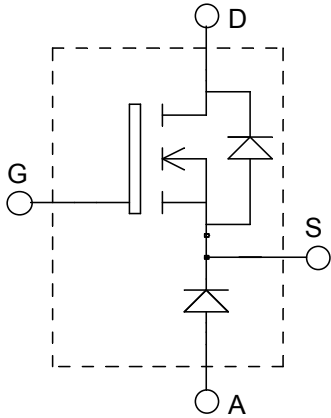


**ISOTOP[®] Buck chopper
MOSFET Power Module**

$V_{DSS} = 500V$
 $R_{DSon} = 65m\Omega \text{ Max @ } T_j = 25^\circ C$
 $I_D = 58A \text{ @ } T_c = 25^\circ C$



Application

- AC and DC motor control
- Switched Mode Power Supplies

Features

- Power MOS 8TM MOSFETs
 - Low R_{DSon}
 - Low input and Miller capacitance
 - Low gate charge
 - Avalanche energy rated
 - Very rugged
- ISOTOP[®] 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 TC of VCEsat
- RoHS Compliant

Absolute maximum ratings

| Symbol | Parameter | Max ratings | Unit |
|------------|---|--------------------|------------|
| V_{DSS} | Drain - Source Breakdown Voltage | 500 | V |
| I_D | Continuous Drain Current | $T_c = 25^\circ C$ | 58 |
| | | $T_c = 80^\circ C$ | 43 |
| I_{DM} | Pulsed Drain current | 270 | A |
| V_{GS} | Gate - Source Voltage | ± 30 | V |
| R_{DSon} | Drain - Source ON Resistance | 65 | m Ω |
| P_D | Maximum Power Dissipation | $T_c = 25^\circ C$ | 543 |
| I_{AR} | Avalanche current (repetitive and non repetitive) | 42 | A |

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_{DSS} | Zero Gate Voltage Drain Current | $V_{DS} = 500\text{V}$ $V_{GS} = 0\text{V}$ | $T_j = 25^\circ\text{C}$ | | 250 | μA |
| | | | $T_j = 125^\circ\text{C}$ | | 1000 | |
| $R_{DS(on)}$ | Drain – Source on Resistance | $V_{GS} = 10\text{V}, I_D = 42\text{A}$ | | | 65 | $\text{m}\Omega$ |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS} = V_{DS}, I_D = 2.5\text{mA}$ | 3 | 4 | 5 | V |
| I_{GSS} | Gate – Source Leakage Current | $V_{GS} = \pm 30\text{V}$ | | | ± 100 | nA |

Dynamic Characteristics

| Symbol | Characteristic | Test Conditions | Min | Typ | Max | Unit |
|--------------|------------------------------|---|-----|-------|-----|------|
| C_{iss} | Input Capacitance | $V_{GS} = 0\text{V}$ $V_{DS} = 25\text{V}$ $f = 1\text{MHz}$ | | 10800 | | pF |
| C_{oss} | Output Capacitance | | | 1164 | | |
| C_{riss} | Reverse Transfer Capacitance | | | 148 | | |
| Q_g | Total gate Charge | $V_{GS} = 10\text{V}$ $V_{Bus} = 250\text{V}$ $I_D = 42\text{A}$ | | 340 | | nC |
| Q_{gs} | Gate – Source Charge | | | 75 | | |
| Q_{gd} | Gate – Drain Charge | | | 155 | | |
| $T_{d(on)}$ | Turn-on Delay Time | Resistive switching @ 25°C $V_{GS} = 15\text{V}$ $V_{Bus} = 333\text{V}$ $I_D = 42\text{A}$ $R_G = 2.2\Omega$ | | 60 | | ns |
| T_r | Rise Time | | | 70 | | |
| $T_{d(off)}$ | Turn-off Delay Time | | | 155 | | |
| T_f | Fall Time | | | 50 | | |

