter On Voltage ($V_{GE} = 15V, I_C = 70A, T_J = 125^\circ\text{C}$) | | 3.3 | | |
| | Collector-Emitter On Voltage ($V_{GE} = 15V, I_C = 140A, T_J = 25^\circ\text{C}$) | | 3.5 | | |
| I_{CES} | Collector Cut-off Current ($V_{CE} = 1200V, V_{GE} = 0V, T_J = 25^\circ\text{C}$) ^② | | 10 | 1000 | μA |
| | Collector Cut-off Current ($V_{CE} = 1200V, V_{GE} = 0V, T_J = 125^\circ\text{C}$) ^② | | 100 | | |
| I_{GES} | Gate-Emitter Leakage Current ($V_{GE} = \pm 20V$) | | | ± 250 | nA |



CAUTION: These Devices are Sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed.

DYNAMIC CHARACTERISTICS

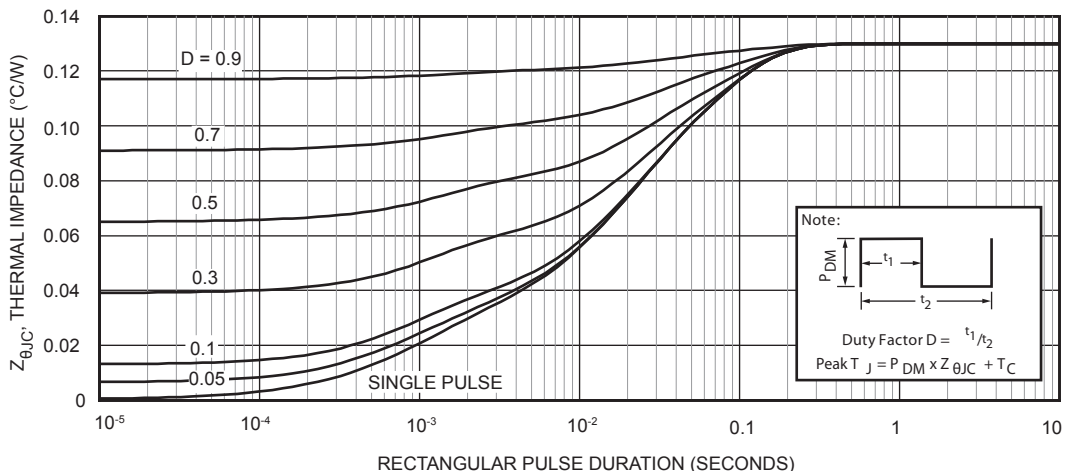
APT70GR120B2_L

| Symbol | Parameter | Test Conditions | Min | Typ | Max | Unit |
|-----------------|---------------------------------|---|-----|------|------|---------|
| C_{ies} | Input Capacitance | Capacitance $V_{GE} = 0V, V_{CE} = 25V$ $f = 1MHz$ | | 7260 | | pF |
| C_{oes} | Output Capacitance | | | 643 | | |
| C_{res} | Reverse Transfer Capacitance | | | 199 | | |
| V_{GEP} | Gate to Emitter Plateau Voltage | Gate Charge $V_{GE} = 15V$ $V_{CE} = 600V$ $I_C = 70A$ | | 7.5 | | V |
| $Q_g^{(3)}$ | Total Gate Charge | | | 412 | 544 | |
| Q_{ge} | Gate-Emitter Charge | | | 48 | 62 | |
| Q_{gc} | Gate- Collector Charge | | | 204 | 275 | |
| $t_{d(on)}$ | Turn-On Delay Time | Inductive Switching (25°C) $V_{CC} = 600V$ $V_{GE} = 15V$ $I_C = 70A$ | | 33 | | ns |
| t_r | Current Rise Time | | | 48 | | |
| $t_{d(off)}$ | Turn-Off Delay Time | | | 278 | | |
| t_f | Current Fall Time | | | 64 | | |
| $E_{on2}^{(5)}$ | Turn-On Switching Energy | $R_G = 4.3 \Omega^{(4)}$ $T_J = +25^\circ C$ | | 3816 | 5720 | μJ |
| $E_{off}^{(6)}$ | Turn-Off Switching Energy | | | 2582 | 3870 | |
| $t_{d(on)}$ | Turn-On Delay Time | Inductive Switching (125°C) $V_{CC} = 600V$ $V_{GE} = 15V$ $I_C = 70A$ | | 33 | | ns |
| t_r | Current Rise Time | | | 48 | | |
| $t_{d(off)}$ | Turn-Off Delay Time | | | 320 | | |
| t_f | Current Fall Time | | | 74 | | |
| $E_{on2}^{(5)}$ | Turn-On Switching Energy | $R_G = 4.3 \Omega^{(4)}$ $T_J = +125^\circ C$ | | 5651 | 8475 | μJ |
| $E_{off}^{(6)}$ | Turn-Off Switching Energy | | | 3323 | 4980 | |

