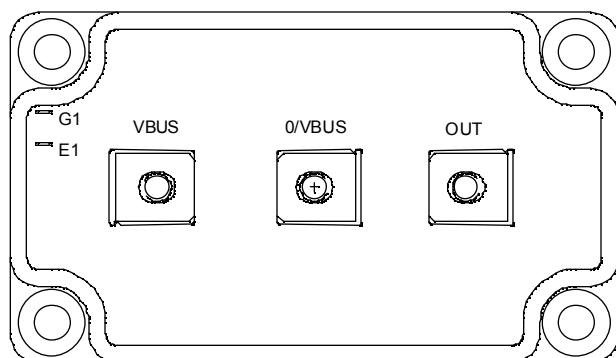
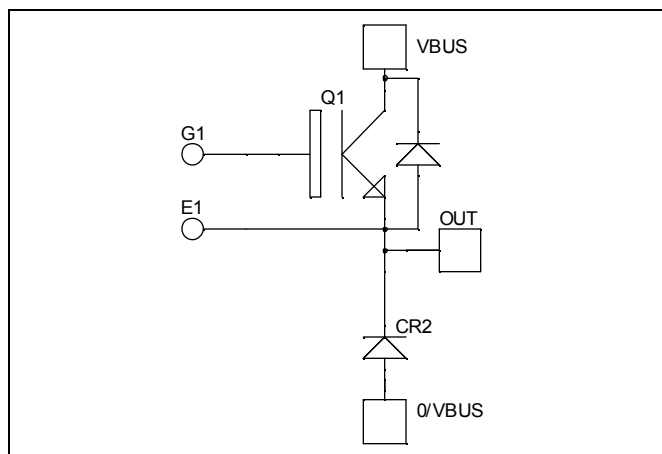


Buck chopper NPT IGBT Power Module

**$V_{CES} = 600V$
 $I_C = 350A @ T_c = 80^\circ C$**



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 100 kHz
 - Soft recovery parallel diodes
 - Low diode VF
 - Low leakage current
 - Avalanche energy rated
 - RBSOA and SCSOA rated
- Kelvin emitter for easy drive
- Very low stray inductance
 - Symmetrical design
 - M5 power connectors
- 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 TC of VCEsat
- Low profile
- RoHS compliant

Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V_{CES}	Collector - Emitter Breakdown Voltage	600	V
I_C	Continuous Collector Current	$T_c = 25^\circ C$ $T_c = 80^\circ C$	$\begin{matrix} 430 \\ 350 \end{matrix}$ A
I_{CM}	Pulsed Collector Current	$T_c = 25^\circ C$	1225
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	1562
RBSOA	Reverse Bias Safe Operating Area	$T_j = 150^\circ C$	800A @ 600V

CAUTION: These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed. See application note APT0502 on www.microsemi.com

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

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	$V_{GE} = 0\text{V}$ $V_{CE} = 600\text{V}$	$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$			200 1750	μA
$V_{CE(sat)}$	Collector Emitter saturation Voltage	$V_{GE} = 15\text{V}$ $I_C = 360\text{A}$	$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$		2.0 2.2	2.5	V
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 4\text{mA}$		3		5	V
I_{GES}	Gate – Emitter Leakage Current	$V_{GE} = \pm 20\text{V}, V_{CE} = 0\text{V}$				± 300	nA

