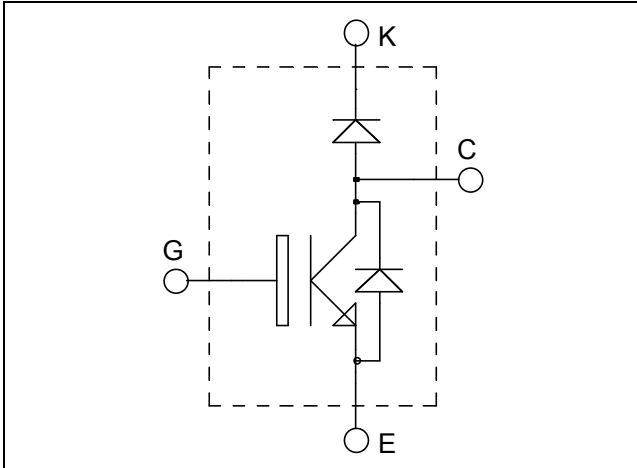


**ISOTOP[®] Boost chopper
Trench + Field Stop IGBT4
Power module**

**$V_{CES} = 1200V$
 $I_C = 60A @ T_c = 80^{\circ}C$**



Application

- AC and DC motor control
- Switched Mode Power Supplies
- Power Factor Correction
- Brake switch

Features

- Trench + Field Stop IGBT 4 Technology
 - Low voltage drop
 - Low leakage current
 - Low switching losses
 - Soft recovery parallel diodes
 - Low diode VF
 - Low leakage current
 - RBSOA and SCSOA rated
- ISOTOP[®] Package (SOT-227)
- Very low stray inductance
- High level of integration

Benefits

- Low conduction losses
- Stable temperature behavior
- Very rugged
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Easy paralleling due to positive T_C of V_{CEsat}
- RoHS Compliant

Absolute maximum ratings

| Symbol | Parameter | Max ratings | Unit |
|-----------|---------------------------------------|----------------------|--------------|
| V_{CES} | Collector - Emitter Breakdown Voltage | 1200 | V |
| I_C | Continuous Collector Current | $T_C = 25^{\circ}C$ | 80 |
| | | $T_C = 80^{\circ}C$ | 60 |
| I_{CM} | Pulsed Collector Current | $T_C = 25^{\circ}C$ | 100 |
| V_{GE} | Gate - Emitter Voltage | ± 20 | V |
| P_D | Maximum Power Dissipation | $T_C = 25^{\circ}C$ | 280 |
| RBSOA | Reverse Bias Safe Operating Area | $T_j = 150^{\circ}C$ | 100A @ 1100V |

CAUTION: These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed. See application note APT0502 on www.microsemi.com

All ratings @ $T_j = 25^\circ\text{C}$ unless otherwise specified

Electrical Characteristics

| Symbol | Characteristic | Test Conditions | Min | Typ | Max | Unit |
|---------------|--------------------------------------|--------------------------------|---------------------------|------|------|---------------|
| I_{CES} | Zero Gate Voltage Collector Current | $V_{GE} = 0V, V_{CE} = 1200V$ | | | 250 | μA |
| $V_{CE(sat)}$ | Collector Emitter saturation Voltage | $V_{GE} = 15V$ $I_C = 50A$ | $T_j = 25^\circ\text{C}$ | 1.85 | 2.25 | V |
| | | | $T_j = 150^\circ\text{C}$ | 2.25 | | |
| $V_{GE(th)}$ | Gate Threshold Voltage | $V_{GE} = V_{CE}, I_C = 1.6mA$ | 5.0 | 5.8 | 6.5 | V |
| I_{GES} | Gate – Emitter Leakage Current | $V_{GE} = 20V, V_{CE} = 0V$ | | | 400 | nA |

