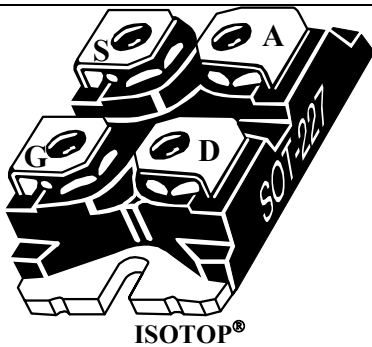
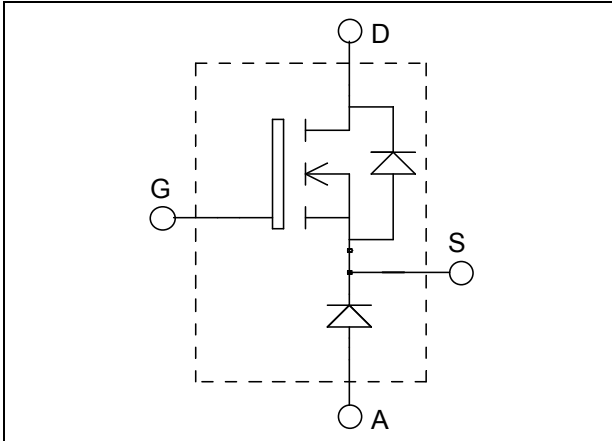


**ISOTOP<sup>®</sup> Buck chopper  
Super Junction MOSFET  
Power Module**

**$V_{DSS} = 900V$**   
 **$R_{DSon} = 120m\Omega \text{ max @ } T_j = 25^\circ C$**   
 **$I_D = 33A \text{ @ } T_c = 25^\circ C$**


**Application**

- AC and DC motor control
- Switched Mode Power Supplies

**Features**

- **COOLMOS<sup>®</sup>** Power Semiconductors
  - Ultra low  $R_{DSon}$
  - Low Miller capacitance
  - Ultra low gate charge
  - Avalanche energy rated
- ISOTOP<sup>®</sup> Package (SOT-227)
- Very low stray inductance
- High level of integration

**Benefits**

- Outstanding performance at high frequency operation
- 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      |
|------------|---|--------------------|-----------|
| $V_{DSS}$  | Drain - Source Breakdown Voltage                  | 900                | V         |
| $I_D$      | Continuous Drain Current                          | $T_c = 25^\circ C$ | 33        |
|            |   | $T_c = 80^\circ C$ | 25        |
| $I_{DM}$   | Pulsed Drain current                              | 75                 | A         |
| $V_{GS}$   | Gate - Source Voltage                             | $\pm 20$           | V         |
| $R_{DSon}$ | Drain - Source ON Resistance                      | 120                | $m\Omega$ |
| $P_D$      | Maximum Power Dissipation                         | $T_c = 25^\circ C$ | 290       |
| $I_{AR}$   | Avalanche current (repetitive and non repetitive) | 8.8                | A         |
| $E_{AR}$   | Repetitive Avalanche Energy                       | 2.9                | mJ        |
| $E_{AS}$   | Single Pulse Avalanche Energy                     | 1940               |           |

**CAUTION:** These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed. See application note APT0502 on [www.microsemi.com](http://www.microsemi.com)

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

**Electrical Characteristics**

| Symbol       | Characteristic                  | Test Conditions                     | Min                       | Typ | Max | Unit             |
|--------------|---------------------------------|-------------------------------------|---------------------------|-----|-----|------------------|
| $I_{DSS}$    | Zero Gate Voltage Drain Current | $V_{GS} = 0V, V_{DS} = 900V$        | $T_j = 25^\circ\text{C}$  |     | 100 | $\mu\text{A}$    |
|              |                                 | $V_{GS} = 0V, V_{DS} = 900V$        | $T_j = 125^\circ\text{C}$ |     | 500 |                  |
| $R_{DS(on)}$ | Drain – Source on Resistance    | $V_{GS} = 10V, I_D = 26A$           |                           | 100 | 120 | $\text{m}\Omega$ |
| $V_{GS(th)}$ | Gate Threshold Voltage          | $V_{GS} = V_{DS}, I_D = 3\text{mA}$ | 2.5                       | 3   | 3.5 | V                |
| $I_{GSS}$    | Gate – Source Leakage Current   | $V_{GS} = \pm 20V, V_{DS} = 0V$     |                           |     | 100 | $\text{nA}$      |

