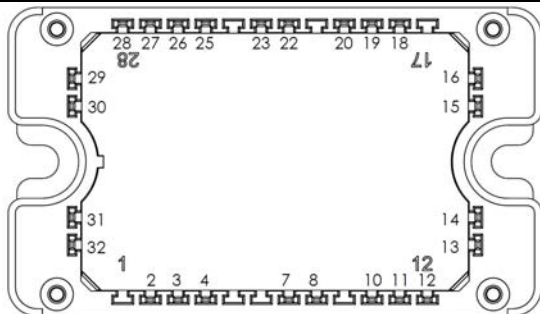
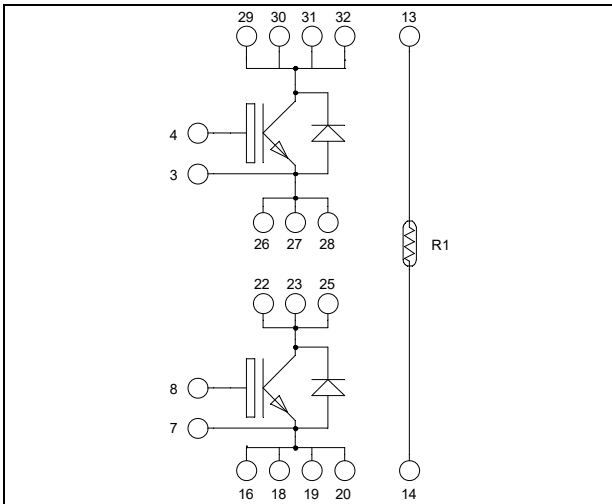


**Phase leg
Trench + Field Stop IGBT3
Power Module**

**$V_{CES} = 600V$
 $I_C = 150A @ T_c = 100^\circ C$**



Pins 29/30/31/32 must be shorted together
 Pins 26/27/28/22/23/25 must be shorted together
 to achieve a phase leg
 Pins 16/18/19/20 must be shorted together

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

Absolute maximum ratings (Per IGBT)

| Symbol | Parameter | Max ratings | Unit |
|-----------|----------------------------------|---------------------|-------------|
| V_{CES} | Collector - Emitter Voltage | 600 | V |
| I_C | Continuous Collector Current | $T_c = 25^\circ C$ | 225 |
| | | $T_c = 100^\circ C$ | 150 |
| I_{CM} | Pulsed Collector Current | $T_c = 25^\circ C$ | 300 |
| V_{GE} | Gate - Emitter Voltage | ± 20 | V |
| P_D | Power Dissipation | $T_c = 25^\circ C$ | 600 |
| RBSOA | Reverse Bias Safe Operating Area | $T_j = 150^\circ C$ | 300A @ 550V |

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

Application

- Welding converters
- Switched Mode Power Supplies
- Uninterruptible Power Supplies
- Motor control

Features

- **Trench + Field Stop IGBT3**
 - Low voltage drop
 - Low tail current
 - Switching frequency up to 20 kHz
 - Low leakage current
 - RBSOA and SCSOA rated
- Very low stray inductance
- Kelvin emitter for easy drive
- Internal thermistor for temperature monitoring
- AlN substrate for improved thermal performance

Benefits

- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Solderable terminals both for power and signal for easy PCB mounting
- Low profile
- Easy paralleling due to positive T_c of V_{CEsat}
- RoHS Compliant

Electrical Characteristics (Per IGBT)

| Symbol | Characteristic | Test Conditions | Min | Typ | Max | Unit |
|----------------------|--------------------------------------|---|-----|------------|-----|------|
| I _{CES} | Zero Gate Voltage Collector Current | V _{GE} = 0V, V _{CE} = 600V | | | 250 | μA |
| V _{CE(sat)} | Collector Emitter Saturation Voltage | V _{GE} = 15V I _C = 150A | | 1.5 1.7 | 1.9 | V |
| V _{GE(th)} | Gate Threshold Voltage | V _{GE} = V _{CE} , I _C = 1.5 mA | 5.0 | 5.8 | 6.5 | V |
| I _{GES} | Gate – Emitter Leakage Current | V _{GE} = 20V, V _{CE} = 0V | | | 400 | nA |