Dynamic Characteristics

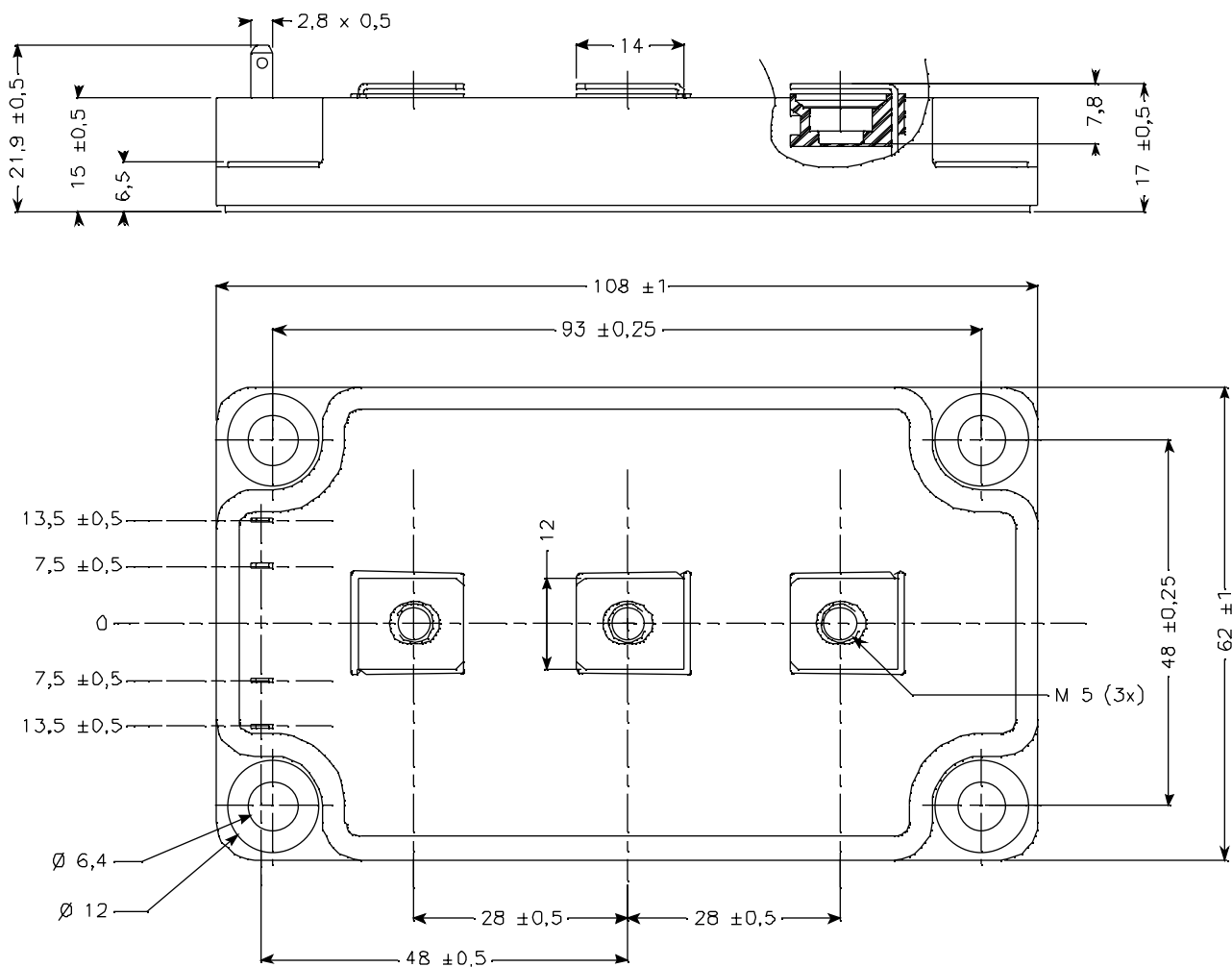
<i>Symbol</i>	<i>Characteristic</i>	<i>Test Conditions</i>		<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
C_{ies}	Input Capacitance	$V_{GE} = 0\text{V}$			17.2		nF
C_{oes}	Output Capacitance	$V_{CE} = 25\text{V}$			1.88		
C_{res}	Reverse Transfer Capacitance	$f = 1\text{MHz}$			1.6		
Q_g	Total gate Charge	$V_{GE} = 15\text{V}$			1320		nC
Q_{ge}	Gate – Emitter Charge	$V_{Bus} = 300\text{V}$			1160		
Q_{gc}	Gate – Collector Charge	$I_C = 360\text{A}$			800		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{GE} = 15\text{V}$ $V_{Bus} = 400\text{V}$ $I_C = 360\text{A}$ $R_G = 1.25\Omega$			26		ns
T_r	Rise Time				25		
$T_{d(off)}$	Turn-off Delay Time				150		
T_f	Fall Time				30		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (125°C) $V_{GE} = 15\text{V}$ $V_{Bus} = 400\text{V}$ $I_C = 360\text{A}$ $R_G = 1.25\Omega$			26		ns
T_r	Rise Time				25		
$T_{d(off)}$	Turn-off Delay Time				170		
T_f	Fall Time				40		
E_{on}	Turn-on Switching Energy	$V_{GE} = 15\text{V}$ $V_{Bus} = 400\text{V}$ $I_C = 360\text{A}$ $R_G = 1.25\Omega$	$T_j = 125^\circ\text{C}$		17.2		mJ
E_{off}	Turn-off Switching Energy		$T_j = 125^\circ\text{C}$		14		

