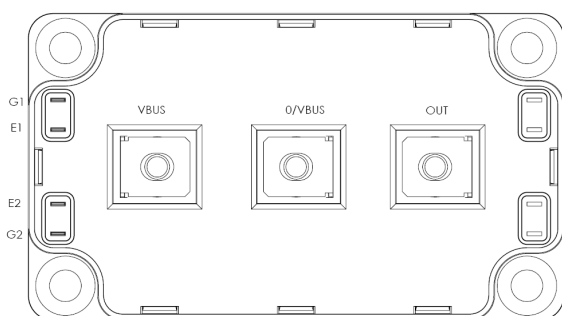
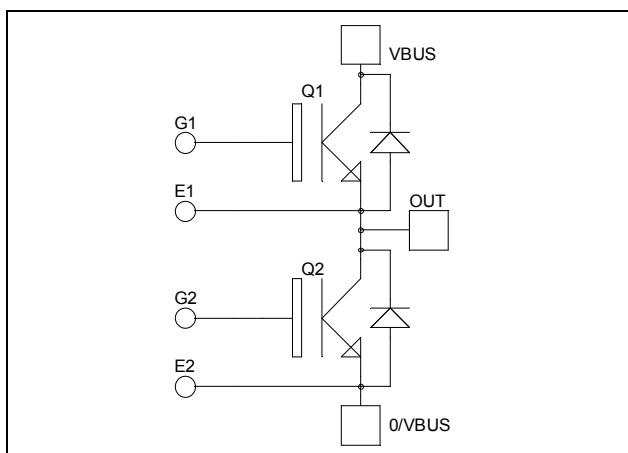


Phase leg NPT IGBT Power Module

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



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 100 kHz
 - Soft recovery parallel diodes
 - Low diode VF
 - Low leakage current
 - 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	$T_c = 25^\circ C$	430	A
		$T_c = 80^\circ C$	350	
		$T_c = 25^\circ C$	1225	
I_{CM}	Pulsed Collector Current	$T_c = 25^\circ C$		
V_{GE}	Gate - Emitter Voltage		± 20	V
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	1562	W
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

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
I_{CES}	Zero Gate Voltage Collector Current	$V_{GE} = 0\text{V}$ $V_{CE} = 600\text{V}$	$T_j = 25^\circ\text{C}$		200	μA
			$T_j = 125^\circ\text{C}$		1750	
$V_{CE(sat)}$	Collector Emitter saturation Voltage	$V_{GE} = 15\text{V}$ $I_C = 360\text{A}$	$T_j = 25^\circ\text{C}$	2.0	2.5	V
			$T_j = 125^\circ\text{C}$	2.2		
$V_{GE(th)}$	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

