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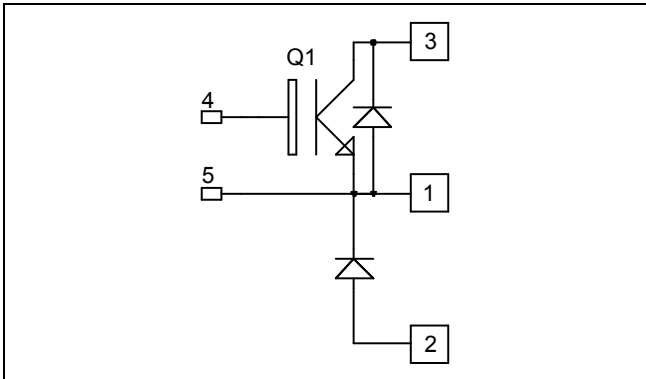
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Buck Chopper NPT IGBT Power Module

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



Application

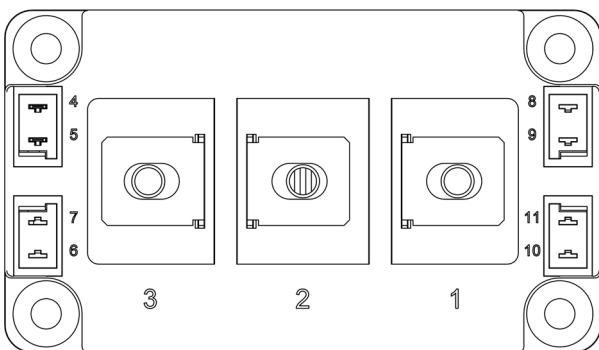
- AC and DC motor control
- Switched Mode Power Supplies

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	± 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

Electrical Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
I_{CES}	Zero Gate Voltage Collector Current	$V_{GE} = 0V, V_{CE} = 1200V$			150	μA
$V_{CE(on)}$	Collector Emitter on Voltage	$V_{GE} = 15V$ $I_C = 300A$		3.2 3.9	3.7	V
		$T_j = 25^\circ C$ $T_j = 125^\circ C$				
$V_{GE(th)}$	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	μA

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		μC
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching ($25^\circ C$)		100		ns
T_r	Rise Time	$V_{GE} = \pm 15V$		60		
$T_{d(off)}$	Turn-off Delay Time	$V_{Bus} = 600V$ $I_C = 200A$		530		
T_f	Fall Time	$R_G = 3.3\Omega$		30		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching ($125^\circ C$)		110		ns
T_r	Rise Time	$V_{GE} = \pm 15V$		70		
$T_{d(off)}$	Turn-off Delay Time	$V_{Bus} = 600V$ $I_C = 200A$		550		
T_f	Fall Time	$R_G = 3.3\Omega$		40		
E_{on}	Turn On Energy	$V_{GE} = \pm 15V$ $V_{Bus} = 600V$		25		mJ
E_{off}	Turn Off Energy	$I_C = 300A$ $R_G = 3.3\Omega$		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	$^\circ C/W$

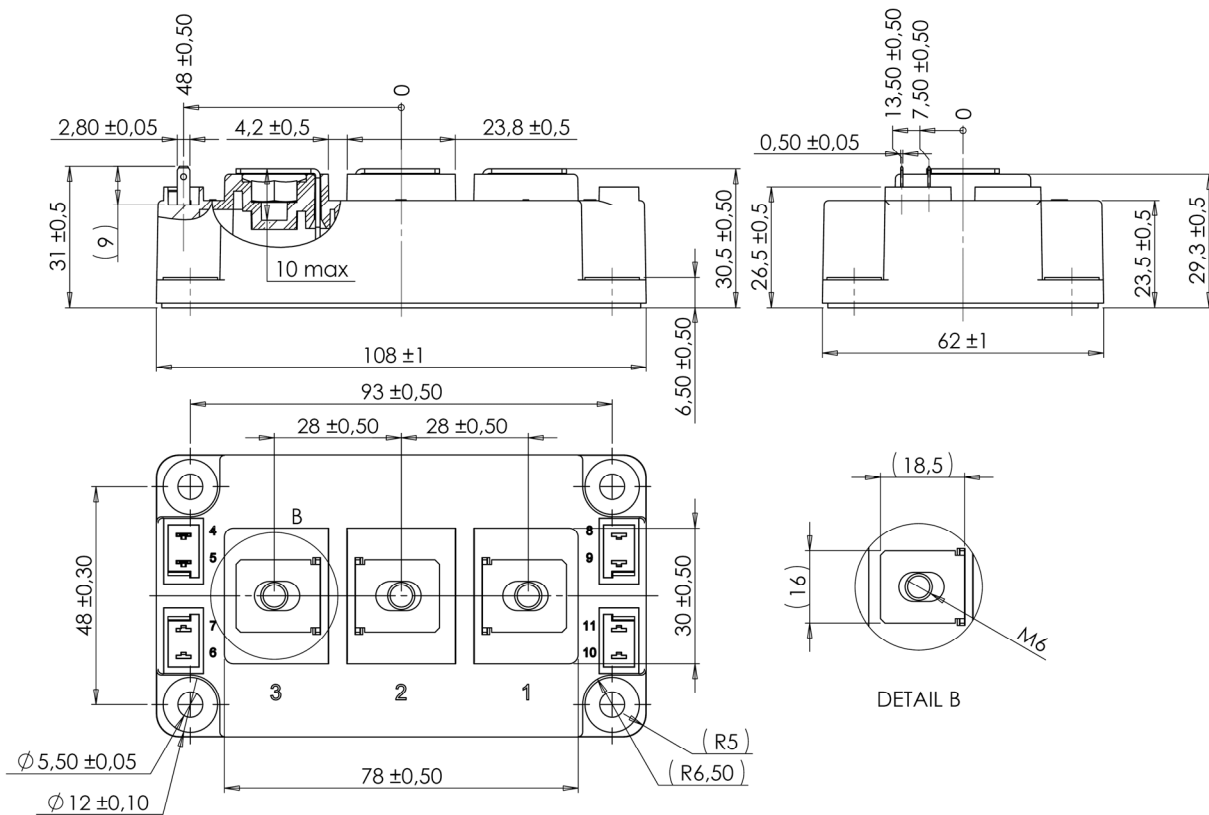
Chopper diode ratings and characteristics