THERMAL AND MECHANICAL CHARACTERISTICS

| Symbol | Characteristic | Min | Typ | Max | Unit |
|-----------------|--|-----|-----|-----|--------------|
| $R_{\theta JC}$ | Junction to Case Thermal Resistance (IGBT) | | | .13 | $^\circ C/W$ |
| $R_{\theta JA}$ | Junction to Ambient Thermal Resistance | | | 40 | |
| W_T | Package Weight | B2 | .22 | | oz |
| | | L | 6 | | g |
| | | | .36 | | oz |
| | | | 10 | | g |

- 1 Repetitive Rating: Pulse width and case temperature limited by maximum junction temperature.
 - 2 Pulse test: Pulse Width < 380 μs , duty cycle < 2%.
 - 3 See Mil-Std-750 Method 3471.
 - 4 R_G is external gate resistance, not including internal gate resistance or gate driver impedance. (MIC4452)
 - 5 E_{on2} is the clamped inductive turn on energy that includes a commutating diode reverse recovery current in the IGBT turn on energy loss. A combi device is used for the clamping diode.
 - 6 E_{off} is the clamped inductive turn-off energy measured in accordance with JEDEC standard JESD24-1.
- Microsemi reserves the right to change, without notice, the specifications and information contained herein.**



TYPICAL PERFORMANCE CURVES

APT70GR120B2_L

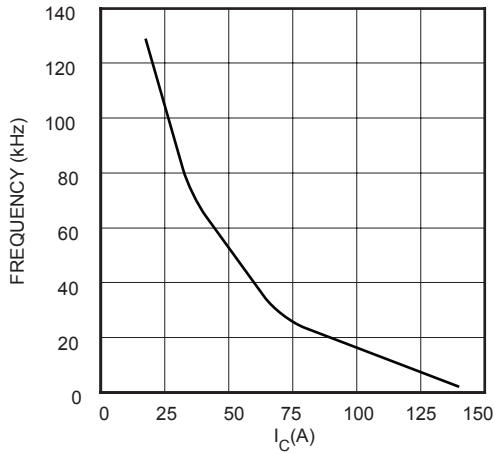


FIGURE 2, Max Frequency vs Current ($T_{case} = 75^{\circ}C$)

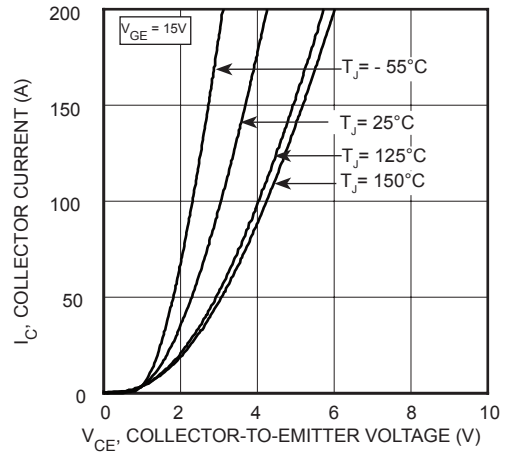


FIGURE 3, Saturation Voltage Characteristics ($T_J = 25^{\circ}C$)

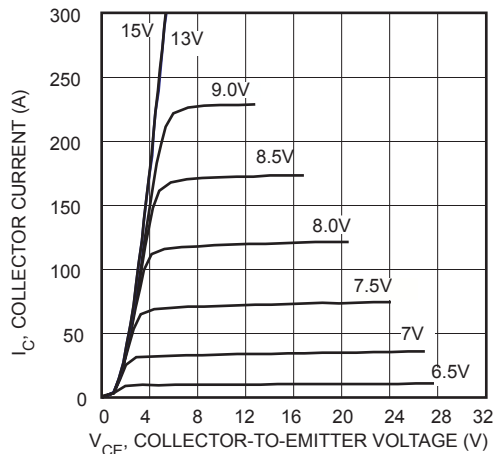


FIGURE 4, Output Characteristics ($T_J = 25^{\circ}C$)