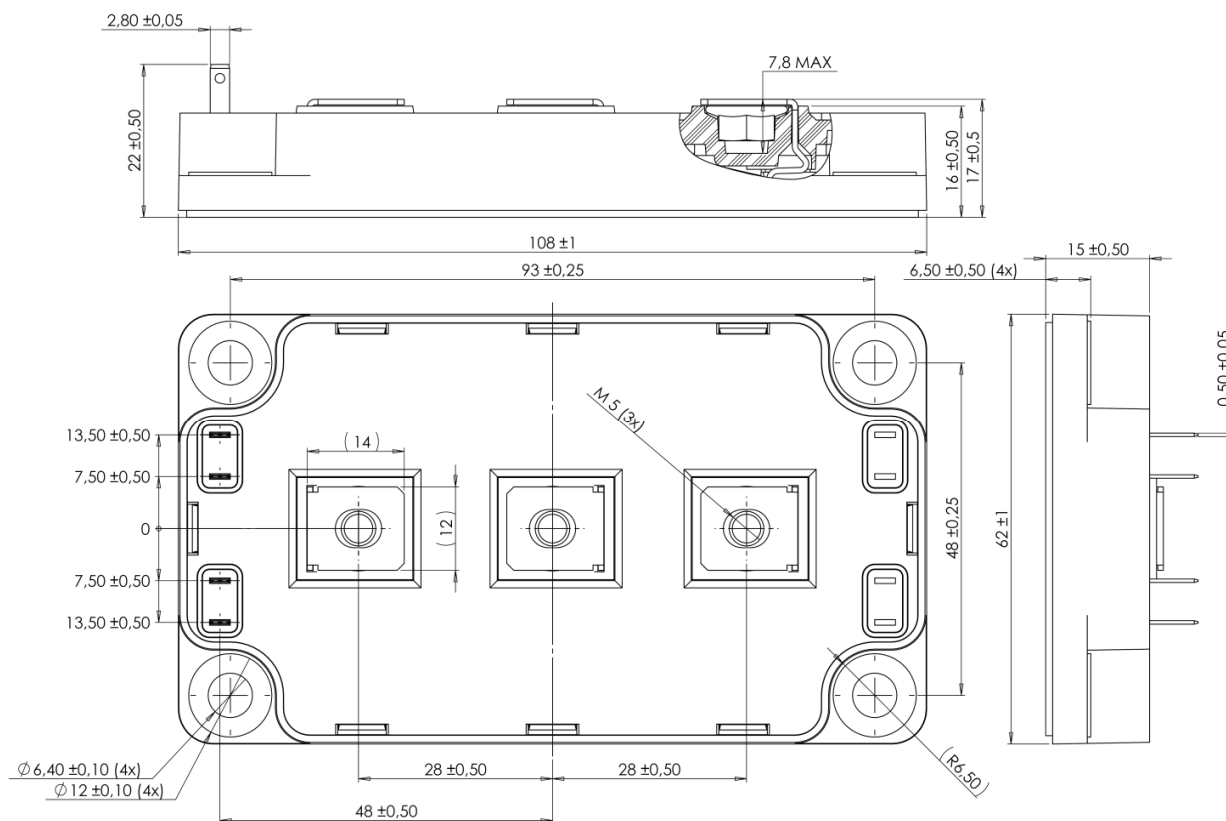
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0\text{V}$		17.2		nF
C_{oes}	Output Capacitance	$V_{CE} = 25\text{V}$		1.88		
C_{res}	Reverse Transfer Capacitance	$f = 1\text{MHz}$		1.6		
Q_g	Total gate Charge	$V_{GE} = 15\text{V}$		1320		nC
Q_{ge}	Gate – Emitter 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)		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	$I_C = 360\text{A}$ $R_G = 1.25\Omega$		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	$I_C = 360\text{A}$ $R_G = 1.25\Omega$		40		
E_{on}	Turn-on Switching Energy	$V_{GE} = 15\text{V}$ $V_{Bus} = 400\text{V}$	$T_j = 125^\circ\text{C}$	17.2		mJ
E_{off}	Turn-off Switching Energy	$I_C = 360\text{A}$ $R_G = 1.25\Omega$	$T_j = 125^\circ\text{C}$	14		

Reverse 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	$V_R = 600\text{V}$	$T_j = 25^\circ\text{C}$		750	μA
			$T_j = 125^\circ\text{C}$		1500	
I_F	DC Forward Current			400		A
V_F	Diode Forward Voltage	$I_F = 400\text{A}$		1.6	1.8	V
		$I_F = 800\text{A}$		1.9		
		$I_F = 400\text{A}$ $T_j = 125^\circ\text{C}$		1.4		
t_{rr}	Reverse Recovery Time	$I_F = 400\text{A}$ $V_R = 400\text{V}$	$T_j = 25^\circ\text{C}$	180		ns
		$di/dt = 800\text{A}/\mu\text{s}$	$T_j = 125^\circ\text{C}$	220		
Q_{rr}	Reverse Recovery Charge	$I_F = 400\text{A}$ $V_R = 400\text{V}$	$T_j = 25^\circ\text{C}$	1560		nC
		$di/dt = 800\text{A}/\mu\text{s}$	$T_j = 125^\circ\text{C}$	5800		

