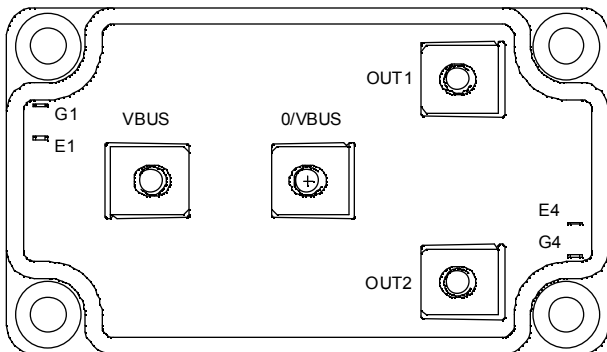
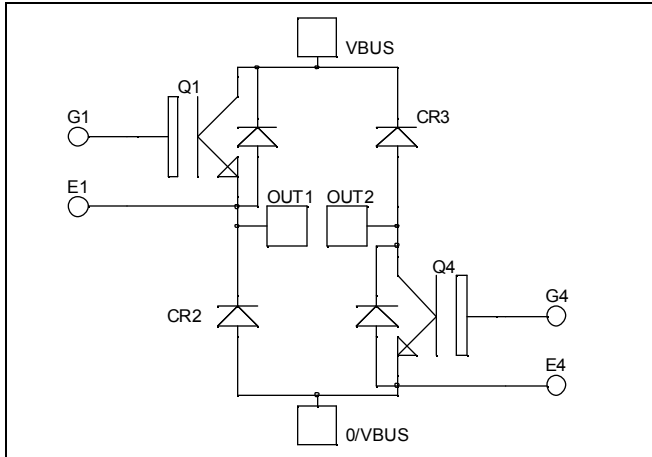


Asymmetrical - bridge NPT IGBT Power Module

$V_{CES} = 600V$
 $I_C = 180A @ T_c = 80^\circ C$



Application

- Welding converters
- Switched Mode Power Supplies
- Switched Reluctance Motor Drives

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 T_c of V_{CESat}
- 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	$T_c = 25^\circ C$	220
		$T_c = 80^\circ C$	180
I_{CM}	Pulsed Collector Current	$T_c = 25^\circ C$	630
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	833
RBSOA	Reverse Bias Safe Operating Area	$T_j = 150^\circ C$	400A @ 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

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
I_{CES}	Zero Gate Voltage Collector Current	$V_{GE} = 0\text{V}$			300	μA
		$V_{CE} = 600\text{V}$	$T_j = 25^\circ\text{C}$		1000	
$V_{CE(sat)}$	Collector Emitter saturation Voltage	$V_{GE} = 15\text{V}$		2.0	2.5	V
		$I_C = 180\text{A}$	$T_j = 125^\circ\text{C}$	2.2		
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 2\text{mA}$	3		5	V
I_{GES}	Gate – Emitter Leakage Current	$V_{GE} = 20\text{V}, V_{CE} = 0\text{V}$			± 200	nA