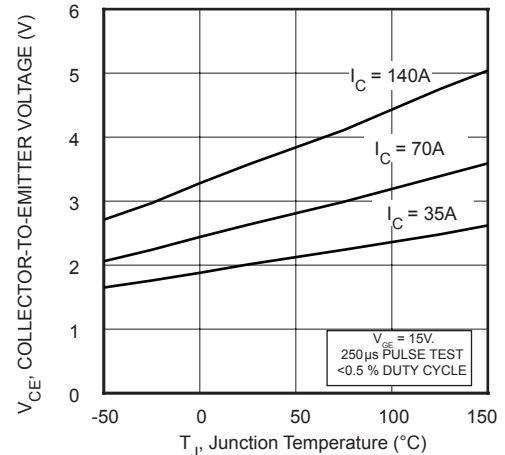


FIGURE 5, On State Voltage vs Junction Temperature

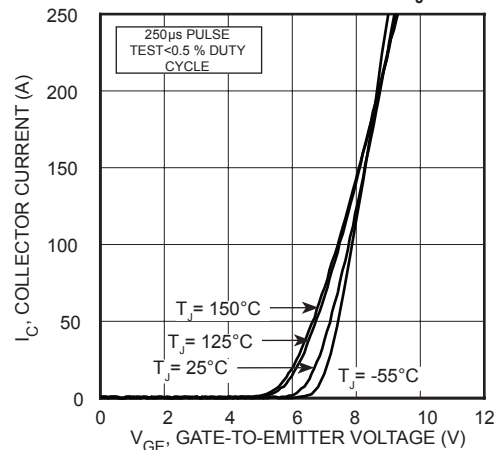


FIGURE 6, Transfer Characteristics

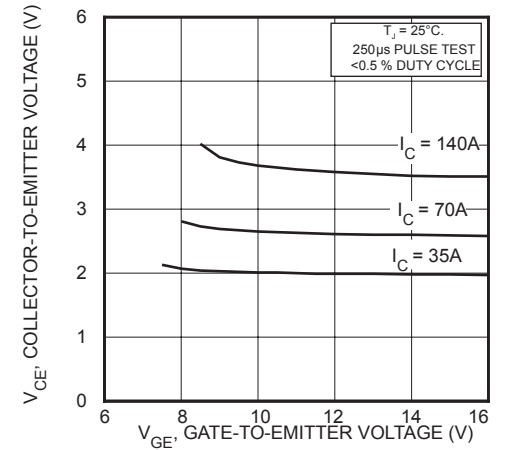


FIGURE 7, On State Voltage vs Gate-to-Emitter Voltage

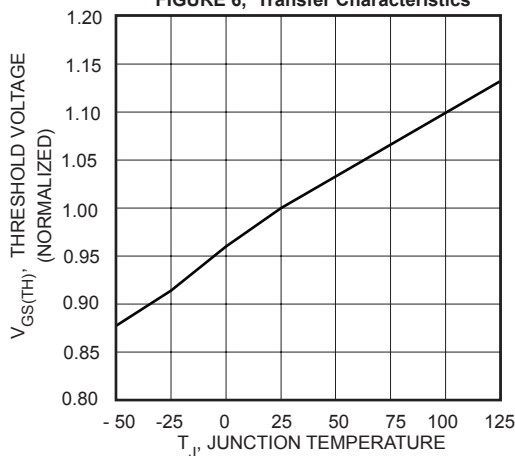


FIGURE 8, Threshold Voltage vs Junction Temperature

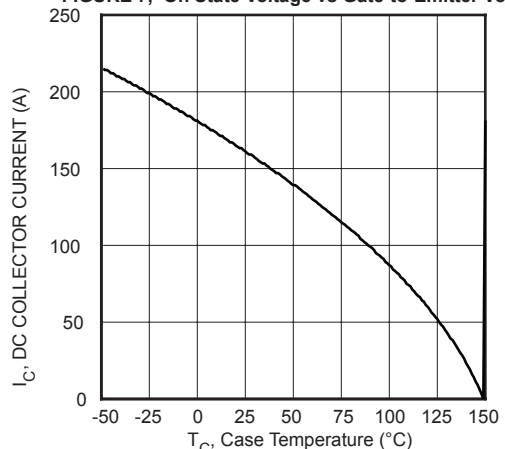


FIGURE 9, DC Collector Current vs Case Temperature

TYPICAL PERFORMANCE CURVES

APT70GR120B2_L

