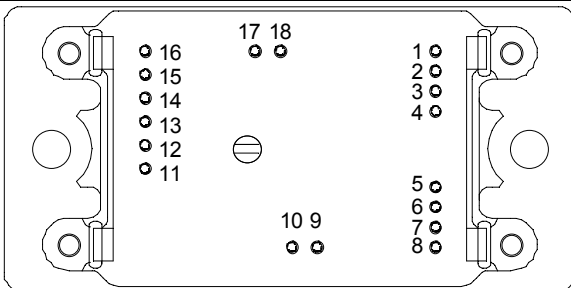
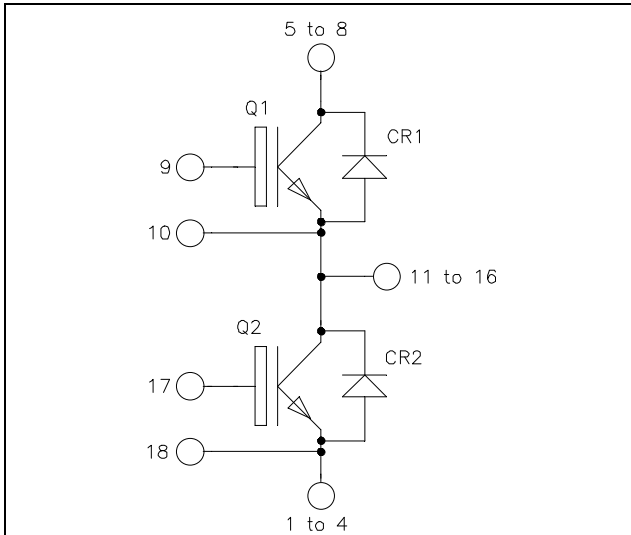


**Phase leg  
Trench + Field Stop IGBT3  
Power Module**

**$V_{CES} = 600V$   
 $I_C = 200A @ T_c = 80^\circ C$**



Pins 1/2/3/4 ; 5/6/7/8 ; 11/12/13/14/15/16  
must be shorted together

### Application

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

### Features

- Fast 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
- 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

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

### Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
$V_{CES}$	Collector - Emitter Breakdown Voltage	600	V
$I_C$	Continuous Collector Current	$T_c = 25^\circ C$	290
		$T_c = 80^\circ C$	200
$I_{CM}$	Pulsed Collector Current	$T_c = 25^\circ C$	400
$V_{GE}$	Gate - Emitter Voltage	$\pm 20$	V
$P_D$	Maximum Power Dissipation	$T_c = 25^\circ C$	625
RBSOA	Reverse Bias Safe Operating Area	$T_j = 150^\circ C$	400A @ 550V

**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)

**Electrical Characteristics**

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
I <sub>CES</sub>	Zero Gate Voltage Collector Current	V <sub>GE</sub> = 0V, V <sub>CE</sub> = 600V			50	μA
V <sub>CE(sat)</sub>	Collector Emitter Saturation Voltage	V <sub>GE</sub> = 15V I <sub>C</sub> = 200A		1.5 1.7	1.9	V
V <sub>GE(th)</sub>	Gate Threshold Voltage	V <sub>GE</sub> = V <sub>CE</sub> , I <sub>C</sub> = 2 mA	5.0	5.8	6.5	V
I <sub>GES</sub>	Gate – Emitter Leakage Current	V <sub>GE</sub> = 20V, V <sub>CE</sub> = 0V			400	nA