Dynamic Characteristics

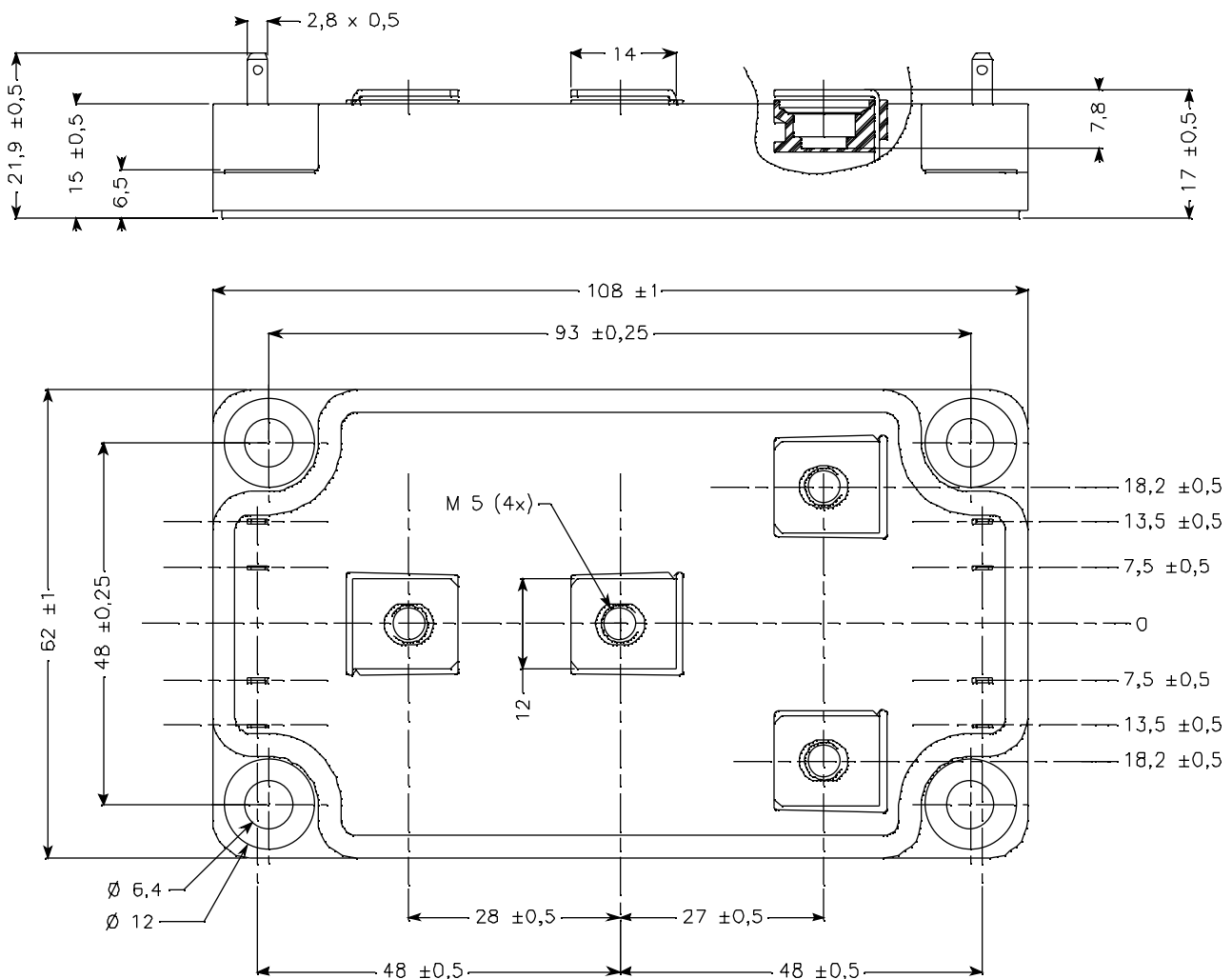
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0\text{V}$		8.6		nF
C_{oes}	Output Capacitance	$V_{CE} = 25\text{V}$		0.94		
C_{res}	Reverse Transfer Capacitance	$f = 1\text{MHz}$		0.8		
Q_g	Total gate Charge	$V_{GS} = 15\text{V}$		660		nC
Q_{ge}	Gate – Emitter Charge	$V_{Bus} = 300\text{V}$		580		
Q_{gc}	Gate – Collector Charge	$I_C = 180\text{A}$		400		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C)		26		ns
T_r	Rise Time	$V_{GE} = 15\text{V}$		25		
$T_{d(off)}$	Turn-off Delay Time	$V_{Bus} = 400\text{V}$		150		
T_f	Fall Time	$I_C = 180\text{A}$ $R_G = 2.5\ \Omega$		30		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (125°C)		26		ns
T_r	Rise Time	$V_{GE} = 15\text{V}$		25		
$T_{d(off)}$	Turn-off Delay Time	$V_{Bus} = 400\text{V}$		170		
T_f	Fall Time	$I_C = 180\text{A}$ $R_G = 2.5\ \Omega$		40		
E_{on}	Turn-on Switching Energy	$V_{GE} = 15\text{V}$ $V_{Bus} = 400\text{V}$	$T_j = 125^\circ\text{C}$	8.6		mJ
E_{off}	Turn-off Switching Energy	$I_C = 180\text{A}$ $R_G = 2.5\ \Omega$	$T_j = 125^\circ\text{C}$	7		