Chopper diode ratings and characteristics

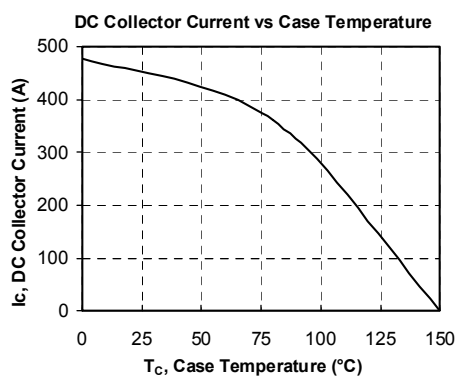
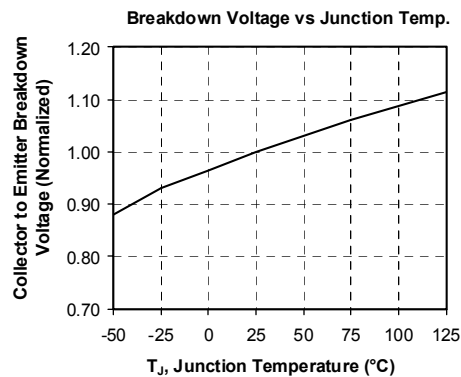
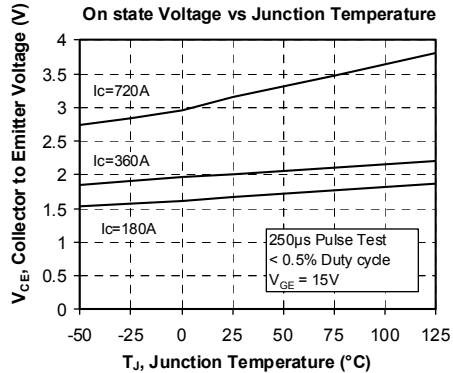
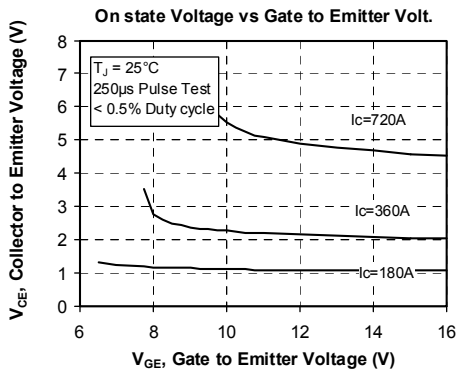
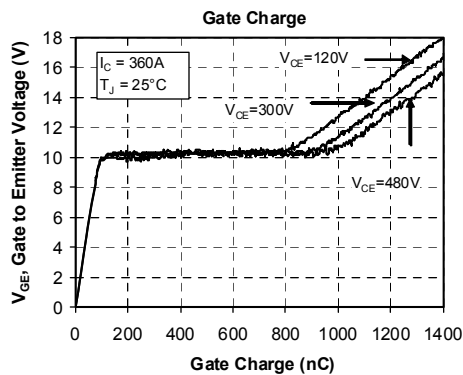
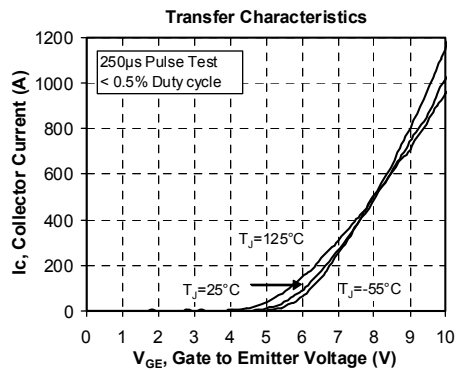
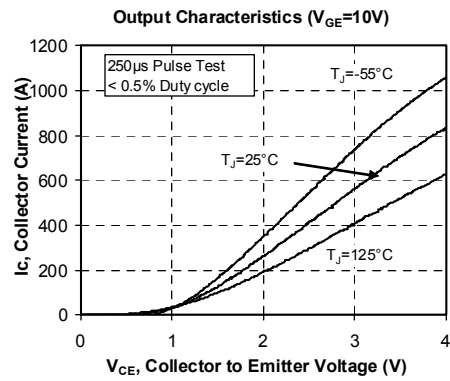
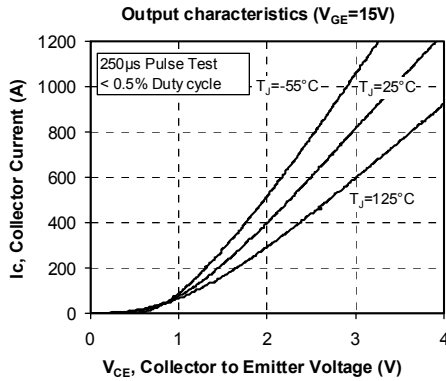
Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
V _{RRM}	Maximum Peak Repetitive Reverse Voltage			600			V
I _{RM}	Maximum Reverse Leakage Current	V _R =600V	T _j = 25°C			750	μA
			T _j = 125°C			1500	
I _F	DC Forward Current		T _c = 80°C		400		A
V _F	Diode Forward Voltage	I _F = 400A			1.6	1.8	V
		I _F = 800A			1.9		
		I _F = 400A	T _j = 125°C		1.4		
t _{rr}	Reverse Recovery Time	I _F = 400A V _R = 400V di/dt = 800A/μs	T _j = 25°C		180		ns
			T _j = 125°C		220		
Q _{rr}	Reverse Recovery Charge		T _j = 25°C		1560		nC
			T _j = 125°C		5800		