**Dynamic Characteristics**

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C <sub>ies</sub>	Input Capacitance	V <sub>GE</sub> = 0V		12.3		nF
C <sub>oes</sub>	Output Capacitance	V <sub>CE</sub> = 25V		0.8		
C <sub>res</sub>	Reverse Transfer Capacitance	f = 1MHz		0.4		
Q <sub>G</sub>	Gate charge	V <sub>GE</sub> = ±15V, I <sub>C</sub> = 200A V <sub>CE</sub> = 300V		2.1		μC
T <sub>d(on)</sub>	Turn-on Delay Time	Inductive Switching (25°C) V <sub>GE</sub> = ±15V V <sub>Bus</sub> = 300V I <sub>C</sub> = 200A R <sub>G</sub> = 2Ω		115		ns
T <sub>r</sub>	Rise Time			45		
T <sub>d(off)</sub>	Turn-off Delay Time			225		
T <sub>f</sub>	Fall Time			55		
T <sub>d(on)</sub>	Turn-on Delay Time	Inductive Switching (150°C) V <sub>GE</sub> = ±15V V <sub>Bus</sub> = 300V I <sub>C</sub> = 200A R <sub>G</sub> = 2Ω		130		ns
T <sub>r</sub>	Rise Time			50		
T <sub>d(off)</sub>	Turn-off Delay Time			300		
T <sub>f</sub>	Fall Time			70		
E <sub>on</sub>	Turn on Energy	V <sub>GE</sub> = ±15V V <sub>Bus</sub> = 300V		1 1.8		mJ
		I <sub>C</sub> = 200A				
E <sub>off</sub>	Turn off Energy	R <sub>G</sub> = 2Ω		5.7 7		mJ
I <sub>sc</sub>	Short Circuit data	V <sub>GE</sub> ≤ 15V ; V <sub>Bus</sub> = 360V t <sub>p</sub> ≤ 6μs ; T <sub>j</sub> = 150°C		1000		A
R <sub>thJC</sub>	Junction to Case Thermal Resistance				0.24	°C/W

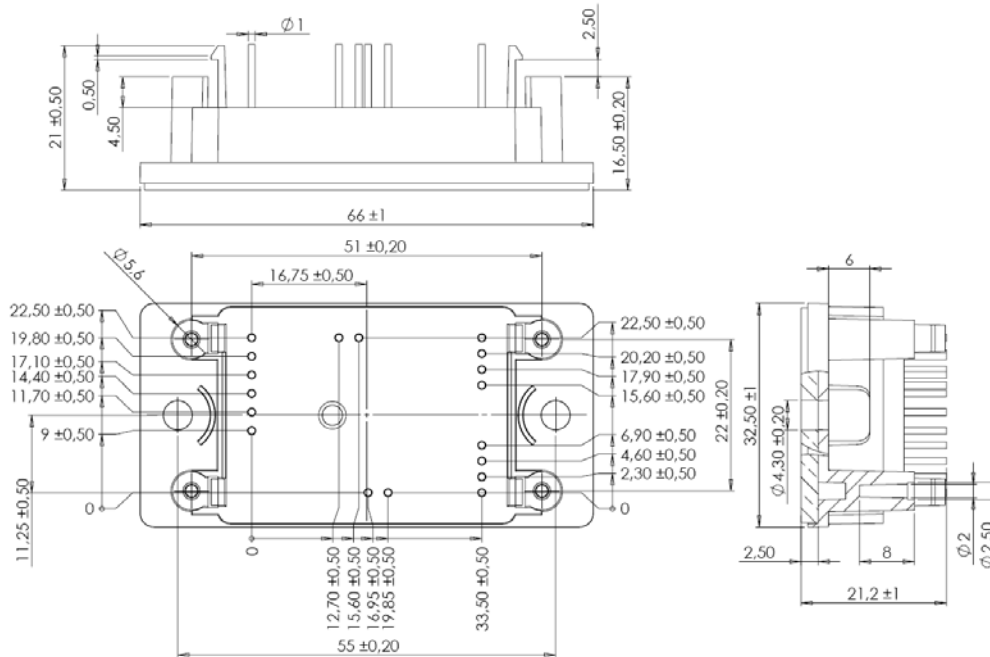
**Reverse diode ratings and characteristics**

