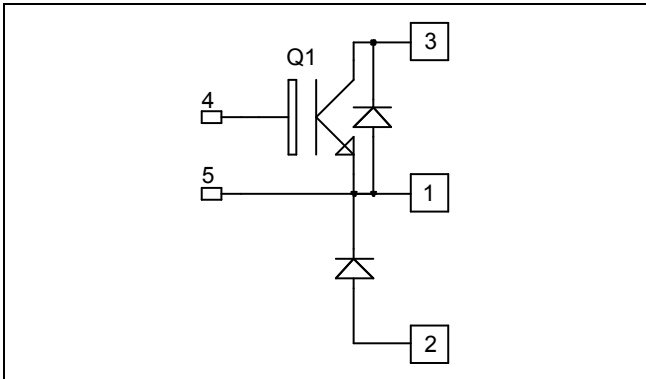


## Buck Chopper NPT IGBT Power Module

**$V_{CES} = 1200V$**   
 **$I_C = 300A @ T_c = 80^\circ C$**



### Application

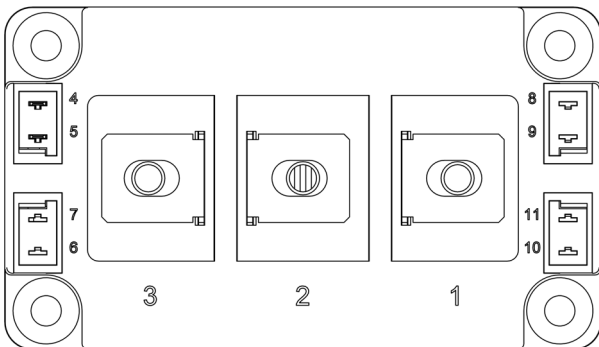
- AC and DC motor control
- Switched Mode Power Supplies

### 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
- High level of integration
- M6 power connectors

### Benefits

- 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	$T_c = 25^\circ C$	420
		$T_c = 80^\circ C$	300
$I_{CM}$	Pulsed Collector Current	$T_c = 25^\circ C$	600
$V_{GE}$	Gate - Emitter Voltage	$\pm 20$	V
$P_D$	Maximum Power Dissipation	$T_c = 25^\circ C$	2100
RBSOA	Reverse Bias Safe Operating Area	$T_j = 125^\circ C$	600A@1150V

**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
$I_{CES}$	Zero Gate Voltage Collector Current	$V_{GE} = 0V, V_{CE} = 1200V$			150	$\mu A$
$V_{CE(on)}$	Collector Emitter on Voltage	$V_{GE} = 15V$ $I_C = 300A$		$T_j = 25^\circ C$ 3.2 $T_j = 125^\circ C$ 3.9	3.7	V
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 12 mA$	5.2	5.8	6.4	V
$I_{GES}$	Gate – Emitter Leakage Current	$V_{GE} = 20V, V_{CE} = 0V$			1.2	$\mu A$