Diode ratings and characteristics

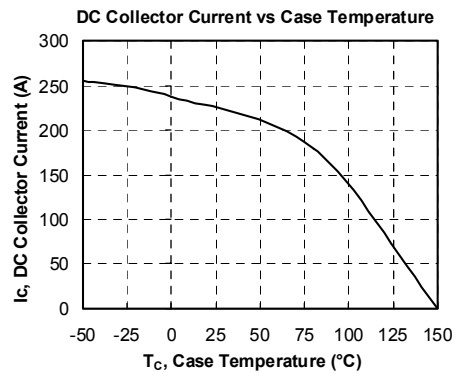
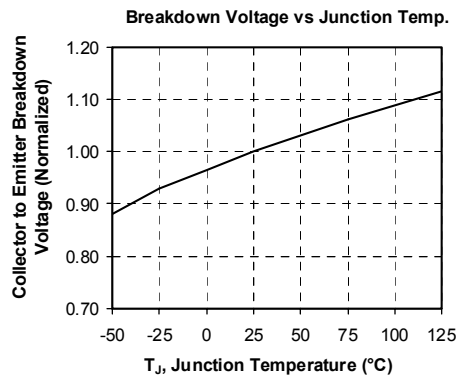
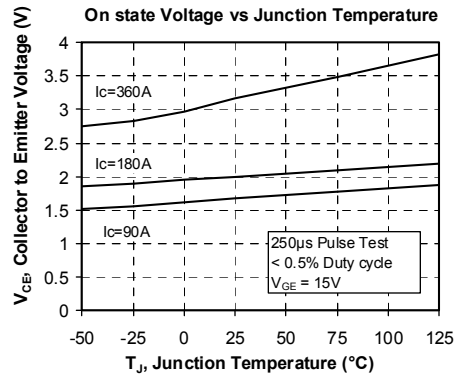
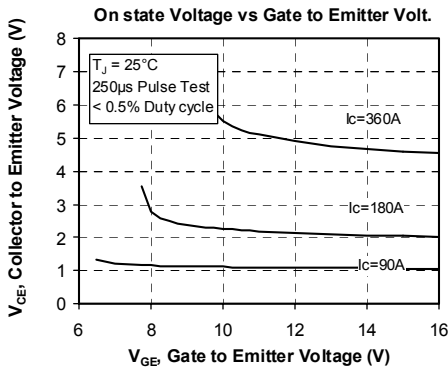
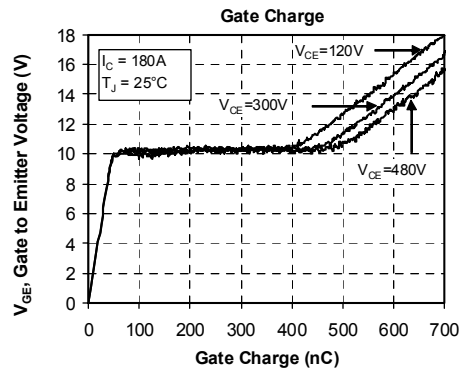
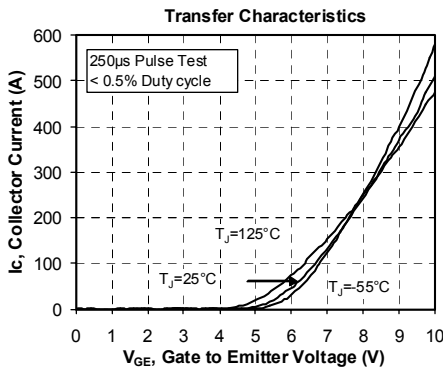
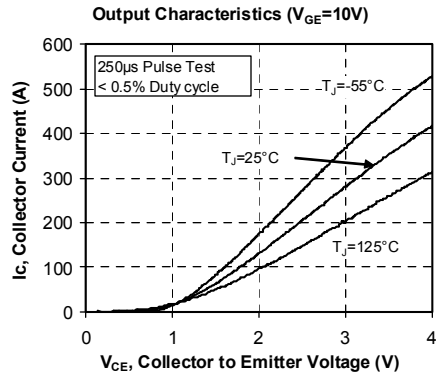
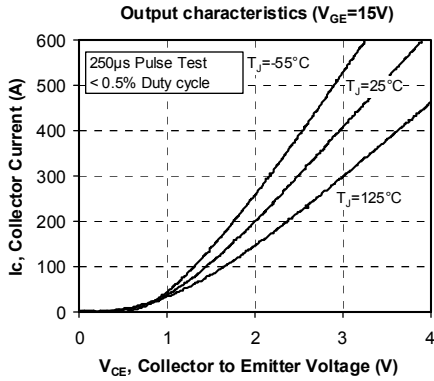
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_{RRM}	Maximum Peak Repetitive Reverse Voltage		600			V
I_{RM}	Maximum Reverse Leakage Current	$V_R = 600\text{V}$	$T_j = 25^\circ\text{C}$		350	μA
			$T_j = 125^\circ\text{C}$		750	
I_F	DC Forward Current			200		A
V_F	Diode Forward Voltage	$I_F = 200\text{A}$		1.6	1.8	V
		$I_F = 400\text{A}$		1.9		
		$I_F = 200\text{A}$	$T_j = 125^\circ\text{C}$	1.4		
t_{rr}	Reverse Recovery Time	$I_F = 200\text{A}$	$T_j = 25^\circ\text{C}$	180		ns
		$V_R = 400\text{V}$	$T_j = 125^\circ\text{C}$	220		
Q_{rr}	Reverse Recovery Charge	$di/dt = 400\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$	780		nC
			$T_j = 125^\circ\text{C}$	2900		