Dynamic Characteristics (Per IGBT)

| Symbol | Characteristic | Test Conditions | Min | Typ | Max | Unit |
|---------------------|-------------------------------------|--|-----|-------------|------|------|
| C _{ies} | Input Capacitance | V _{GE} = 0V | | 9200 | | pF |
| C _{oes} | Output Capacitance | V _{CE} = 25V | | 580 | | |
| C _{res} | Reverse Transfer Capacitance | f = 1MHz | | 270 | | |
| Q _G | Gate charge | V _{GE} = ±15V ; V _{CE} = 300V I _C = 150A | | 1.6 | | μC |
| T _{d(on)} | Turn-on Delay Time | Inductive Switching (25°C) V _{GE} = ±15V V _{Bus} = 300V I _C = 150A R _G = 3.3Ω | | 115 | | ns |
| T _r | Rise Time | | | 45 | | |
| T _{d(off)} | Turn-off Delay Time | | | 225 | | |
| T _f | Fall Time | | | 55 | | |
| T _{d(on)} | Turn-on Delay Time | Inductive Switching (150°C) V _{GE} = ±15V V _{Bus} = 300V I _C = 150A R _G = 3.3Ω | | 130 | | ns |
| T _r | Rise Time | | | 50 | | |
| T _{d(off)} | Turn-off Delay Time | | | 300 | | |
| T _f | Fall Time | | | 70 | | |
| E _{on} | Turn on Energy | V _{GE} = ±15V V _{Bus} = 300V | | 0.85 1.5 | | mJ |
| E _{off} | Turn off Energy | I _C = 150A R _G = 3.3Ω | | 4.1 5.3 | | |
| I _{sc} | Short Circuit data | V _{GE} ≤ 15V ; V _{Bus} = 360V t _p ≤ 6μs ; T _j = 150°C | | 750 | | A |
| R _{thJC} | Junction to Case Thermal Resistance | | | | 0.25 | °C/W |

Reverse diode ratings and characteristics (Per diode)

| Symbol | Characteristic | Test Conditions | Min | Typ | Max | Unit |
|-------------------|-------------------------------------|--|------------------------|-----|------|------|
| V _{RRM} | Peak Repetitive Reverse Voltage | | | | 600 | V |
| I _{RM} | Reverse Leakage Current | V _R = 600V | | | 150 | μA |
| I _F | DC Forward Current | | | 150 | | A |
| V _F | Diode Forward Voltage | I _F = 150A V _{GE} = 0V | | 1.6 | 2 | V |
| | | | T _c = 100°C | | 1.5 | |
| t _{rr} | Reverse Recovery Time | I _F = 150A V _R = 300V di/dt = 2800A/μs | | 100 | | ns |
| | | | T _j = 150°C | | 150 | |
| Q _{rr} | Reverse Recovery Charge | I _F = 150A V _R = 300V di/dt = 2800A/μs | | 7.2 | | μC |
| | | | T _j = 150°C | | 15.2 | |
| E _r | Reverse Recovery Energy | I _F = 150A V _R = 300V di/dt = 2800A/μs | | 1.7 | | mJ |
| | | | T _j = 150°C | | 3.6 | |
| R _{thJC} | Junction to Case Thermal Resistance | | | | 0.42 | °C/W |