**Dynamic Characteristics**

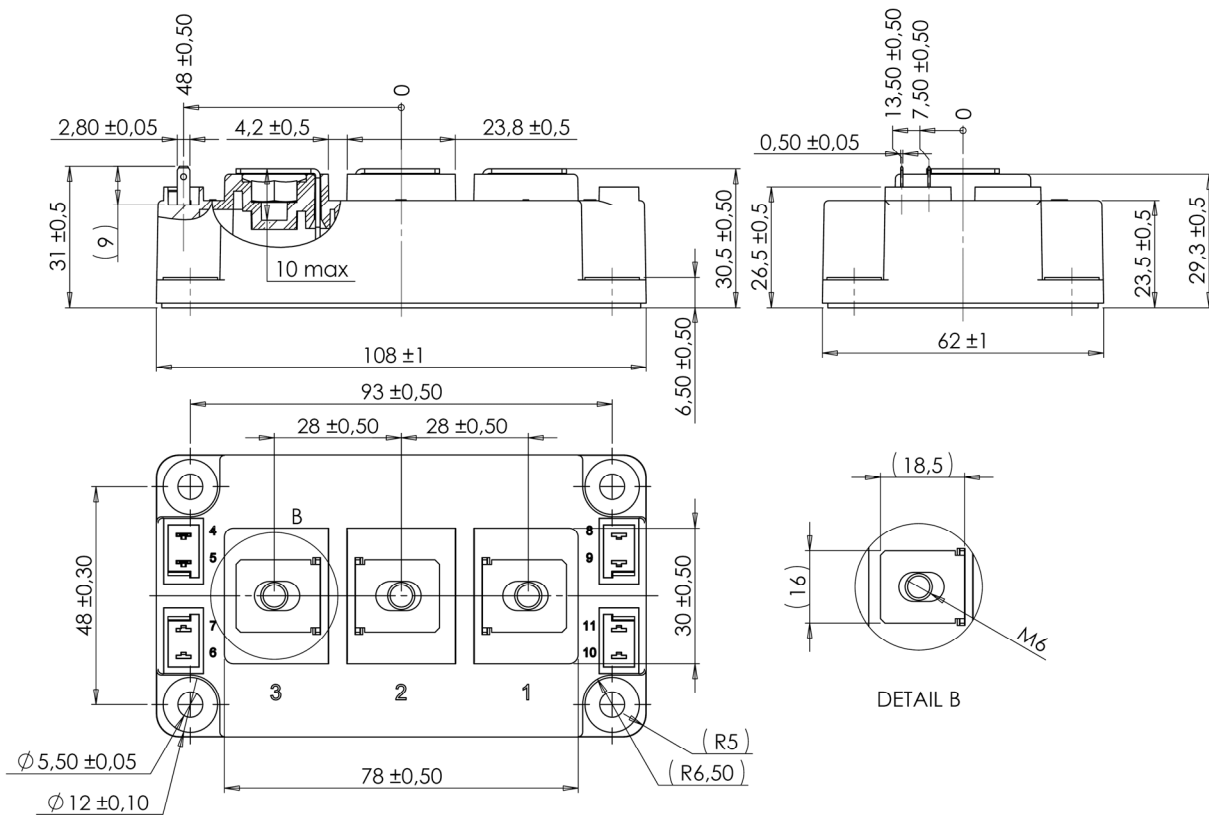
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$C_{ies}$	Input Capacitance	$V_{GE} = 0V, V_{CE} = 25V$		19		nF
$C_{res}$	Reverse Transfer Capacitance	$f = 1MHz$		1.4		nF
$Q_G$	Gate charge	$V_{GE} = \pm 15V, I_C = 300A$ $V_{CE} = 600V$		3		$\mu C$
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{GE} = \pm 15V$ $V_{Bus} = 600V$ $I_C = 200A$ $R_G = 3.3\Omega$		100		ns
$T_r$	Rise Time			60		
$T_{d(off)}$	Turn-off Delay Time			530		
$T_f$	Fall Time			30		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (125°C) $V_{GE} = \pm 15V$ $V_{Bus} = 600V$ $I_C = 200A$ $R_G = 3.3\Omega$		110		ns
$T_r$	Rise Time			70		
$T_{d(off)}$	Turn-off Delay Time			550		
$T_f$	Fall Time			40		
$E_{on}$	Turn On Energy	$V_{GE} = \pm 15V$ $V_{Bus} = 600V$ $I_C = 300A$		$T_j = 125^\circ C$ 25		mJ
$E_{off}$	Turn Off Energy	$R_G = 3.3\Omega$		$T_j = 125^\circ C$ 21		
$I_{sc}$	Short Circuit data	$V_{GE} \leq 15V ; V_{Bus} = 900V$ $t_p \leq 10\mu s ; T_j = 125^\circ C$		2000		A
$R_{thJC}$	Junction to Case Thermal Resistance				0.06	$^\circ C/W$