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V <sub>RRM</sub>	Maximum Peak Repetitive Reverse Voltage		600			V
I <sub>RM</sub>	Maximum Reverse Leakage Current	V <sub>R</sub> = 600V			50	μA
I <sub>F</sub>	DC Forward Current	T <sub>c</sub> = 80°C		200		A
V <sub>F</sub>	Diode Forward Voltage	I <sub>F</sub> = 200A V <sub>GE</sub> = 0V		1.6 1.5	2	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>F</sub> = 200A V <sub>R</sub> = 300V di/dt = 2200A/μs		130 225		ns
Q <sub>rr</sub>	Reverse Recovery Charge	I <sub>F</sub> = 200A V <sub>R</sub> = 300V di/dt = 2200A/μs		9 19		μC
Er	Reverse Recovery Energy	I <sub>F</sub> = 200A V <sub>R</sub> = 300V di/dt = 2200A/μs		2.3 4.7		mJ
R <sub>thJC</sub>	Junction to Case Thermal Resistance				0.4	°C/W

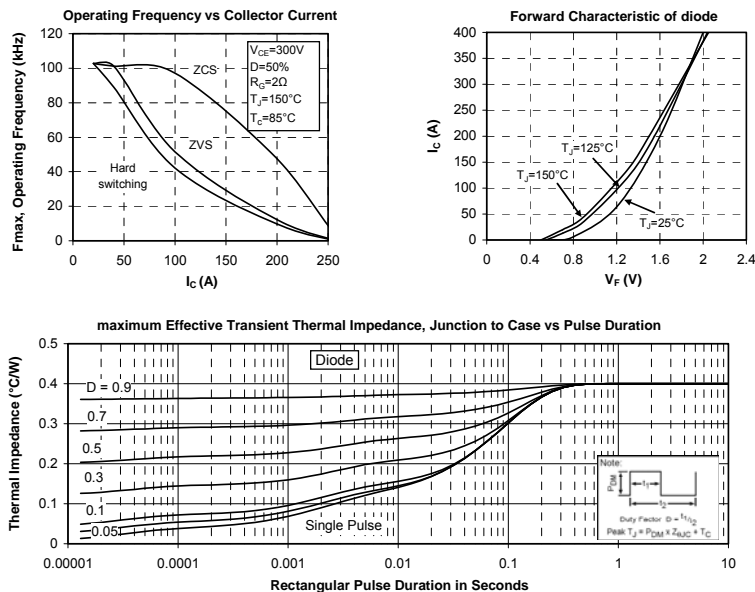
