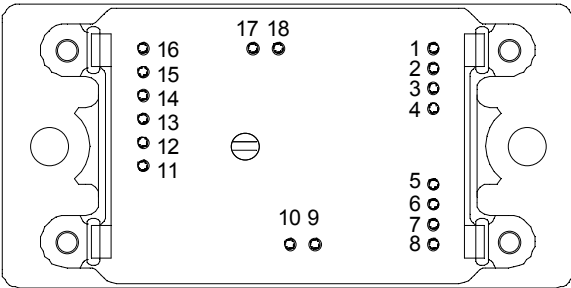
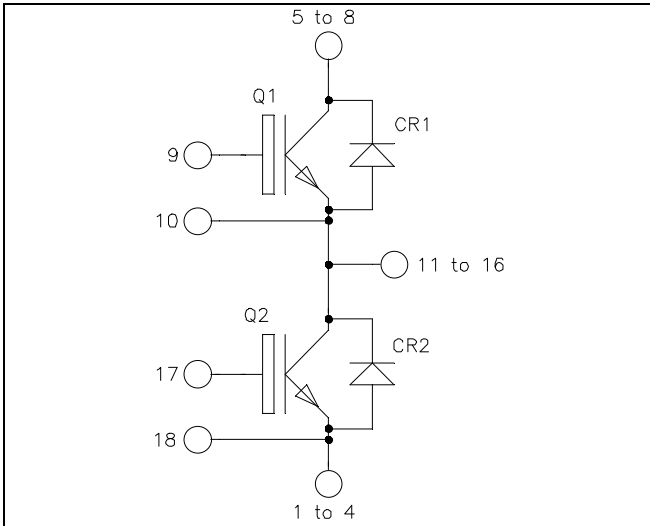


Phase leg  
NPT IGBT Power Module

$V_{CES} = 1200V$   
 $I_C = 100A @ T_c = 80^\circ C$



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

- Non Punch Through (NPT) Fast IGBT
  - Low voltage drop
  - Low tail current
  - Switching frequency up to 50 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	1200	V
$I_C$	Continuous Collector Current	$T_c = 25^\circ C$	135
		$T_c = 80^\circ C$	100
$I_{CM}$	Pulsed Collector Current	$T_c = 25^\circ C$	300
$V_{GE}$	Gate - Emitter Voltage	$\pm 20$	V
$P_D$	Maximum Power Dissipation	$T_c = 25^\circ C$	568
RBSOA	Reverse Bias Safe Operating Area	$T_j = 150^\circ C$	200A @ 1200V

**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**

<i>Symbol</i>	<i>Characteristic</i>	<i>Test Conditions</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
$I_{CES}$	Zero Gate Voltage Collector Current	$V_{GE} = 0V, V_{CE} = 1200V$			250	$\mu A$
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	$V_{GE} = 15V$		3.2	3.7	V
		$I_C = 100A$	$T_j = 25^\circ C$			
				3.9		
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 4mA$	4.5	5.5	6.5	V
$I_{GES}$	Gate – Emitter Leakage Current	$V_{GE} = 20V, V_{CE} = 0V$			600	nA

**Dynamic Characteristics**

<i>Symbol</i>	<i>Characteristic</i>	<i>Test Conditions</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
$C_{ies}$	Input Capacitance	$V_{GE} = 0V$		6.5		nF
$C_{oes}$	Output Capacitance	$V_{CE} = 25V$		1		
$C_{res}$	Reverse Transfer Capacitance	$f = 1MHz$		0.5		
$Q_G$	Gate charge	$V_{GE} = \pm 15V; V_{CE} = 600V$ $I_C = 100A$		1.1		$\mu C$
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching ( $25^\circ C$ ) $V_{GE} = \pm 15V$ $V_{Bus} = 600V$ $I_C = 100A$ $R_G = 5.6\Omega$		120		ns
$T_r$	Rise Time			50		
$T_{d(off)}$	Turn-off Delay Time			310		
$T_f$	Fall Time			20		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching ( $125^\circ C$ ) $V_{GE} = \pm 15V$ $V_{Bus} = 600V$ $I_C = 100A$ $R_G = 5.6\Omega$		130		ns
$T_r$	Rise Time			60		
$T_{d(off)}$	Turn-off Delay Time			360		
$T_f$	Fall Time			30		
$E_{on}$	Turn-on Switching Energy	$V_{GE} = \pm 15V$ $V_{Bus} = 600V$		12		mJ
$E_{off}$	Turn-off Switching Energy	$I_C = 100A$ $R_G = 5.6\Omega$		5		
$I_{sc}$	Short Circuit data	$V_{GE} \leq 15V; V_{Bus} = 900V$ $t_p \leq 10\mu s; T_j = 125^\circ C$		650		A
$R_{thJC}$	Junction to Case Thermal Resistance				0.19	$^\circ C/W$