**Dynamic Characteristics**

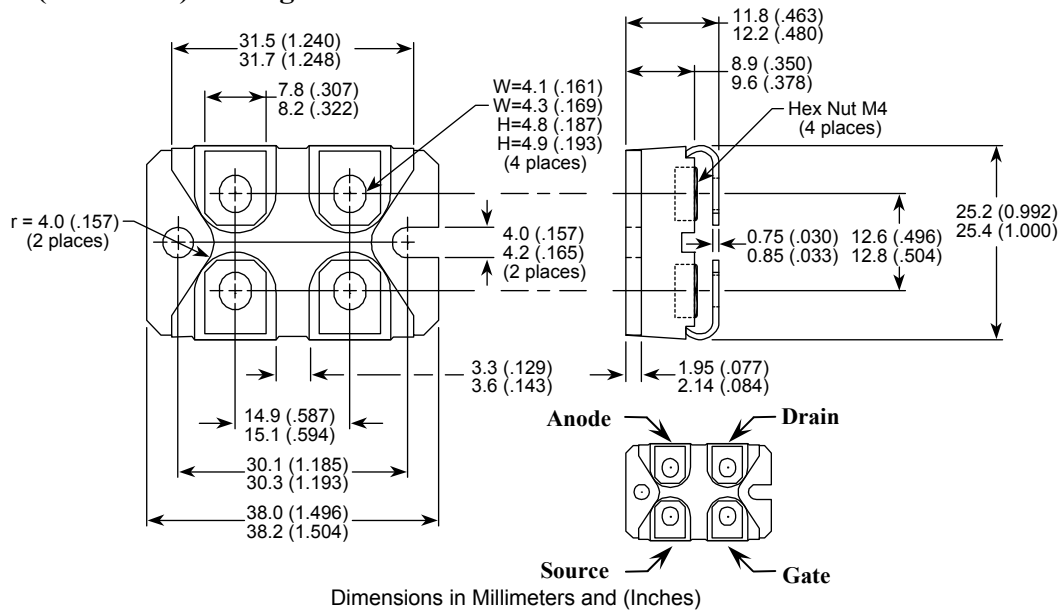
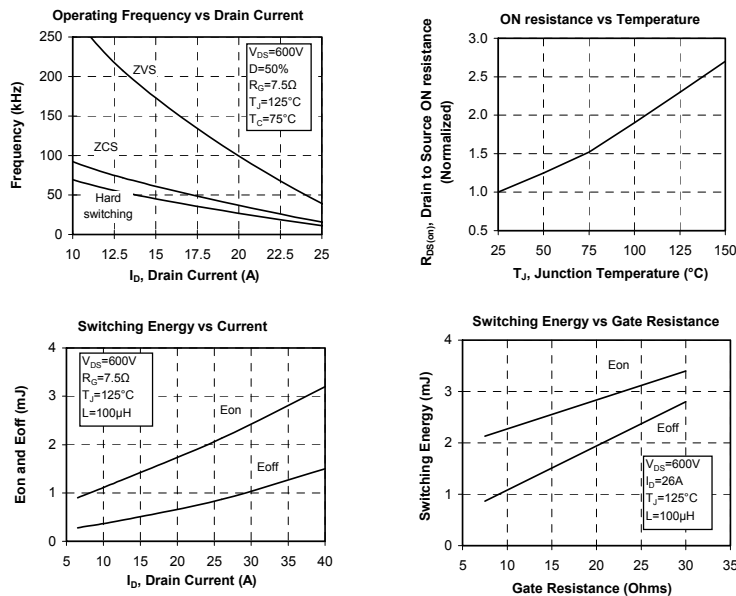
| Symbol       | Characteristic            | Test Conditions   | Min | Typ  | Max | Unit        |
|--------------|---------------------------|---|-----|------|-----|-------------|
| $C_{iss}$    | Input Capacitance         | $V_{GS} = 0V; V_{DS} = 100V$  |     | 6.8  |     | $\text{nF}$ |
| $C_{oss}$    | Output Capacitance        | $f = 1\text{MHz}$   |     | 0.33 |     |             |
| $Q_g$        | Total gate Charge         | $V_{GS} = 10V$<br>$V_{Bus} = 400V$<br>$I_D = 26A$   |     | 270  |     | $\text{nC}$ |
| $Q_{gs}$     | Gate – Source Charge      |   |     | 32   |     |             |
| $Q_{gd}$     | Gate – Drain Charge       |   |     | 115  |     |             |
| $T_{d(on)}$  | Turn-on Delay Time        | <b>Inductive Switching (<math>125^\circ\text{C}</math>)</b><br>$V_{GS} = 10V$<br>$V_{Bus} = 600V$<br>$I_D = 26A$<br>$R_G = 7.5\Omega$ |     | 70   |     | $\text{ns}$ |
| $T_r$        | Rise Time                 |   |     | 20   |     |             |
| $T_{d(off)}$ | Turn-off Delay Time       |   |     | 400  |     |             |
| $T_f$        | Fall Time                 |   |     | 25   |     |             |
| $E_{on}$     | Turn-on Switching Energy  | <b>Inductive switching @ <math>25^\circ\text{C}</math></b><br>$V_{GS} = 10V; V_{Bus} = 600V$<br>$I_D = 26A; R_G = 7.5\Omega$          |     | 1.5  |     | $\text{mJ}$ |
| $E_{off}$    | Turn-off Switching Energy |   |     | 0.75 |     |             |
| $E_{on}$     | Turn-on Switching Energy  | <b>Inductive switching @ <math>125^\circ\text{C}</math></b><br>$V_{GS} = 10V; V_{Bus} = 600V$<br>$I_D = 26A; R_G = 7.5\Omega$         |     | 2.1  |     | $\text{mJ}$ |
| $E_{off}$    | Turn-off Switching Energy |   |     | 0.85 |     |             |