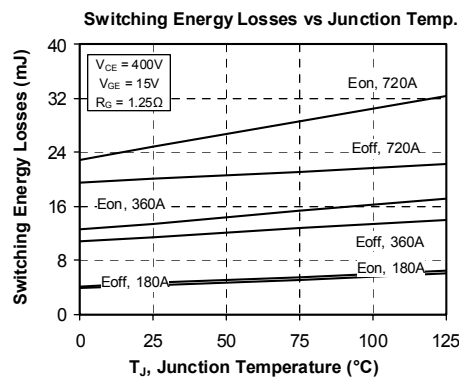
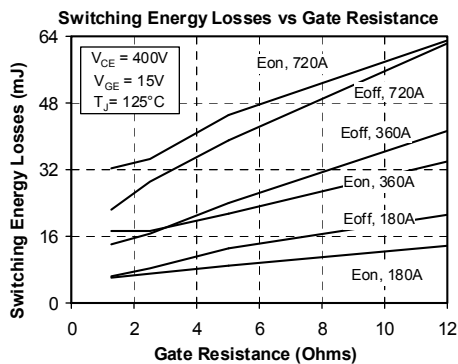
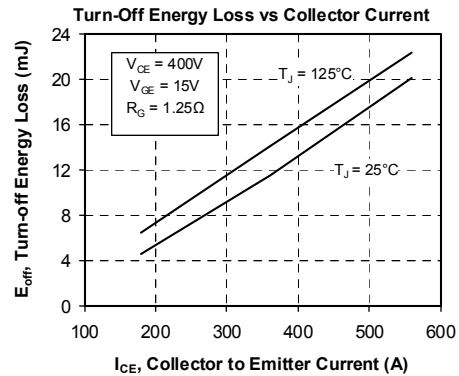
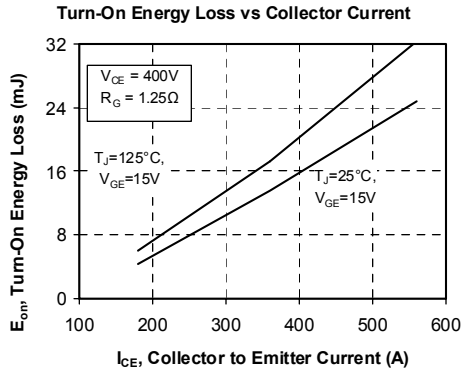
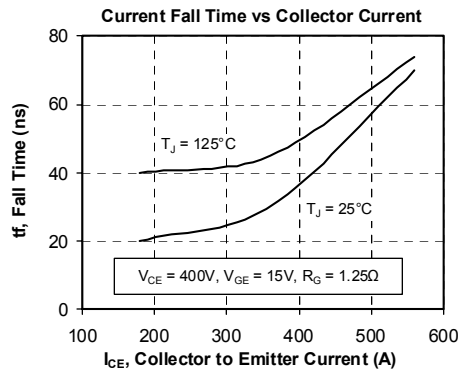
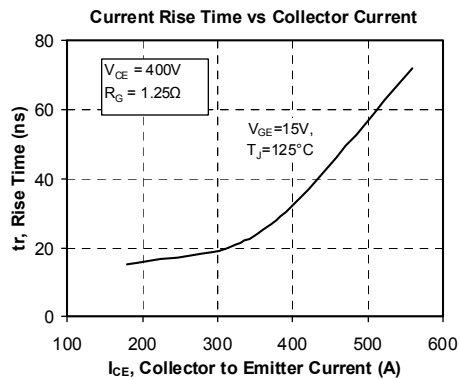
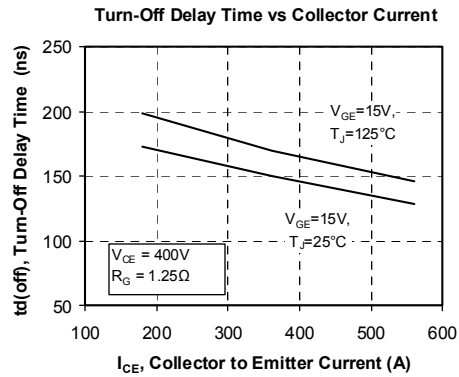
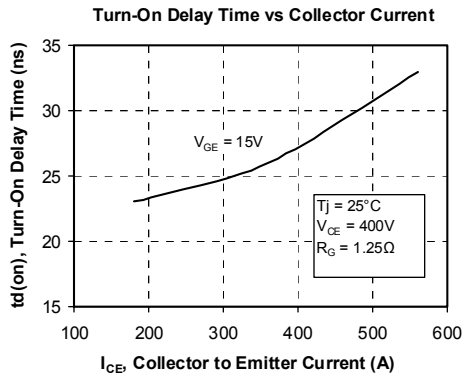
Thermal and package characteristics
Symbol Characteristic

