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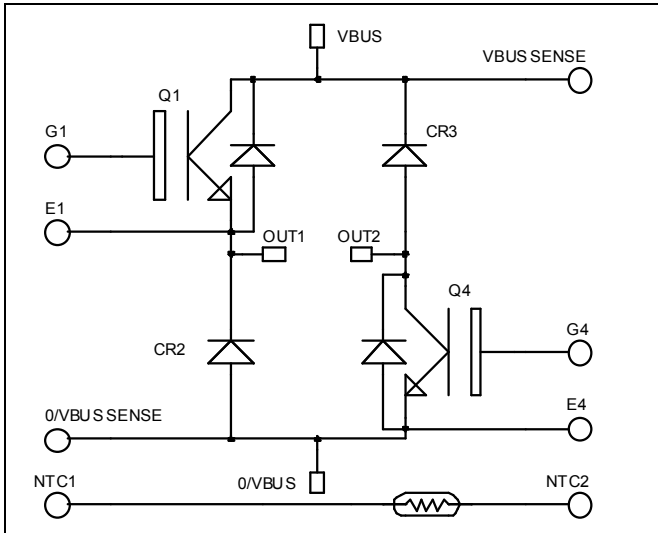
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Asymmetrical - Bridge Trench + Field Stop IGBT3 Power Module

$V_{CES} = 1700V$
 $I_C = 50A @ T_c = 80^\circ C$

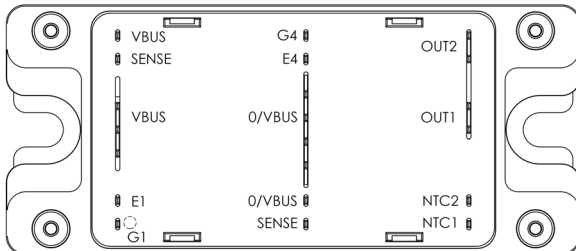


Application

- Welding converters
- Switched Mode Power Supplies
- Switched Reluctance Motor Drives

Features

- Trench + Field Stop IGBT3 Technology
 - Low voltage drop
 - Low tail current
 - Switching frequency up to 20 kHz
 - Soft recovery parallel diodes
 - Low diode VF
 - Low leakage current
 - RBSOA and SCSOA rated
- Kelvin emitter for easy drive
- Very low stray inductance
 - Symmetrical design
 - Lead frames for power connections
- High level of integration
- Internal thermistor for temperature monitoring



Benefits

- Stable temperature behavior
- Very rugged
- Solderable terminals for easy PCB mounting
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Easy paralleling due to positive T_C of V_{CESat}
- Low profile
- RoHS Compliant

Absolute maximum ratings

| Symbol | Parameter | Max ratings | Unit |
|-----------|---------------------------------------|---------------------|--------------|
| V_{CES} | Collector - Emitter Breakdown Voltage | 1700 | V |
| I_C | Continuous Collector Current | $T_c = 25^\circ C$ | 75 |
| | | $T_c = 80^\circ C$ | 50 |
| I_{CM} | Pulsed Collector Current | $T_c = 25^\circ C$ | 100 |
| V_{GE} | Gate - Emitter Voltage | ± 20 | V |
| P_D | Maximum Power Dissipation | $T_c = 25^\circ C$ | 312 |
| RBSOA | Reverse Bias Safe Operating Area | $T_j = 125^\circ C$ | 100A @ 1600V |

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 | $V_{GE} = 0\text{V}, V_{CE} = 1700\text{V}$ | | | 250 | μA |
| $V_{CE(sat)}$ | Collector Emitter Saturation Voltage | $V_{GE} = 15\text{V}$ $I_C = 50\text{A}$ | | 2.0 2.4 | 2.4 | V |
| | | $T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$ | | | | |
| $V_{GE(th)}$ | Gate Threshold Voltage | $V_{GE} = V_{CE}, I_C = 1\text{mA}$ | 5.0 | 5.8 | 6.5 | V |
| I_{GES} | Gate – Emitter Leakage Current | $V_{GE} = 20\text{V}, V_{CE} = 0\text{V}$ | | | 400 | nA |