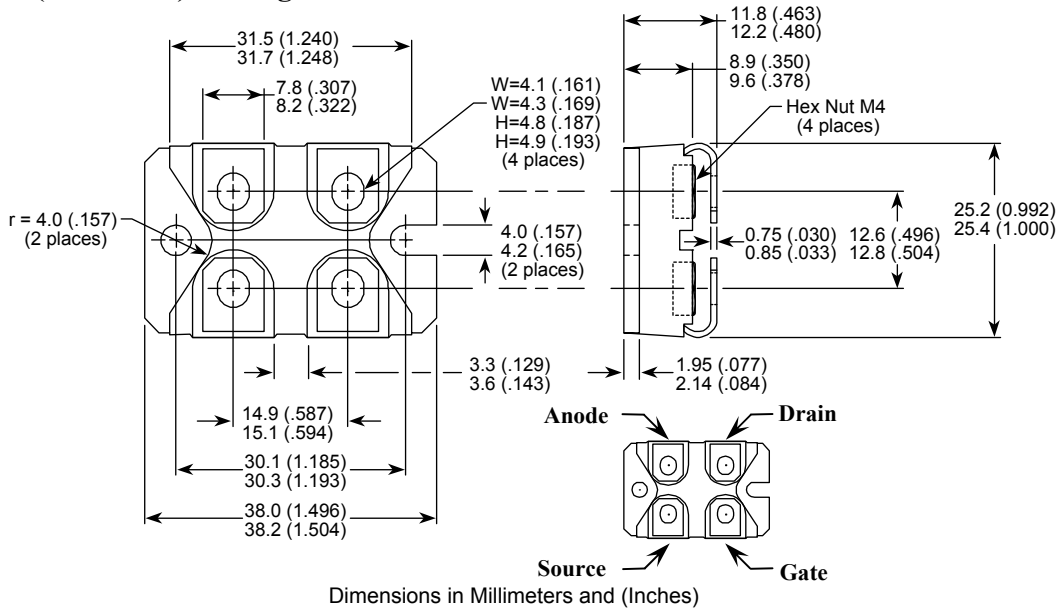
Chopper diode ratings and characteristics

| Symbol | Characteristic | Test Conditions | Min | Typ | Max | Unit |
|-----------|---|--|---------------------------|-----|-----|---------------|
| V_{RRM} | Maximum Peak Repetitive Reverse Voltage | | 600 | | | V |
| I_{RM} | Maximum Reverse Leakage Current | $V_R = 600\text{V}$ | $T_j = 25^\circ\text{C}$ | | 25 | μA |
| | | | $T_j = 125^\circ\text{C}$ | | 500 | |
| I_F | DC Forward Current | $T_c = 90^\circ\text{C}$ | | 30 | | A |
| V_F | Diode Forward Voltage | $I_F = 30\text{A}$ | | 1.8 | 2.2 | V |
| | | $I_F = 60\text{A}$ | | 2.2 | | |
| | | $I_F = 30\text{A}$ | $T_j = 125^\circ\text{C}$ | 1.5 | | |
| t_{rr} | Reverse Recovery Time | $I_F = 30\text{A}$ $V_R = 400\text{V}$ $di/dt = 200\text{A}/\mu\text{s}$ | $T_j = 25^\circ\text{C}$ | 25 | | ns |
| | | | $T_j = 125^\circ\text{C}$ | 160 | | |
| Q_{rr} | Reverse Recovery Charge | | $T_j = 25^\circ\text{C}$ | 35 | | nC |
| | | | $T_j = 125^\circ\text{C}$ | 480 | | |