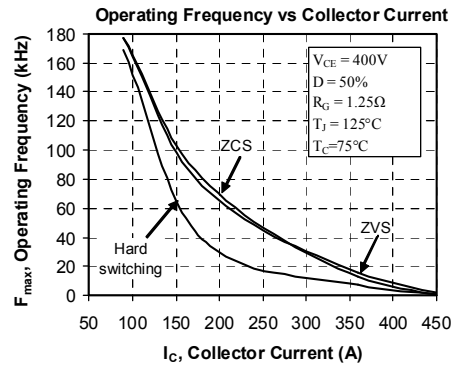
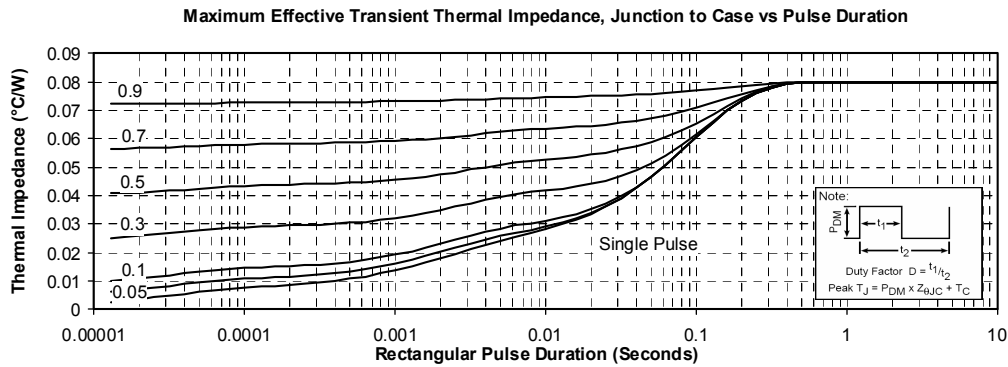
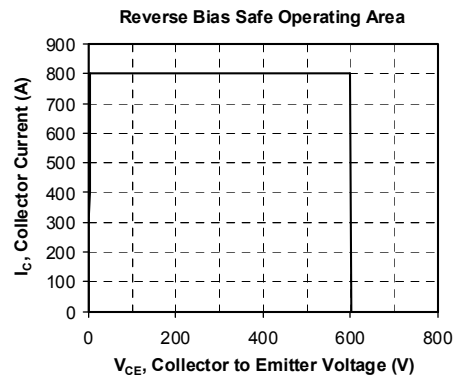
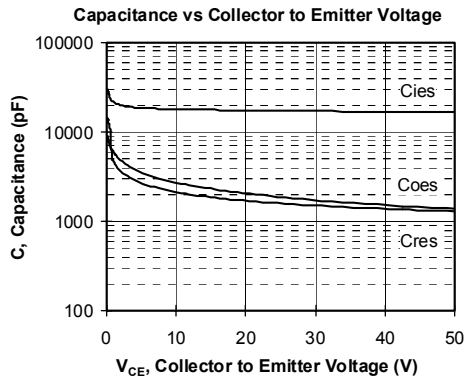
			<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
R_{thJC}	Junction to Case Thermal Resistance	IGBT			0.08	°C/W
		Diode			0.16	
V_{ISOL}	RMS Isolation Voltage, any terminal to case $t = 1$ min, $I_{isol} < 1$ mA, 50/60Hz		2500			V
T_J	Operating junction temperature range		-40		150	°C
T_{STG}	Storage Temperature Range		-40		125	
T_C	Operating Case Temperature		-40		100	
Torque	Mounting torque	To heatsink	M6	3	5	N.m
		For terminals	M5	2	3.5	
Wt	Package Weight				280	g

SP6 Package outline (dimensions in mm)

 See application note APT0601 - Mounting Instructions for SP6 Power Modules on www.microsemi.com

Typical Performance Curve







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