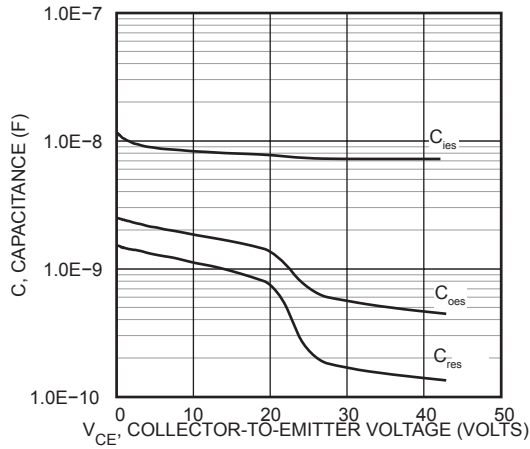


FIGURE 10, Capacitance vs Collector-To-Emitter Voltage

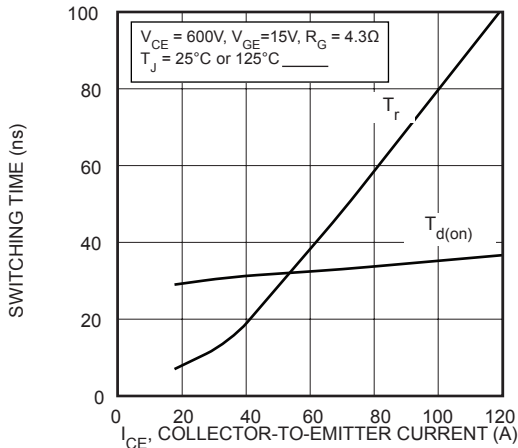


FIGURE 12, Turn-On Time vs Collector Current

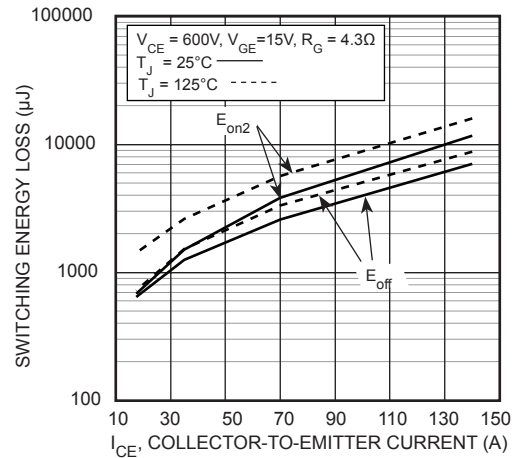


FIGURE 14, Energy Loss vs Collector Current

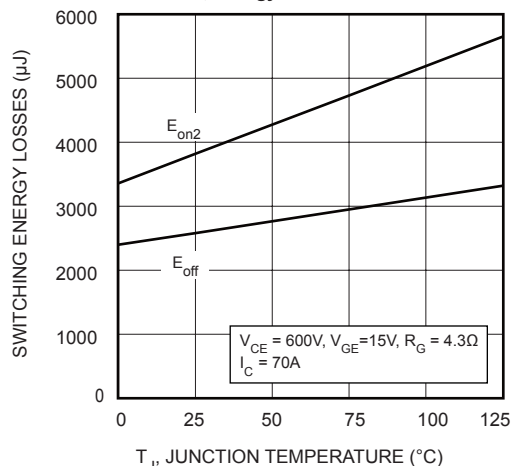


FIGURE 16, Switching Energy vs Junction Temperature

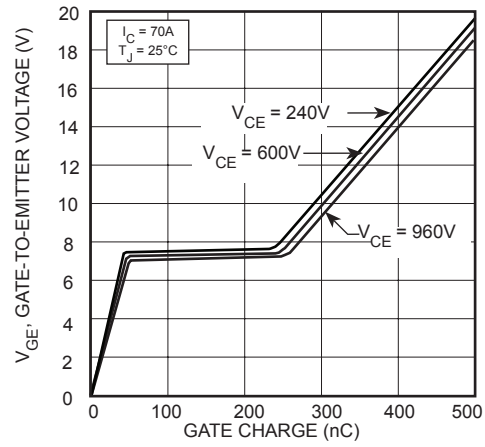


FIGURE 11, Gate charge

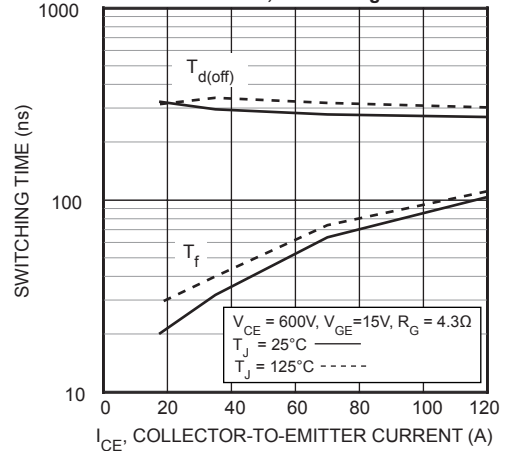


FIGURE 13, Turn-Off Time vs Collector Current