**Chopper diode ratings and characteristics**

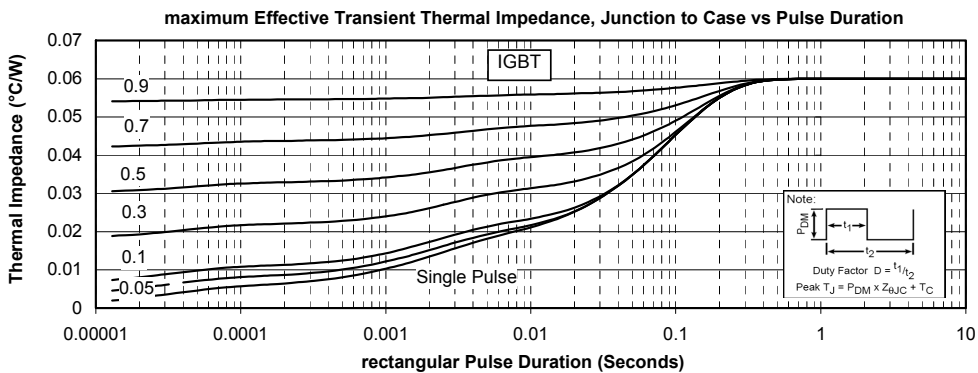
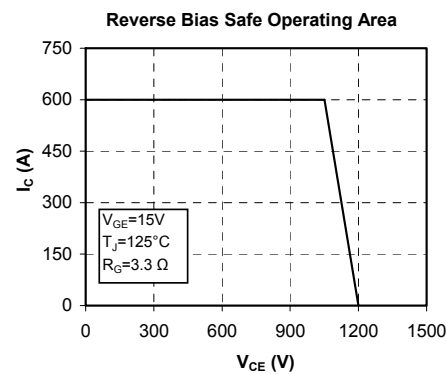
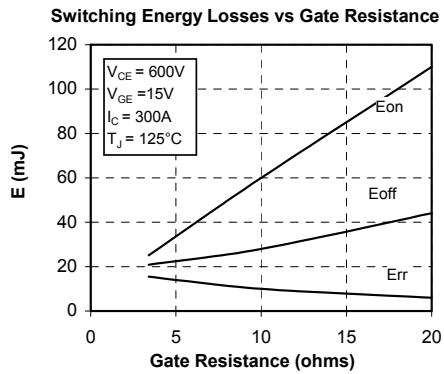
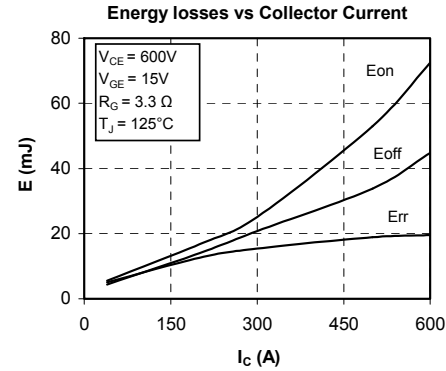
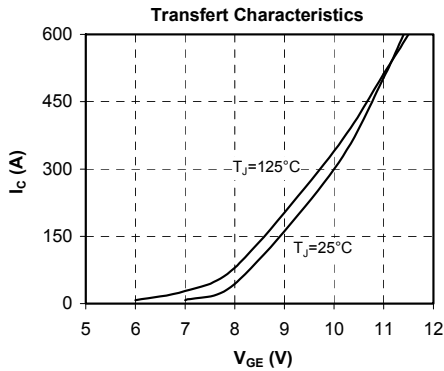
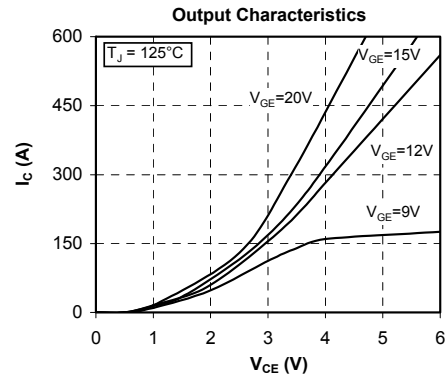
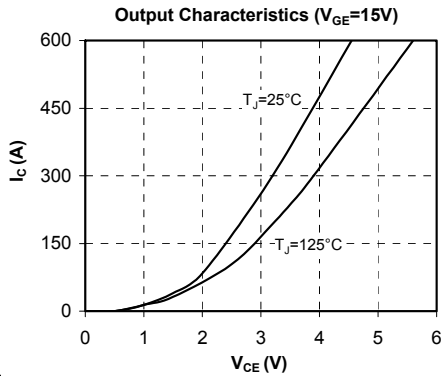
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit	
$V_{RRM}$	Maximum Peak Repetitive Reverse Voltage		1200			V	
$I_{RRM}$	Maximum Reverse Leakage Current	$V_R = 1200V$			250	$\mu A$	
$I_F$	DC Forward Current	$T_c = 80^\circ C$		300		A	
$V_F$	Diode Forward Voltage	$I_F = 300A$		$T_j = 25^\circ C$ 2.1 $T_j = 125^\circ C$ 1.9		V	
$t_{rr}$	Reverse Recovery Time	$I_F = 300A$ $V_R = 600V$ $di/dt = 4500A/\mu s$		$T_j = 25^\circ C$ 120 $T_j = 125^\circ C$ 210		ns	
$Q_{rr}$	Reverse Recovery Charge			$T_j = 25^\circ C$ 19 $T_j = 125^\circ C$ 53			$\mu C$
$E_{rr}$	Reverse Recovery Energy			$T_j = 25^\circ C$ 7 $T_j = 125^\circ C$ 15		mJ	
$R_{thJC}$	Junction to Case Thermal Resistance						