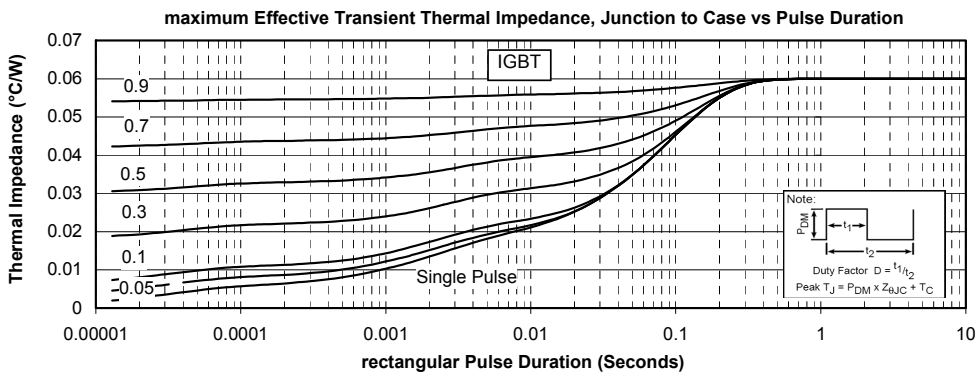
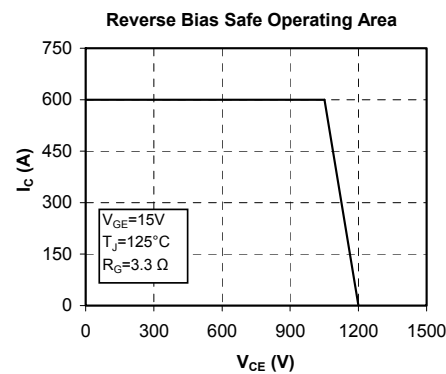
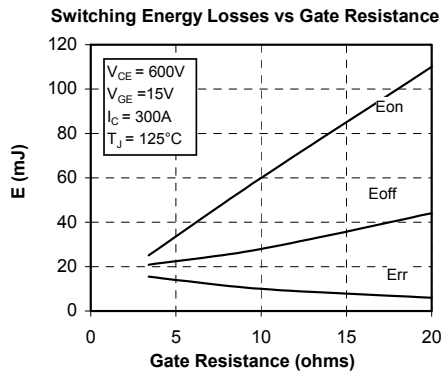
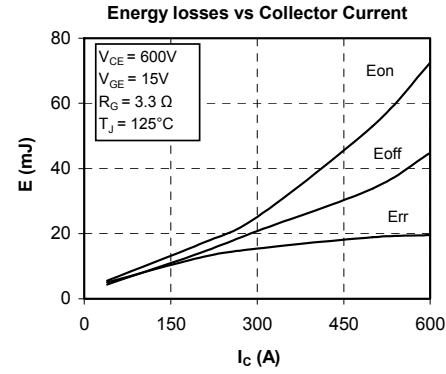
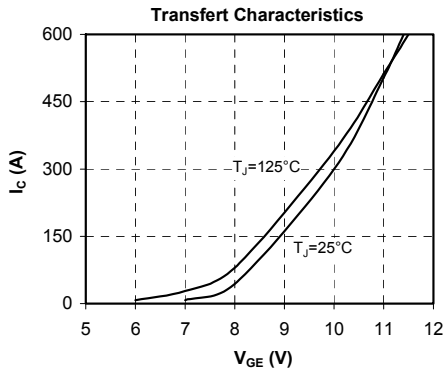
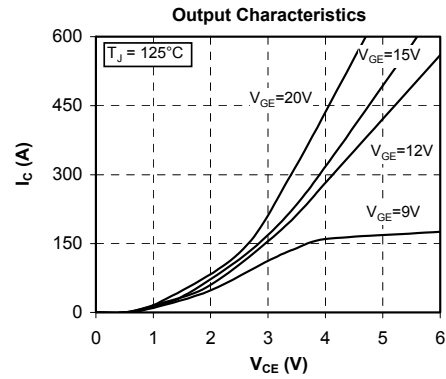
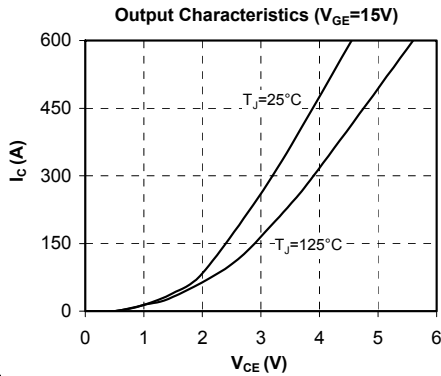
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit	
V_{RRM}	Maximum Peak Repetitive Reverse Voltage		1200			V	
I_{RRM}	Maximum Reverse Leakage Current	$V_R = 1200V$			250	μA	
I_F	DC Forward Current	$T_c = 80^\circ C$		300		A	
V_F	Diode Forward Voltage	$I_F = 300A$		2.1 1.9		V	
		$T_j = 25^\circ C$ $T_j = 125^\circ C$					
t_{rr}	Reverse Recovery Time	$I_F = 300A$ $V_R = 600V$ $di/dt = 4500A/\mu s$		120 210		ns	
			$T_j = 25^\circ C$ $T_j = 125^\circ C$				
Q_{rr}	Reverse Recovery Charge		$T_j = 25^\circ C$ $T_j = 125^\circ C$		19 53		μC
E_{rr}	Reverse Recovery Energy		$T_j = 25^\circ C$ $T_j = 125^\circ C$		7 15		mJ
R_{thJC}	Junction to Case Thermal Resistance				0.12	$^\circ C/W$	