Dynamic Characteristics

| Symbol | Characteristic | Test Conditions | Min | Typ | Max | Unit |
|--------------|------------------------------|--|---------------------------|------|-----|---------------|
| C_{ies} | Input Capacitance | $V_{GE} = 0V$ | | 2770 | | pF |
| C_{oes} | Output Capacitance | $V_{CE} = 25V$ | | 205 | | |
| C_{res} | Reverse Transfer Capacitance | $f = 1MHz$ | | 160 | | |
| Q_G | Gate charge | $V_{GE} = \pm 15V; V_{CE} = 600V$ $I_C = 50A$ | | 0.38 | | μC |
| $T_{d(on)}$ | Turn-on Delay Time | Inductive Switching (25°C) | | 130 | | ns |
| T_r | Rise Time | $V_{GE} = \pm 15V$ $V_{CE} = 600V$ | | 20 | | |
| $T_{d(off)}$ | Turn-off Delay Time | $I_C = 50A$ | | 300 | | |
| T_f | Fall Time | $R_G = 8.2\Omega$ | | 45 | | |
| $T_{d(on)}$ | Turn-on Delay Time | Inductive Switching (150°C) | | 150 | | ns |
| T_r | Rise Time | $V_{GE} = \pm 15V$ $V_{CE} = 600V$ | | 35 | | |
| $T_{d(off)}$ | Turn-off Delay Time | $I_C = 50A$ | | 350 | | |
| T_f | Fall Time | $R_G = 8.2\Omega$ | | 80 | | |
| E_{on} | Turn-on Switching Energy | $V_{GE} = \pm 15V$ $V_{CE} = 600V$ | $T_j = 25^\circ\text{C}$ | 3.8 | | mJ |
| | | | $T_j = 150^\circ\text{C}$ | 5.5 | | |
| E_{off} | Turn-off Switching Energy | $I_C = 50A$ $R_G = 8.2\Omega$ | $T_j = 25^\circ\text{C}$ | 2.5 | | mJ |
| | | | $T_j = 150^\circ\text{C}$ | 4.5 | | |
| I_{sc} | Short Circuit data | $V_{GE} \leq 15V; V_{Bus} = 900V$ $t_p \leq 10\mu\text{s}; T_j = 150^\circ\text{C}$ | | 200 | | A |

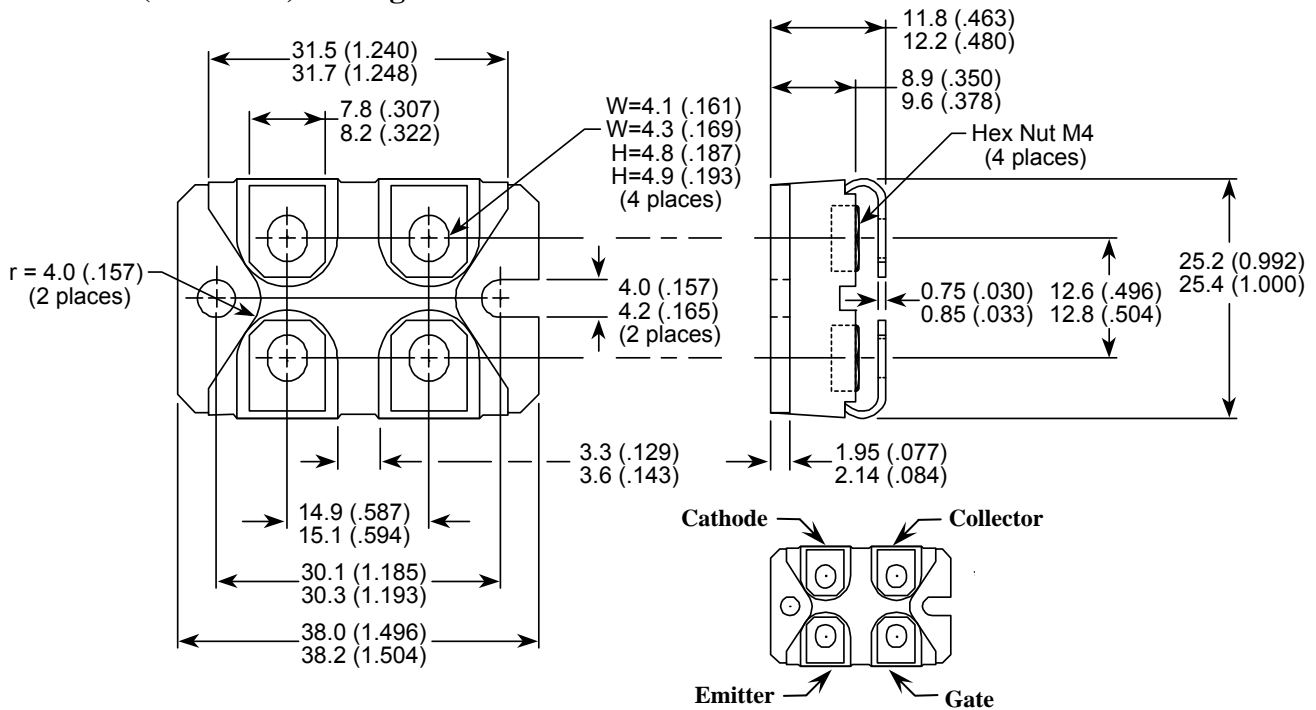
Chopper diode ratings and characteristics