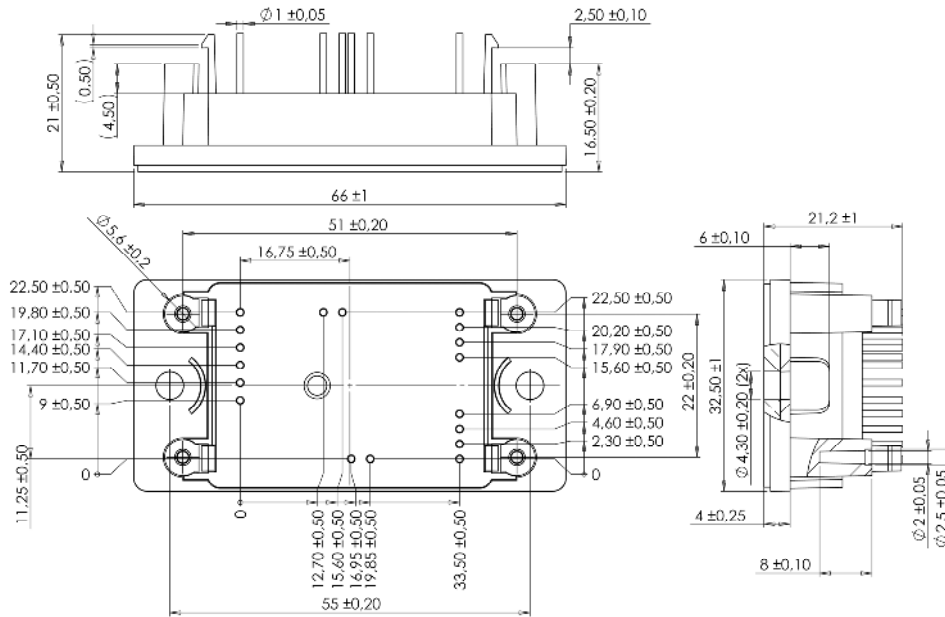
**Reverse diode ratings and characteristics**

<i>Symbol</i>	<i>Characteristic</i>	<i>Test Conditions</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
$V_{RRM}$	Maximum Peak Repetitive Reverse Voltage		1200			V
$I_{RM}$	Maximum Reverse Leakage Current	$V_R = 1200V$			250	$\mu A$
$I_F$	DC Forward Current	$T_c = 80^\circ C$		100		A
$V_F$	Diode Forward Voltage	$I_F = 100A$		2.4	3	V
		$I_F = 150A$		2.7		
		$I_F = 100A$	$T_j = 125^\circ C$	1.8		
$t_{rr}$	Reverse Recovery Time	$I_F = 100A$ $V_R = 800V$ $di/dt = 200A/\mu s$	$T_j = 25^\circ C$	385		ns
			$T_j = 125^\circ C$	480		
$Q_{rr}$	Reverse Recovery Charge		$T_j = 25^\circ C$	1055		nC
			$T_j = 125^\circ C$	5240		
$R_{thJC}$	Junction to Case Thermal Resistance				0.55	$^\circ C/W$