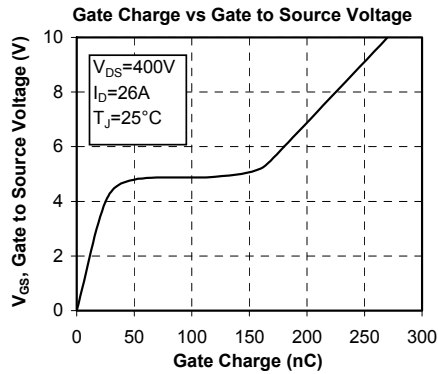
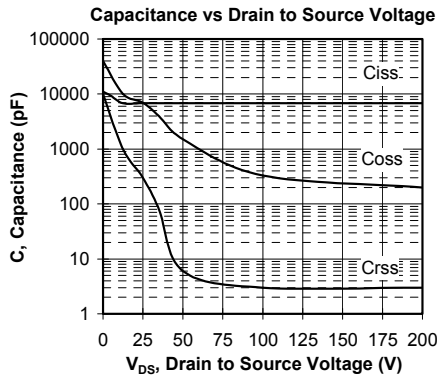
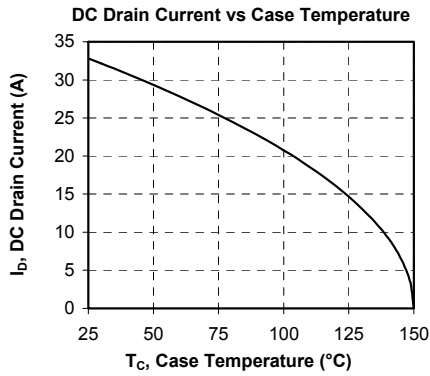
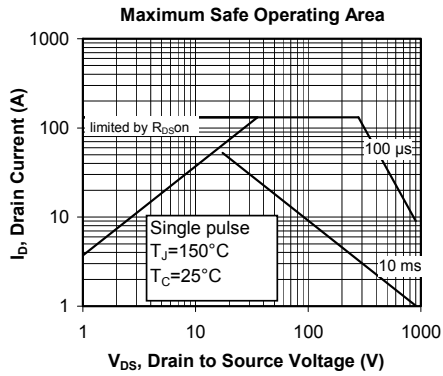
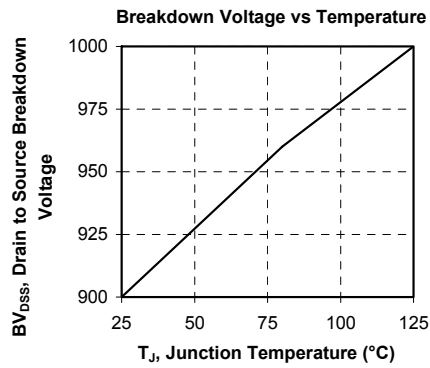
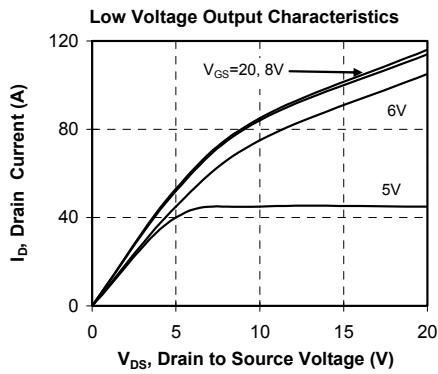
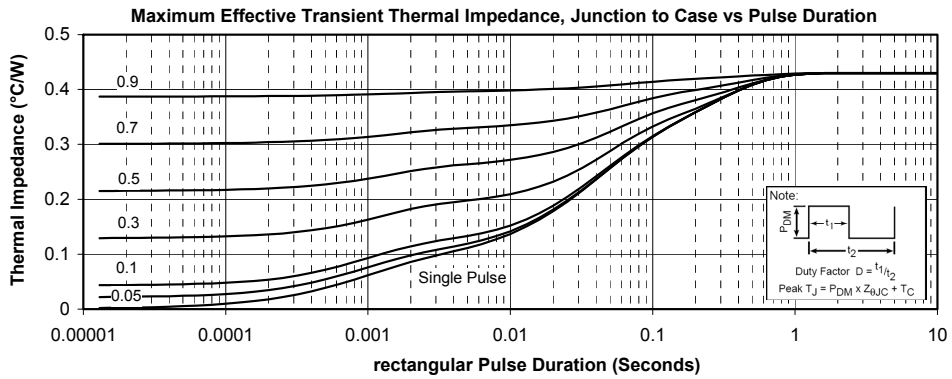
**Chopper diode ratings and characteristics**