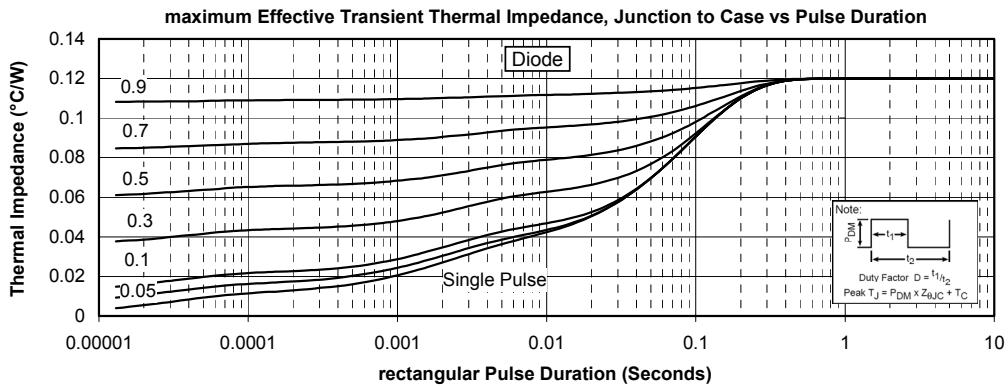
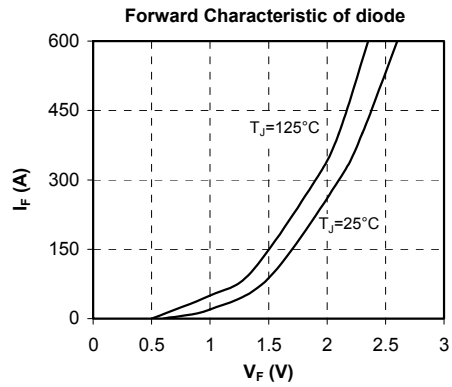
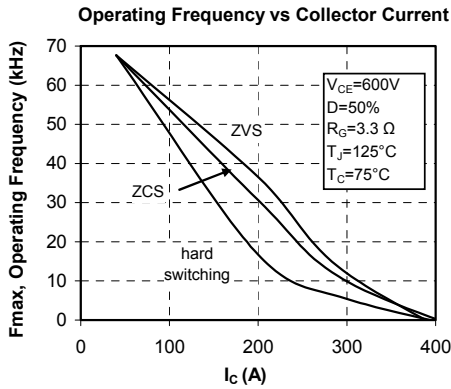
Thermal and package characteristics

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	150	°C		
T _{STG}	Storage Temperature Range	-40	125			
T _{JOP}	Recommended junction temperature under switching conditions	-40	T _{Jmax} - 25			
T _C	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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