| Symbol | Characteristic | Test Conditions | Min | Typ | Max | Unit |
|-----------|---|-----------------------------|---------------------------|------|-----|---------------|
| V_{RRM} | Maximum Peak Repetitive Reverse Voltage | | 1200 | | | V |
| I_{RM} | Maximum Reverse Leakage Current | $V_R = 1200V$ | | | 100 | μA |
| | | | | | 500 | |
| I_F | DC Forward Current | | | 30 | | A |
| V_F | Diode Forward Voltage | $I_F = 30A$ | | 2.6 | 3.1 | V |
| | | $I_F = 60A$ | | 3.2 | | |
| | | $I_F = 30A$ | $T_j = 125^\circ\text{C}$ | 1.8 | | |
| t_{rr} | Reverse Recovery Time | $I_F = 30A$ $V_R = 800V$ | $T_j = 25^\circ\text{C}$ | 300 | | ns |
| | | | $T_j = 125^\circ\text{C}$ | 380 | | |
| Q_{rr} | Reverse Recovery Charge | $di/dt = 200A/\mu\text{s}$ | $T_j = 25^\circ\text{C}$ | 360 | | nC |
| | | | $T_j = 125^\circ\text{C}$ | 1700 | | |

Thermal and package characteristics

| Symbol | Characteristic | Min | Typ | Max | Unit |
|-----------------------------------|--|-------|------|------|------|
| R _{thJC} | Junction to Case Thermal Resistance | IGBT | | 0.53 | °C/W |
| | | Diode | | 1.2 | |
| R _{thJA} | Junction to Ambient (IGBT & Diode) | | | 20 | |
| V _{ISOL} | RMS Isolation Voltage, any terminal to case t=1 min, I _{isol} <1mA, 50/60Hz | 2500 | | | V |
| T _J , T _{STG} | Storage Temperature Range | -55 | | 175 | °C |
| T _L | Max Lead Temp for Soldering: 0.063" from case for 10 sec | | | 300 | |
| Torque | Mounting torque (Mounting = 8-32 or 4mm Machine and terminals = 4mm Machine) | | | 1.5 | N.m |
| Wt | Package Weight | | 29.2 | | g |