| Symbol    | Characteristic                          | Test Conditions   | Min                       | Typ  | Max | Unit          |
|-----------|---|---|---------------------------|------|-----|---------------|
| $V_{RRM}$ | Maximum Peak Repetitive Reverse Voltage |   | 1200                      |      |     | V             |
| $I_{RM}$  | Maximum Reverse Leakage Current         | $V_R = 1200V$   | $T_j = 25^\circ\text{C}$  |      | 100 | $\mu\text{A}$ |
|           |   |   | $T_j = 125^\circ\text{C}$ |      | 500 |               |
| $I_F$     | DC Forward Current                      | $T_c = 80^\circ\text{C}$                                  |                           | 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                   | $I_F = 30A$<br>$V_R = 800V$<br>$di/dt = 200A/\mu\text{s}$ | $T_j = 25^\circ\text{C}$  | 300  |     | $\text{ns}$   |
|           |   |   | $T_j = 125^\circ\text{C}$ | 380  |     |               |
| $Q_{rr}$  | Reverse Recovery Charge                 | $I_F = 30A$<br>$V_R = 800V$<br>$di/dt = 200A/\mu\text{s}$ | $T_j = 25^\circ\text{C}$  | 360  |     | $\text{nC}$   |
|           |   |   | $T_j = 125^\circ\text{C}$ | 1700 |     |               |