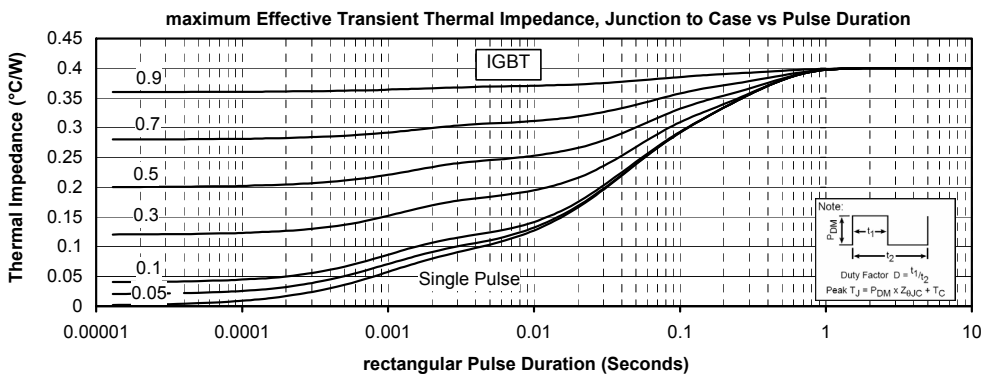
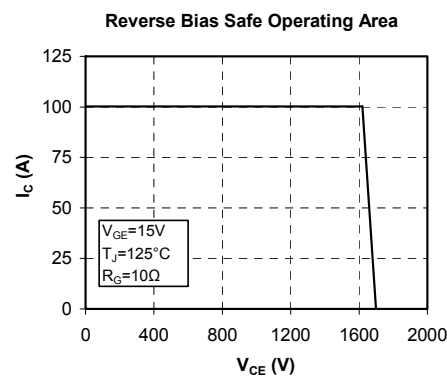
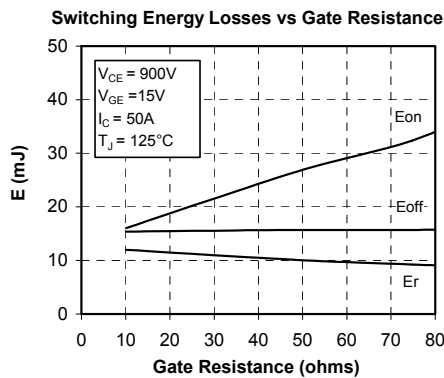
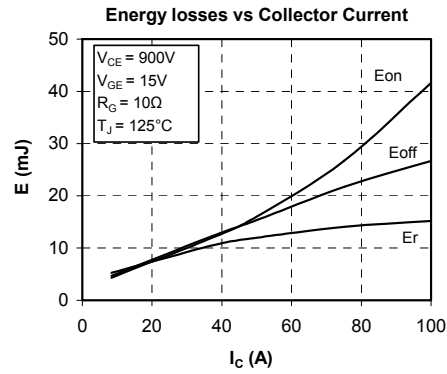
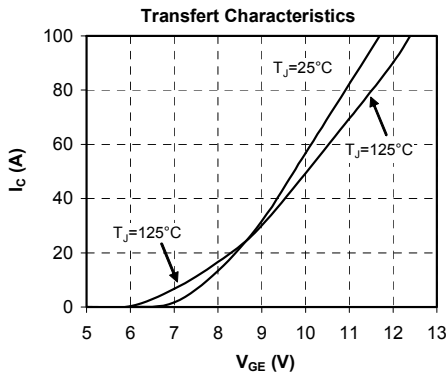
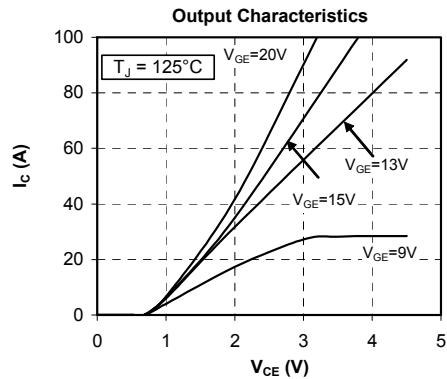
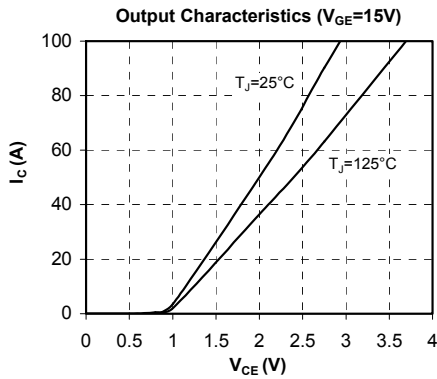
Dynamic Characteristics