Thermal and package characteristics

| Symbol | Characteristic | Min | Max | Unit | | |
|-------------------|--|-------------|-----------------------|------|-----|-----|
| V _{ISOL} | RMS Isolation Voltage, any terminal to case t=1 min, 50/60Hz | 4000 | | V | | |
| T _J | Operating junction temperature range | -40 | 175 | °C | | |
| T _{JOP} | Recommended junction temperature under switching conditions | -40 | T _{Jmax} -25 | | | |
| T _{STG} | Storage Temperature Range | -40 | 125 | | | |
| T _C | Operating Case Temperature | -40 | 125 | | | |
| Torque | Mounting torque | To heatsink | M4 | 2 | 3 | N.m |
| Wt | Package Weight | | | | 110 | g |

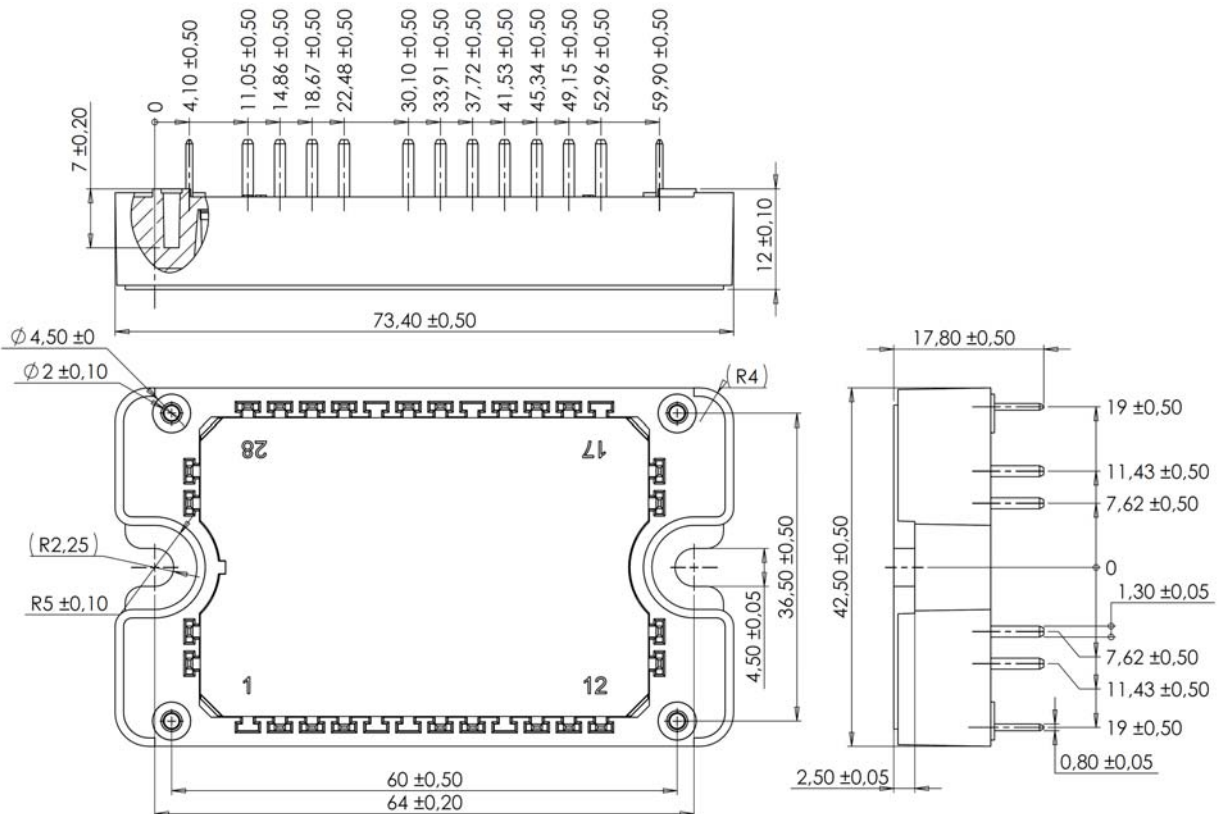
Temperature sensor NTC (see application note APT0406 on www.microsemi.com for more information).