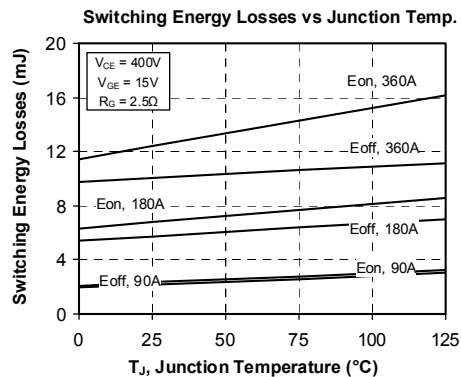
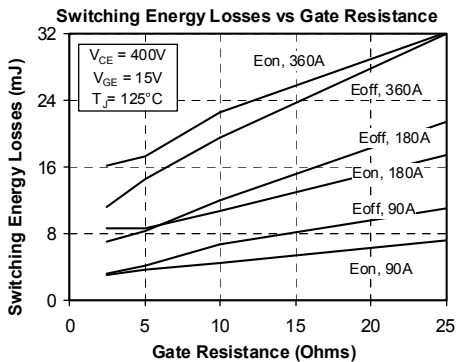
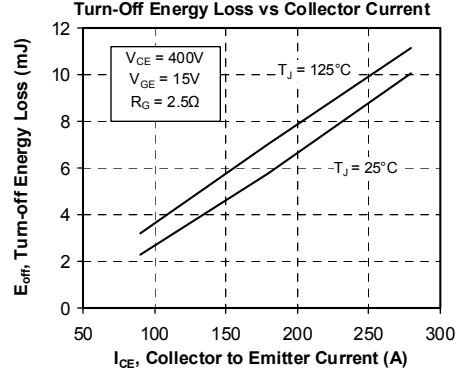
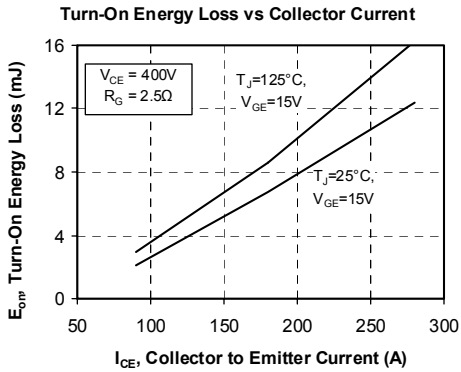
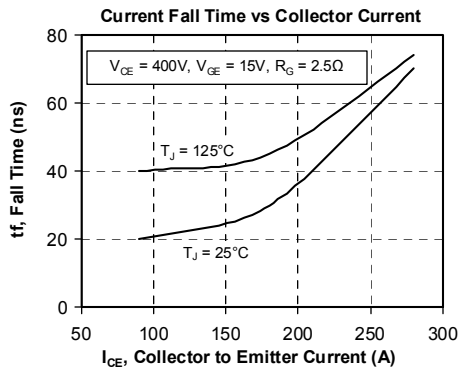
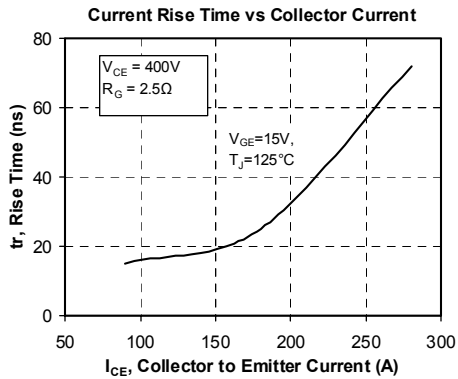
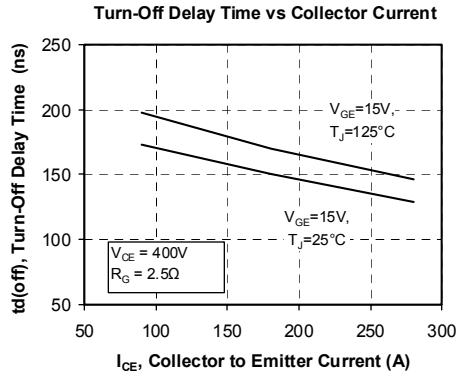
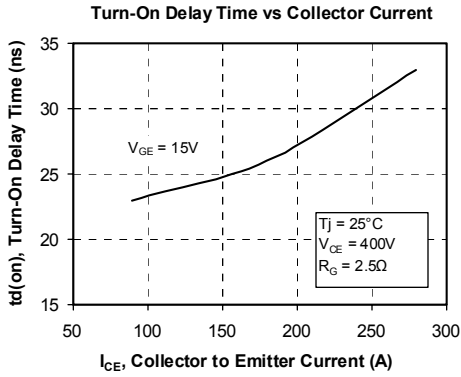
Thermal and package characteristics
Symbol Characteristic