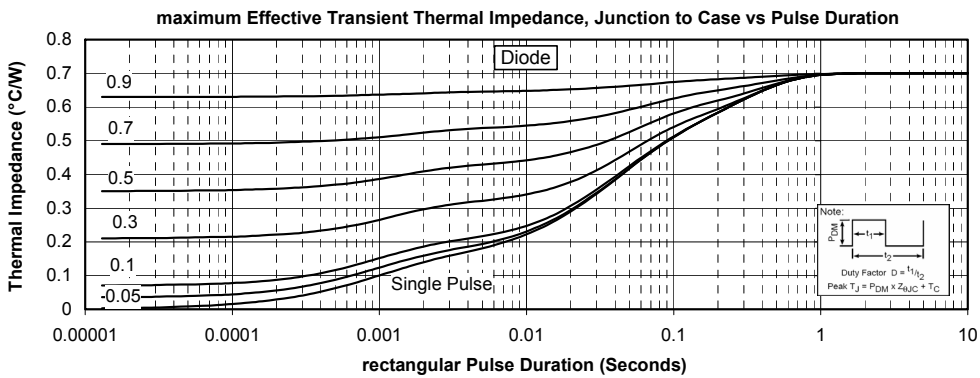
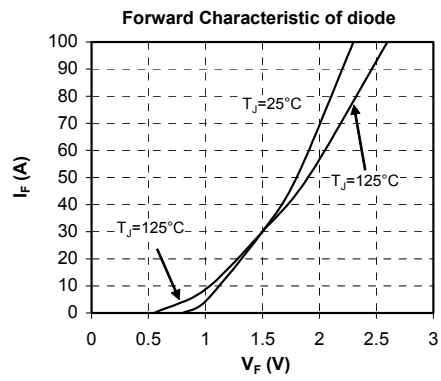
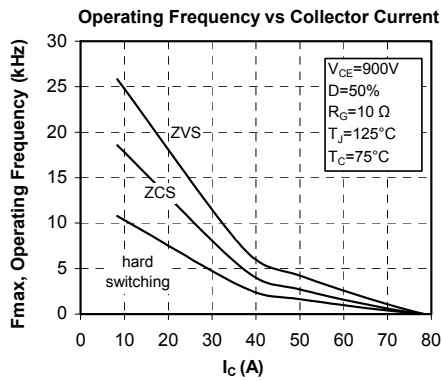
| Symbol | Characteristic | Test Conditions | Min | Typ | Max | Unit |
|--------------|------------------------------|--|-----|------|-----|------|
| C_{ies} | Input Capacitance | $V_{GE} = 0\text{V}$ | | 4400 | | pF |
| C_{oes} | Output Capacitance | $V_{CE} = 25\text{V}$ | | 180 | | |
| C_{res} | Reverse Transfer Capacitance | $f = 1\text{MHz}$ | | 150 | | |
| $T_{d(on)}$ | Turn-on Delay Time | Inductive Switching (25°C) | | 370 | | ns |
| T_r | Rise Time | $V_{GE} = 15\text{V}$ $V_{Bus} = 900\text{V}$ | | 40 | | |
| $T_{d(off)}$ | Turn-off Delay Time | $I_C = 50\text{A}$ | | 650 | | |
| T_f | Fall Time | $R_G = 10\Omega$ | | 180 | | |
| $T_{d(on)}$ | Turn-on Delay Time | Inductive Switching (125°C) | | 400 | | ns |
| T_r | Rise Time | $V_{GE} = 15\text{V}$ $V_{Bus} = 900\text{V}$ | | 50 | | |
| $T_{d(off)}$ | Turn-off Delay Time | $I_C = 50\text{A}$ | | 800 | | |
| T_f | Fall Time | $R_G = 10\Omega$ | | 300 | | |
| E_{on} | Turn-on Switching Energy | $V_{GE} = 15\text{V}$ $V_{Bus} = 900\text{V}$ | | 16 | | mJ |
| | | $T_j = 125^\circ\text{C}$ | | | | |
| E_{off} | Turn-off Switching Energy | $I_C = 50\text{A}$ $R_G = 10\Omega$ | | 15 | | |
| | | $T_j = 125^\circ\text{C}$ | | | | |

Diode ratings and characteristics

| Symbol | Characteristic | Test Conditions | Min | Typ | Max | Unit |
|-----------|---|--|------|------------|------------|---------------|
| V_{RRM} | Maximum Peak Repetitive Reverse Voltage | | 1700 | | | V |
| I_{RM} | Maximum Reverse Leakage Current | $V_R = 1700\text{V}$ | | | 250 500 | μA |
| | | $T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$ | | | | |
| I_F | DC Forward Current | | | 50 | | A |
| | | $T_c = 80^\circ\text{C}$ | | | | |
| V_F | Diode Forward Voltage | $I_F = 50\text{A}$ | | 1.8 1.9 | 2.2 | V |
| | | $T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$ | | | | |
| t_{rr} | Reverse Recovery Time | | | 385 490 | | ns |
| | | $T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$ | | | | |
| Q_{rr} | Reverse Recovery Charge | $I_F = 50\text{A}$ $V_R = 900\text{V}$ $di/dt = 800\text{A}/\mu\text{s}$ | | 14 23 | | μC |
| | | $T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$ | | | | |
| E_r | Reverse Recovery Energy | | | 6 12 | | mJ |
| | | $T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$ | | | | |

Typical Performance Curve





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