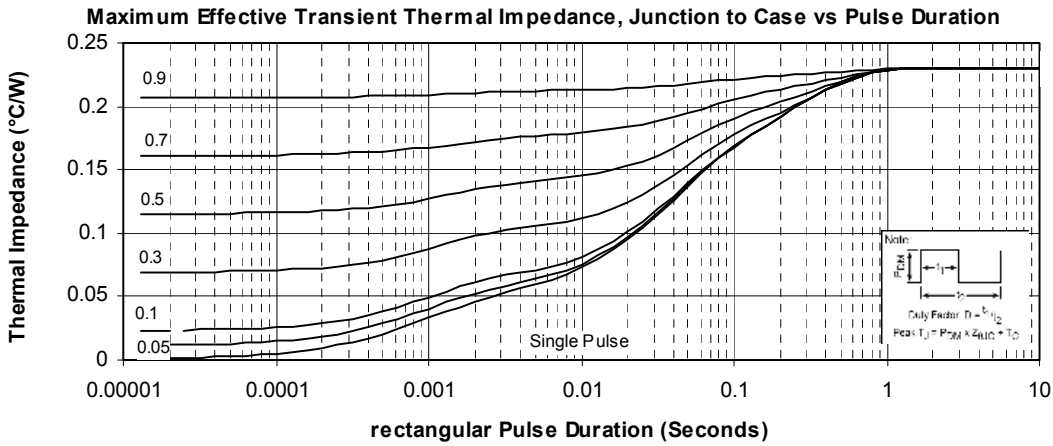
Thermal and package characteristics

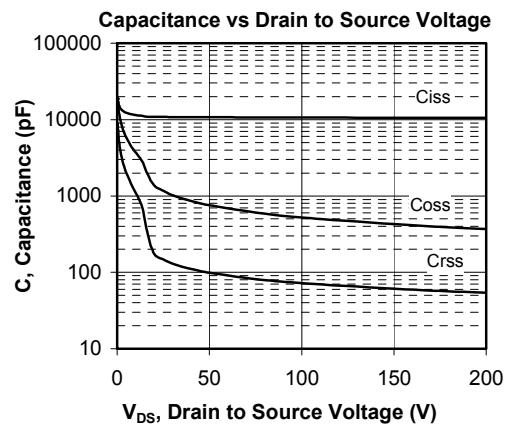
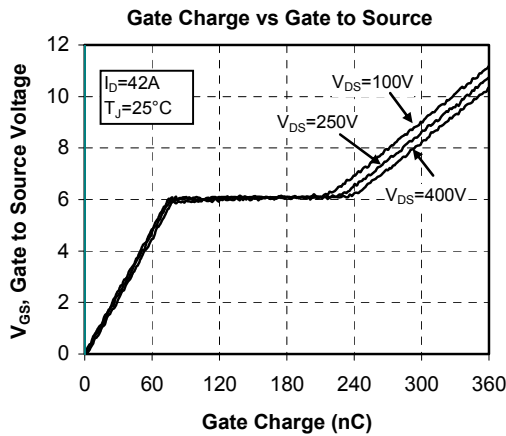
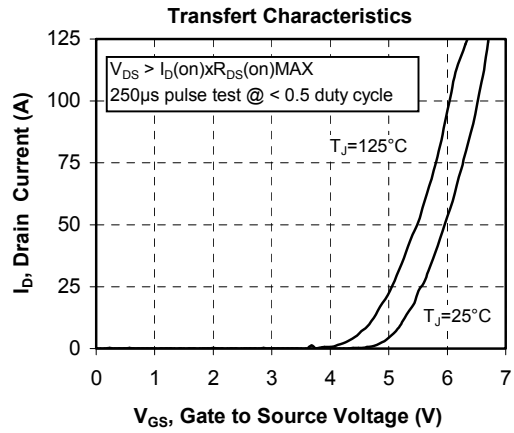
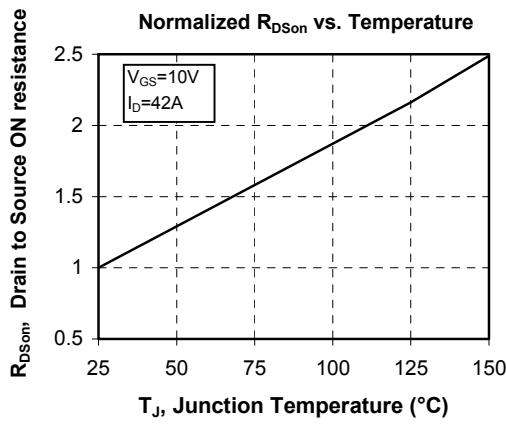
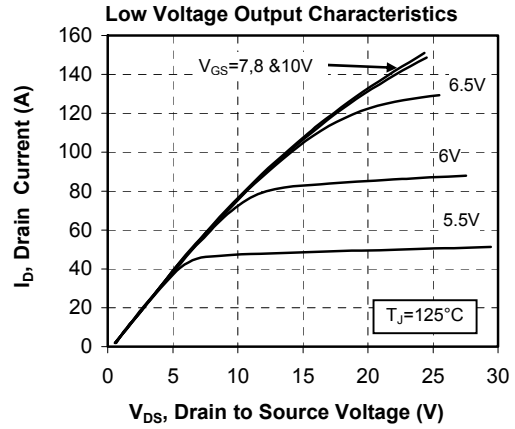
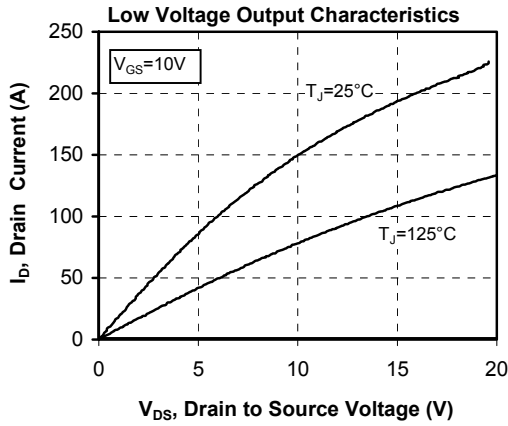
| Symbol | Characteristic | Min | Typ | Max | Unit |
|----------------|--|--------|------|------|---------------------------|
| R_{thJC} | Junction to Case Thermal Resistance | Mosfet | | 0.23 | $^\circ\text{C}/\text{W}$ |
| | | Diode | | 1.05 | |
| R_{thJA} | Junction to Ambient (IGBT & Diode) | | | 20 | $^\circ\text{C}/\text{W}$ |
| V_{ISOL} | RMS Isolation Voltage, any terminal to case $t = 1\text{ min}, 50/60\text{Hz}$ | 2500 | | | V |
| T_j, T_{STG} | Storage Temperature Range | -40 | | 150 | $^\circ\text{C}$ |
| 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