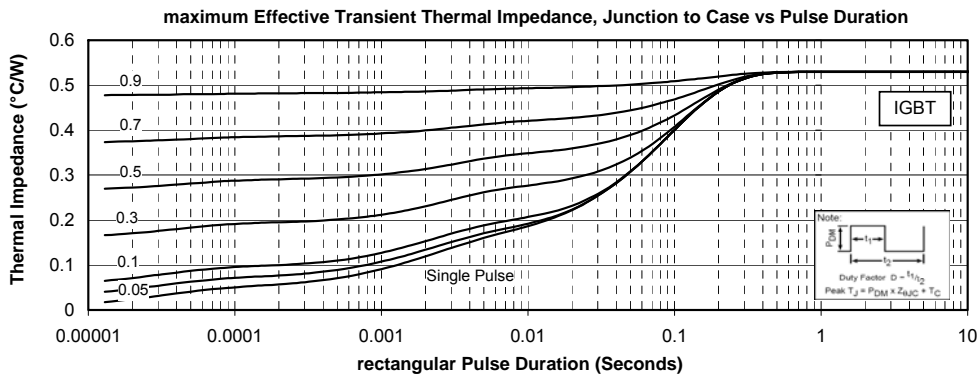
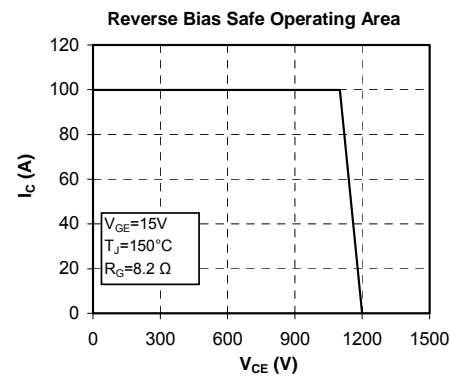
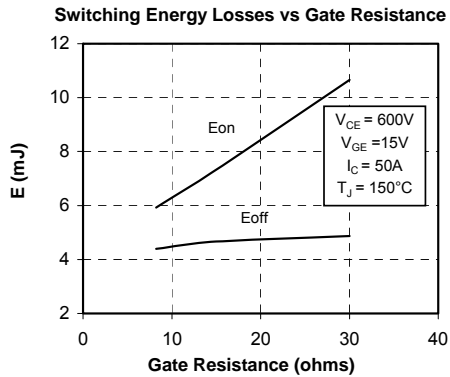
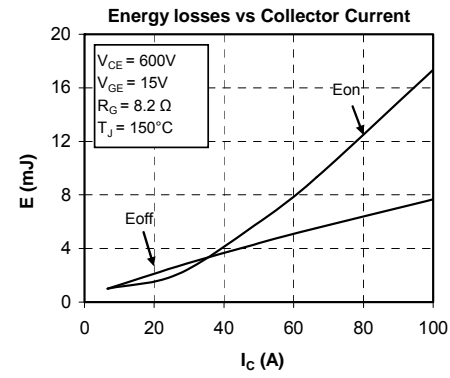
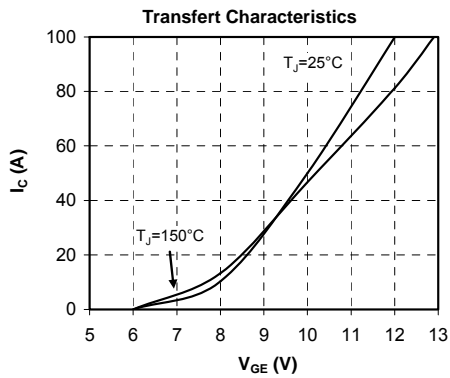
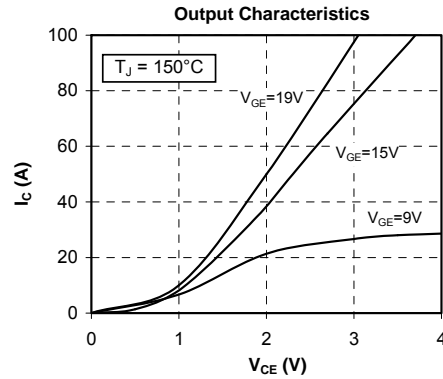
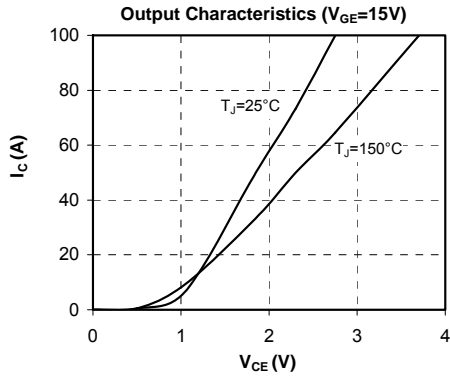
SOT-227 (ISOTOP®) Package Outline