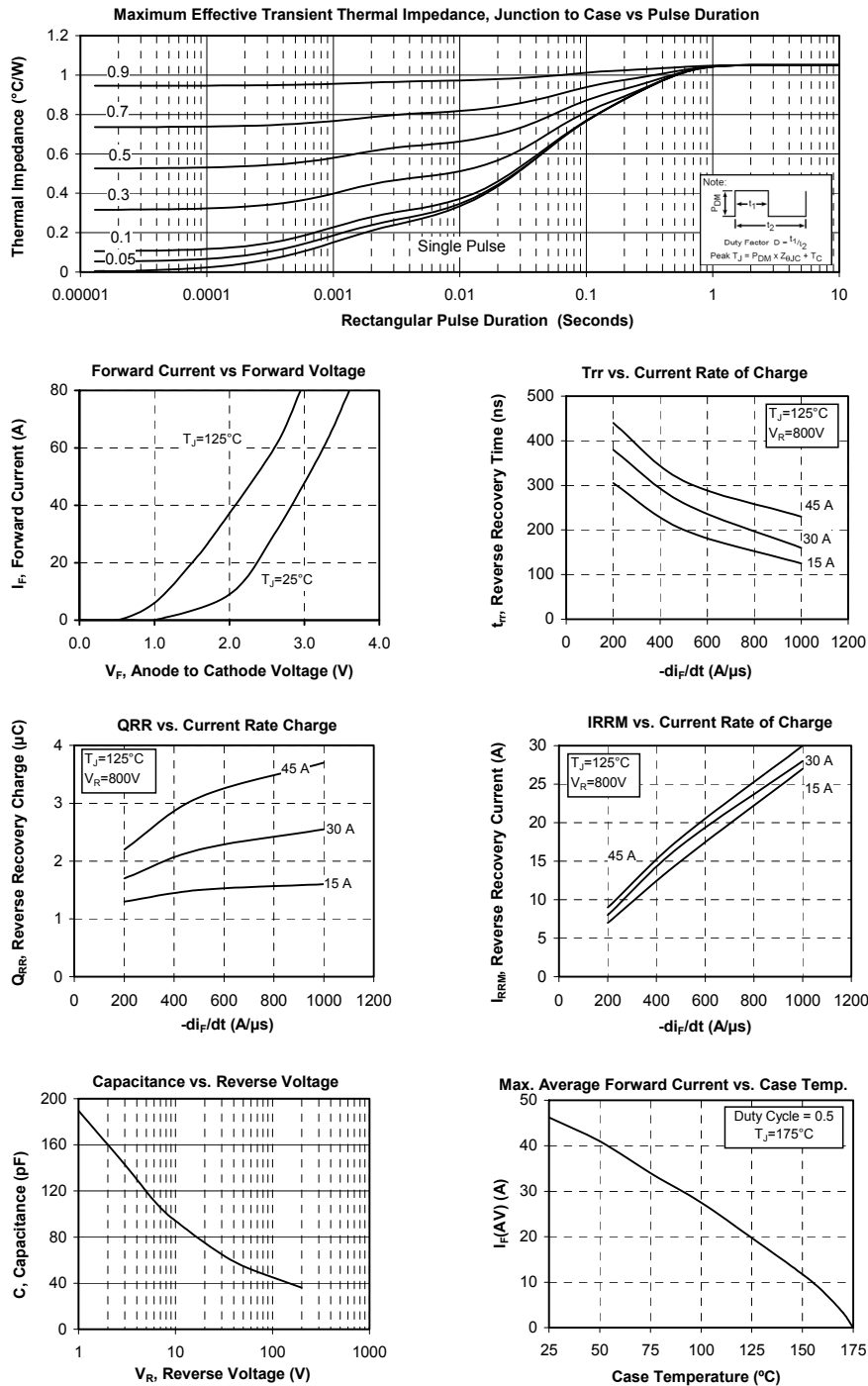
**Thermal and package characteristics**

| Symbol                            | Characteristic   | Min     | Typ  | Max  | Unit |
|-----------------------------------|--|---------|------|------|------|
| R <sub>thJC</sub>                 | Junction to Case Thermal Resistance  | CoolMOS |      | 0.43 | °C/W |
|                                   |  | Diode   |      | 1.05 |      |
| R <sub>thJA</sub>                 | Junction to Ambient (IGBT & Diode)   |         |      | 20   |      |
| V <sub>ISOL</sub>                 | RMS Isolation Voltage, any terminal to case t=1 min, 50/60Hz                 | 2500    |      |      | V    |
| T <sub>J</sub> , T <sub>STG</sub> | Storage Temperature Range  | -40     |      | 150  | °C   |
| T <sub>L</sub>                    | 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**

**Typical CoolMOS performance Curve**






**Typical Chopper diode performance Curve**


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