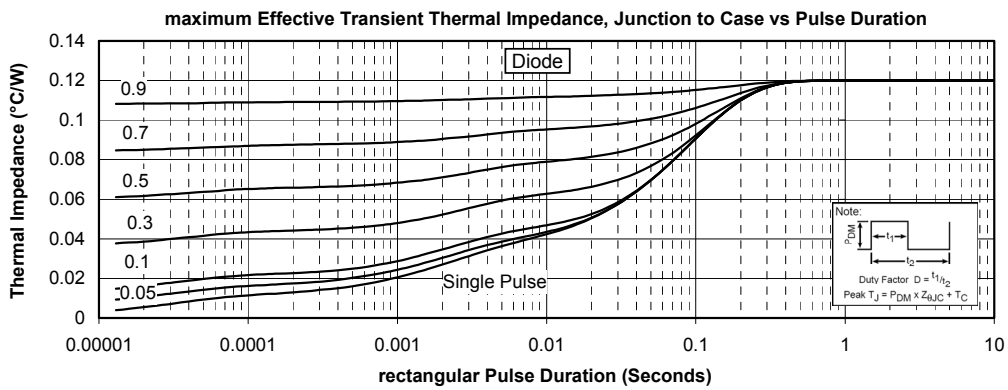
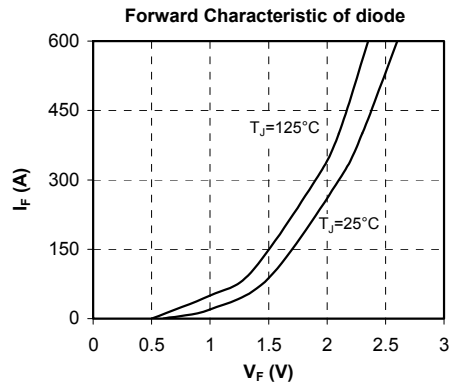
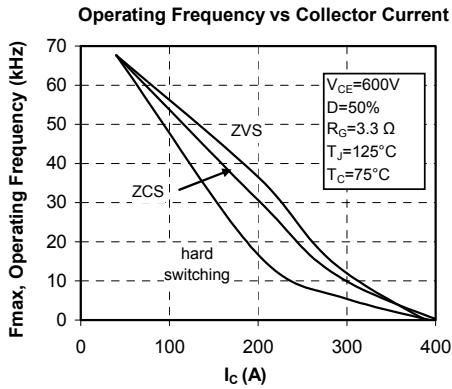
**Thermal and package characteristics**

Symbol	Characteristic	Min	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>JOP</sub>	Recommended junction temperature under switching conditions	-40	T <sub>Jmax</sub> - 25			
T <sub>C</sub>	Operating Case Temperature	-40	125			
Torque	Mounting torque	For terminals	M6	3	5	N.m
		To Heatsink	M6	3	5	
Wt	Package Weight			350	g	

**D3 Package outline (dimensions in mm)**


## Typical Performance Curve





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