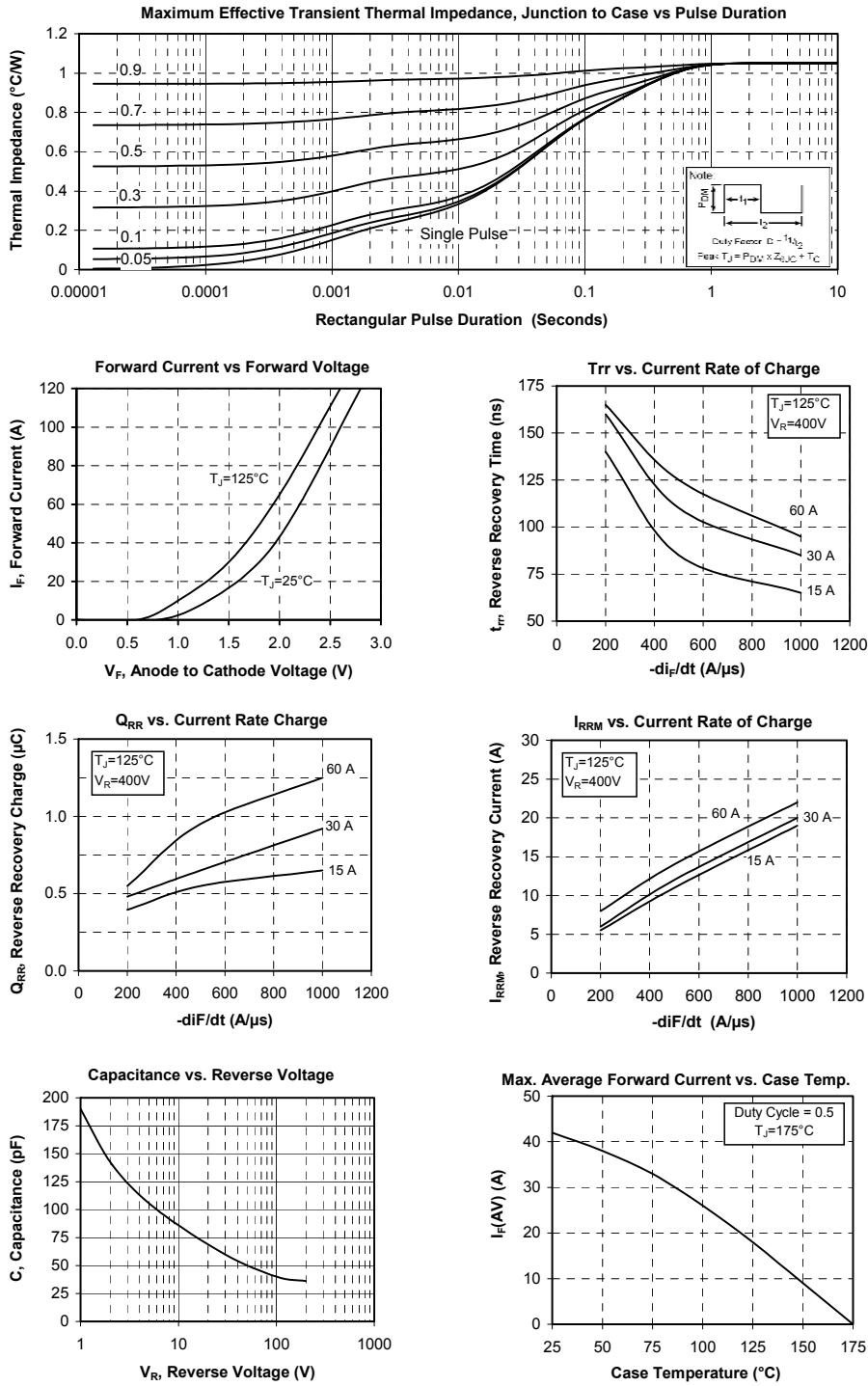


Typical Mosfet Performance Curve





Typical Diode Performance Curve



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