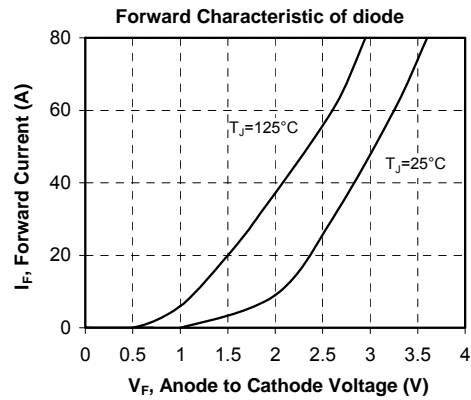
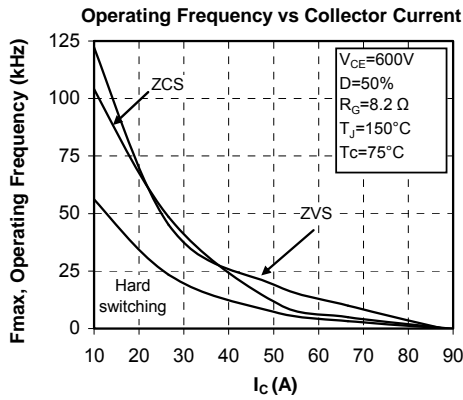


Dimensions in Millimeters and (Inches)

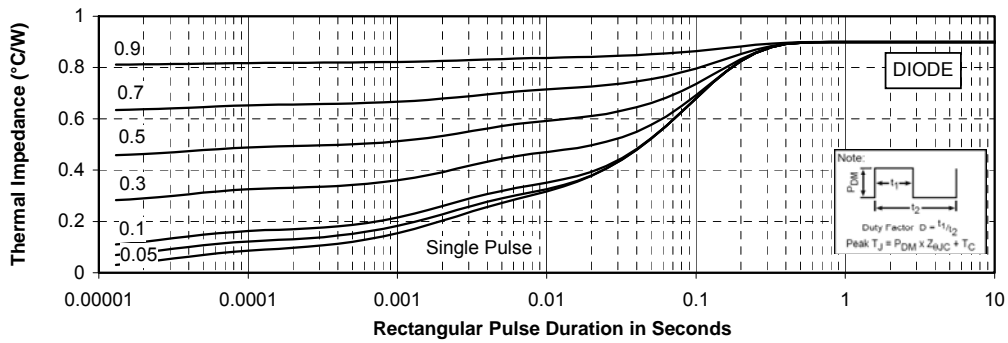
ISOTOP® is a registered trademark of ST Microelectronics NV

Typical Performance Curve





maximum Effective Transient Thermal Impedance, Junction to Case vs Pulse Duration



Microsemi reserves the right to change, without notice, the specifications and information contained herein

Microsemi's products are covered by one or more of U.S. patents 4,895,810 5,045,903 5,089,434 5,182,234 5,019,522 5,262,336 6,503,786 5,256,583 4,748,103 5,283,202 5,231,474 5,434,095 5,528,058 6,939,743 7,352,045 5,283,201 5,801,417 5,648,283 7,196,634 6,664,594 7,157,886 6,939,743 7,342,262 and foreign patents. U.S and Foreign patents pending. All Rights Reserved.