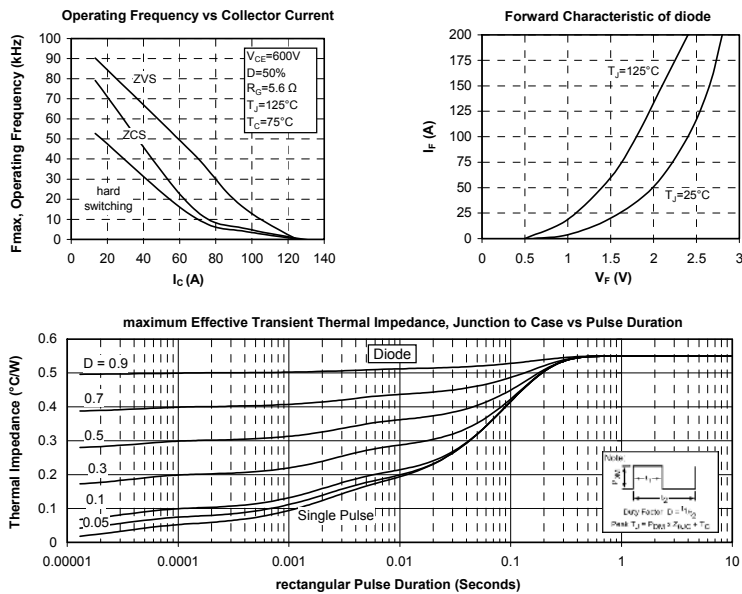
## Thermal and package characteristics

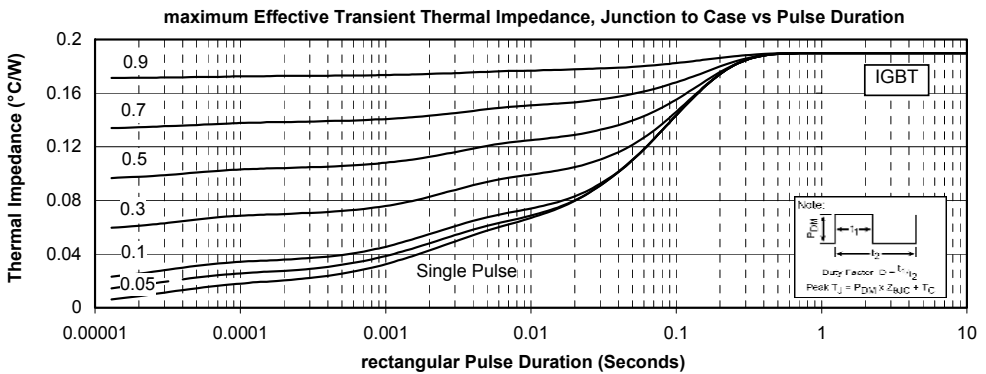
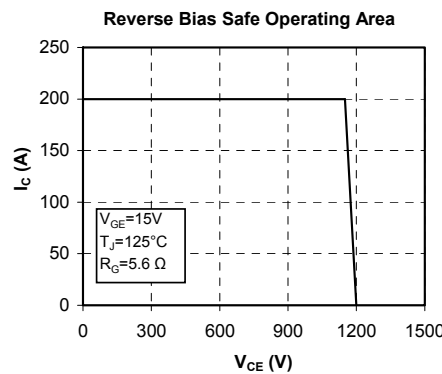
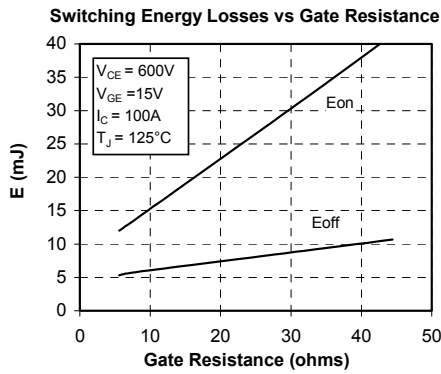
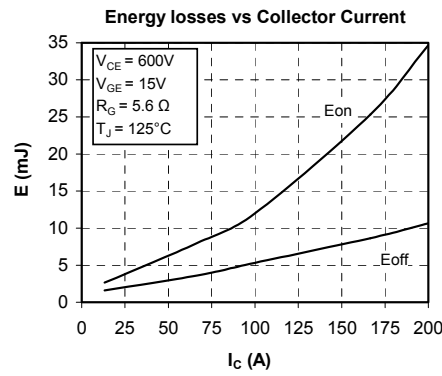
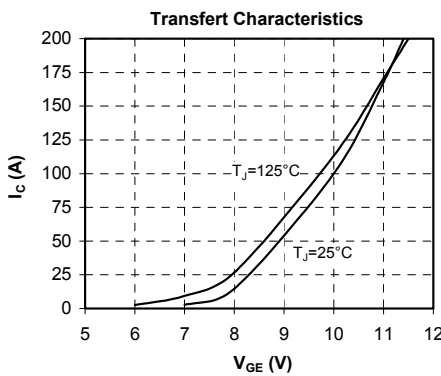
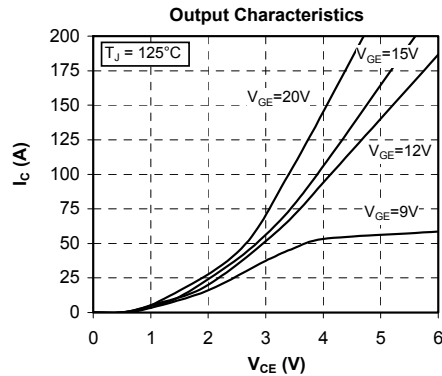
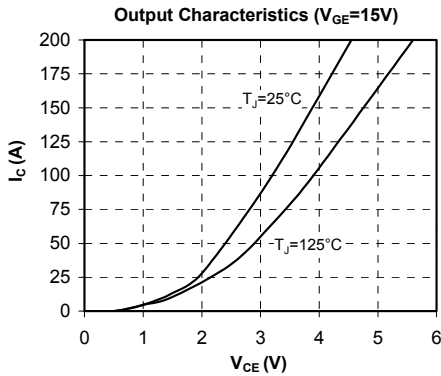
Symbol	Characteristic	Min	Typ	Max	Unit	
V <sub>ISOL</sub>	RMS Isolation Voltage, any terminal to case t=1 min, 50/60Hz	4000			V	
T <sub>J</sub>	Operating junction temperature range	-40		150	°C	
T <sub>STG</sub>	Storage Temperature Range	-40		125		
T <sub>C</sub>	Operating Case Temperature	-40		100		
Torque	Mounting torque	To heatsink	M4	2	3	N.m
Wt	Package Weight				75	g

## SP2 Package outline (dimensions in mm)



## Typical Performance Curve





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