## Thermal and package characteristics

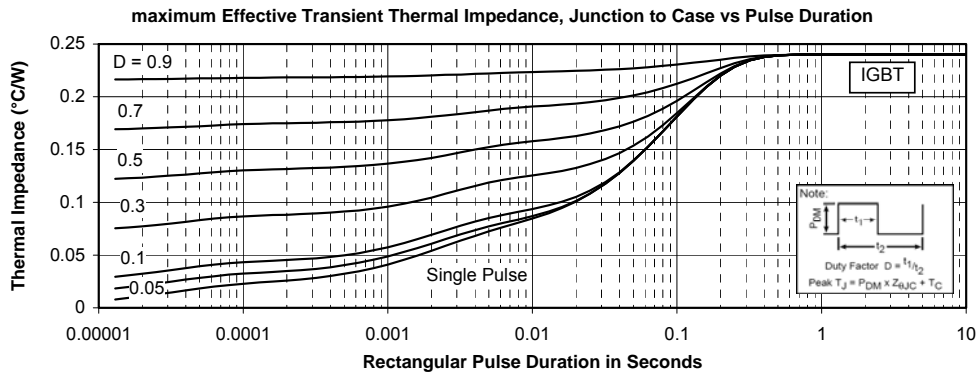
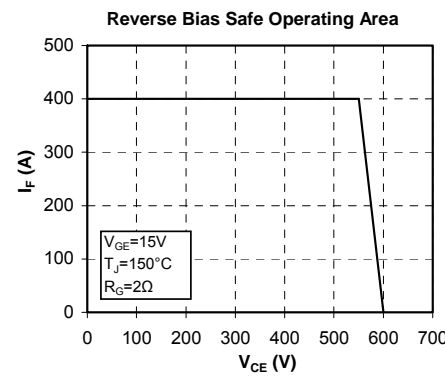
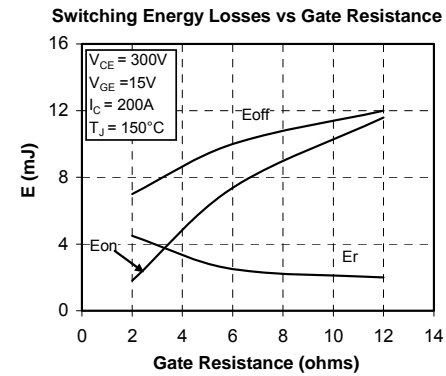
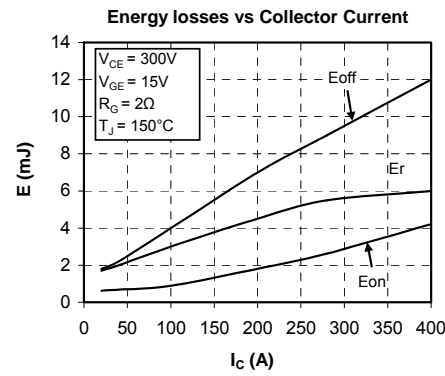
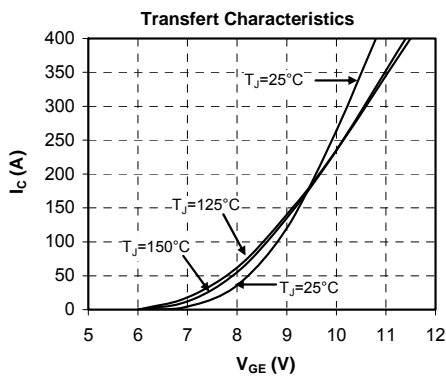
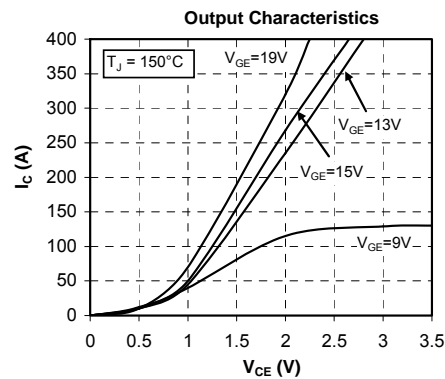
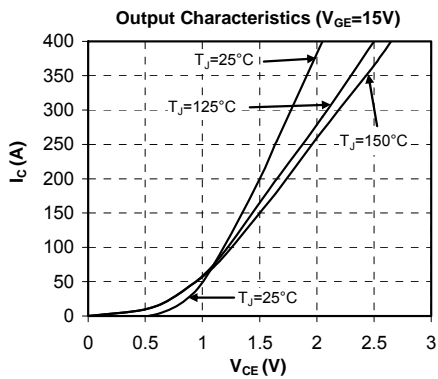
Symbol	Characteristic	Min	Typ	Max	Unit	
$V_{ISOL}$	RMS Isolation Voltage, any terminal to case $t=1$ min, $I_{isol} < 1$ mA, 50/60Hz	4000			V	
$T_J$	Operating junction temperature range	-40		175	°C	
$T_{STG}$	Storage Temperature Range	-40		125		
$T_C$	Operating Case Temperature	-40		100		
Torque	Mounting torque	To heatsink	M4	2	3	N.m
Wt	Package Weight				75	g

## SP2 Package outline (dimensions in mm)



## Typical Performance Curve





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