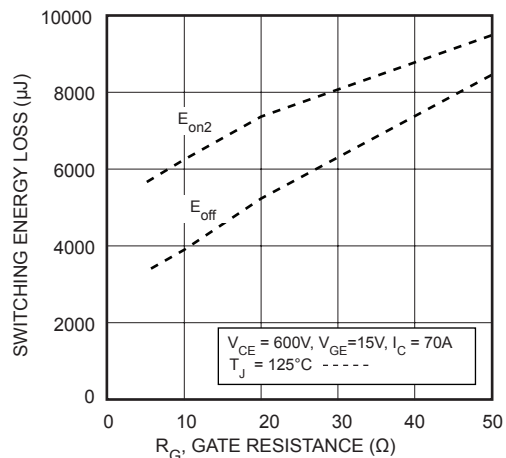


FIGURE 15, Energy Loss vs Gate Resistance

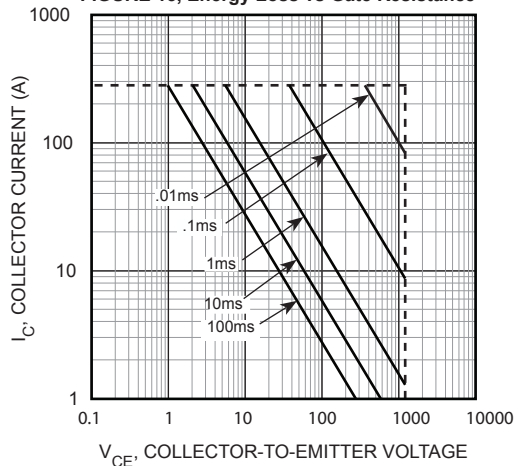
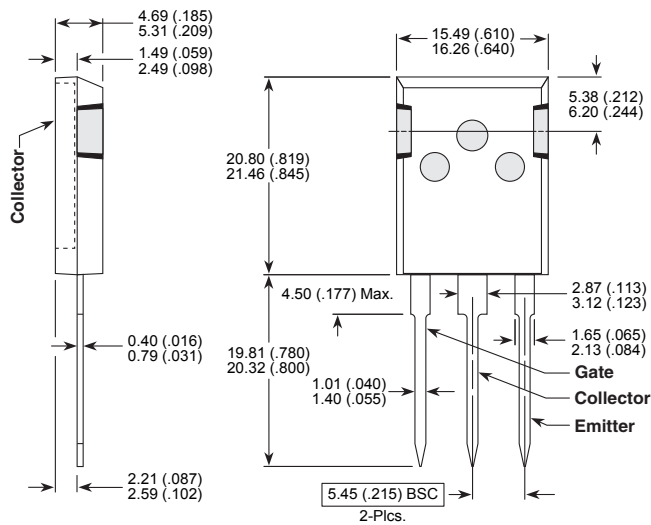


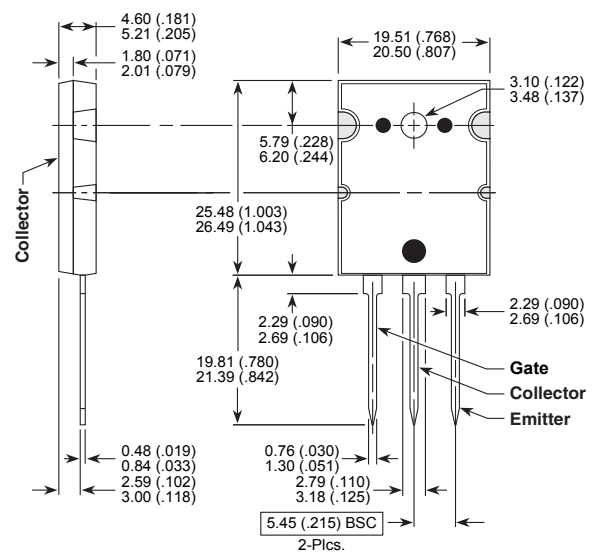
FIGURE 17, Minimum Switching Safe Operating Area

T-MAX™ (B2) Package Outline



These dimensions are equal to the TO-247 without the mounting hole.
 Dimensions in Millimeters and (Inches)

TO-264 (L) Package Outline



Dimensions in Millimeters and (Inches)

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