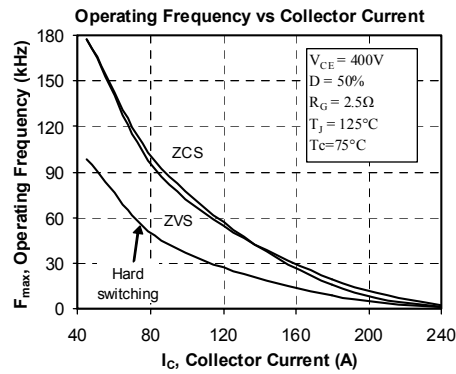
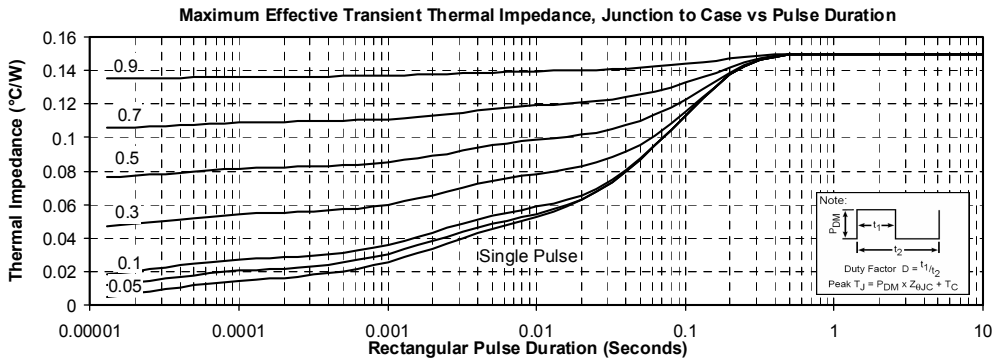
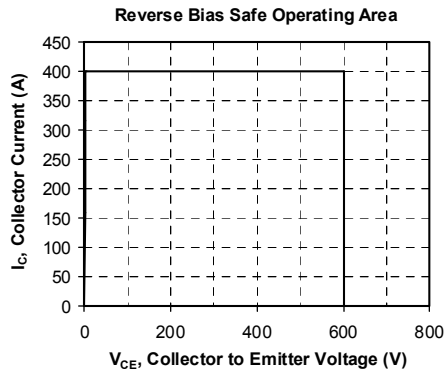
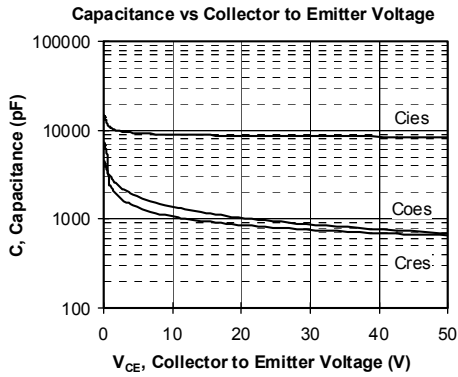
		<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>	
R_{thJC}	Junction to Case Thermal Resistance	IGBT		0.15	°C/W	
		Diode		0.32		
V_{ISOL}	RMS Isolation Voltage, any terminal to case $t=1$ min, $I_{isol}<1$ mA, 50/60Hz	2500			V	
T_J	Operating junction temperature range	-40		150	°C	
T_{STG}	Storage Temperature 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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