| Symbol | Characteristic | Min | Typ | Max | Unit |
|-----------------------------------|----------------------------|-----|------|-----|------|
| R ₂₅ | Resistance @ 25°C | | 50 | | kΩ |
| ΔR ₂₅ /R ₂₅ | | | 5 | | % |
| B _{25/85} | T ₂₅ = 298.15 K | | 3952 | | K |
| ΔB/B | | | 4 | | % |

$$R_T = \frac{R_{25}}{\exp \left[B_{25/85} \left(\frac{1}{T_{25}} - \frac{1}{T} \right) \right]}$$

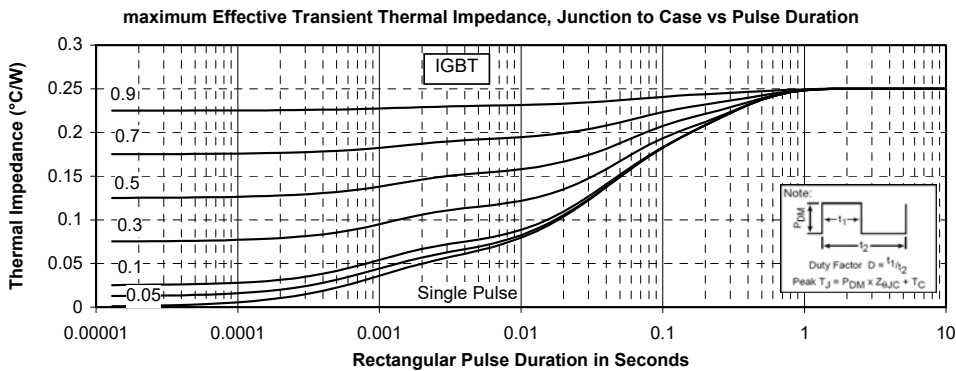
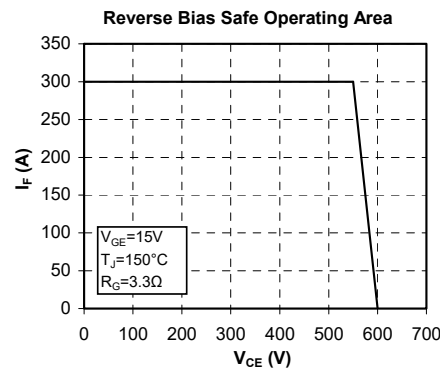
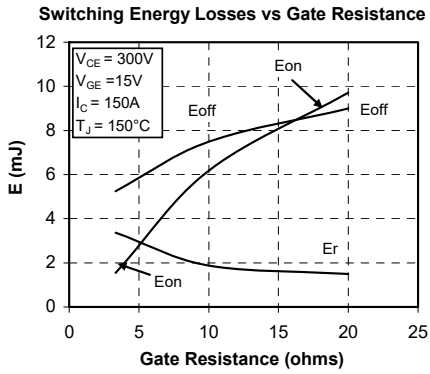
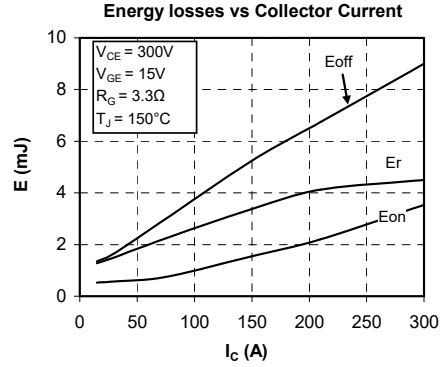
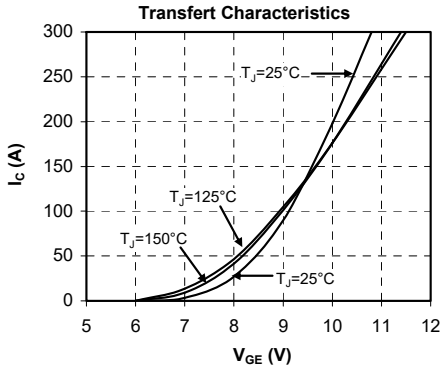
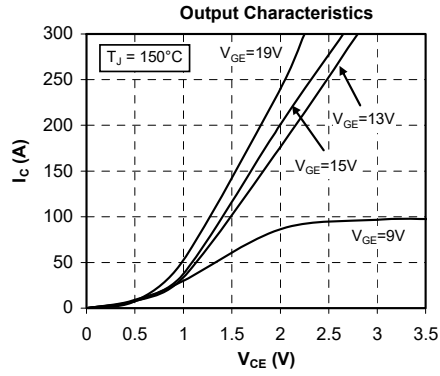
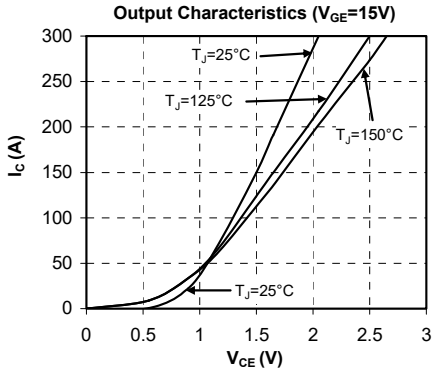
T: Thermistor temperature
 R_T: Thermistor value at T

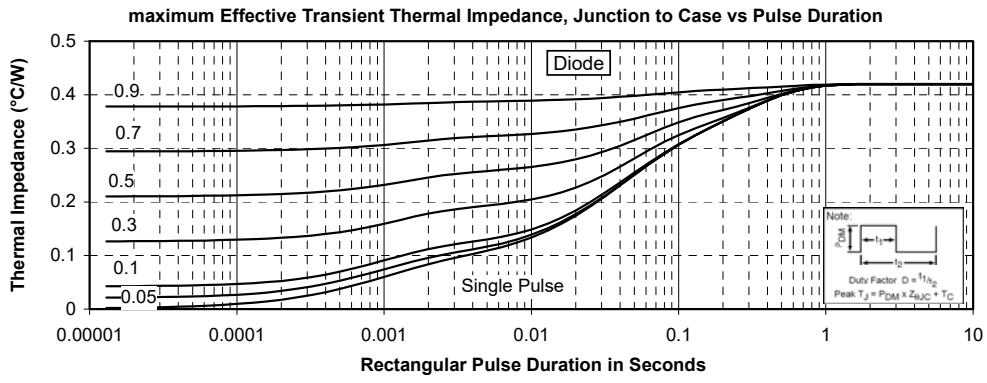
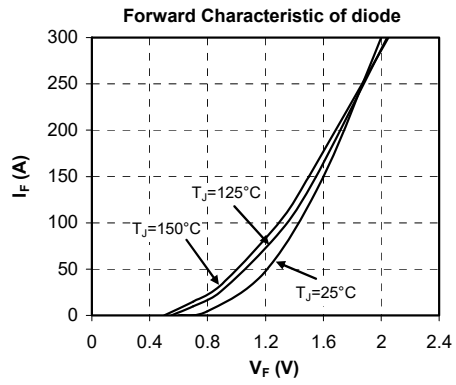
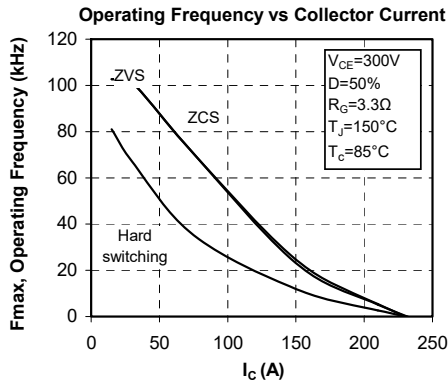
Package outline (dimensions in mm)



See application note 1901 - Mounting Instructions for SP3 Power Modules on www.microsemi.com

Typical Performance Curve





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