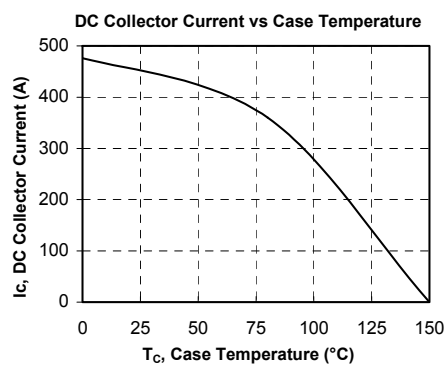
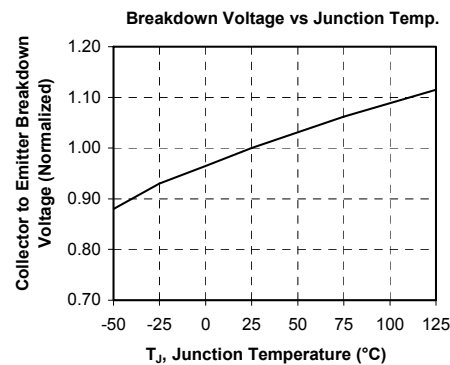
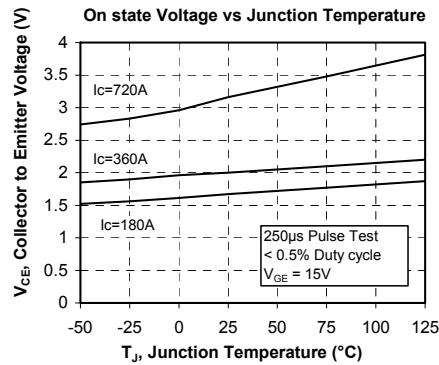
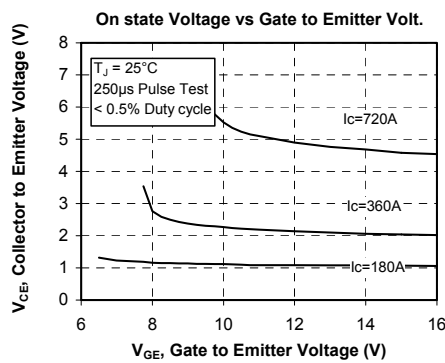
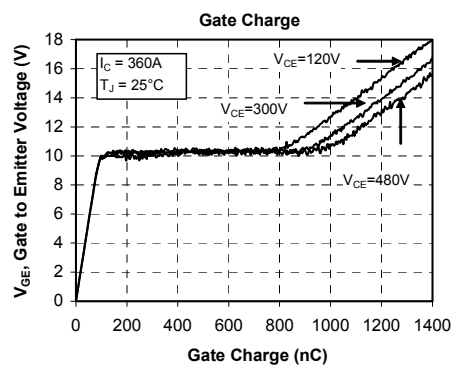
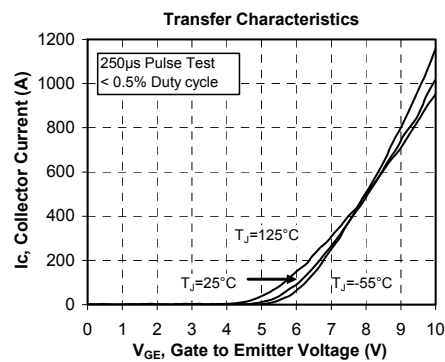
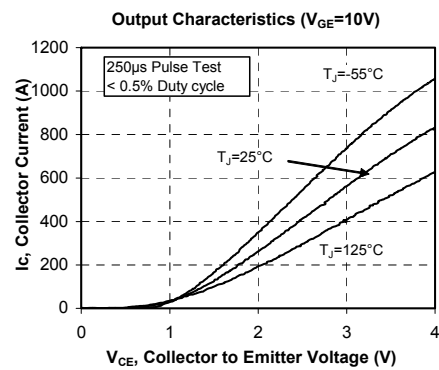
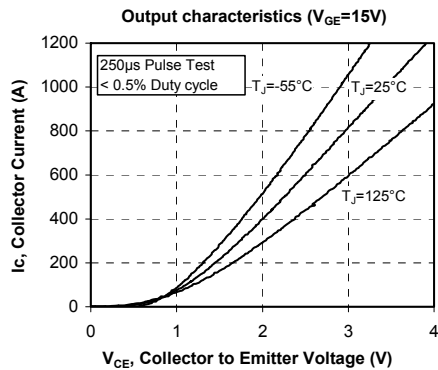
Thermal and package characteristics

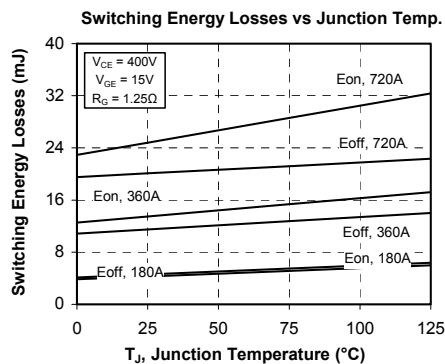
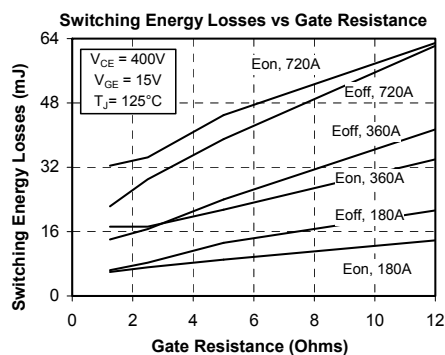
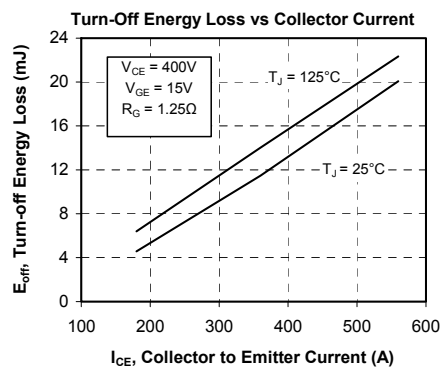
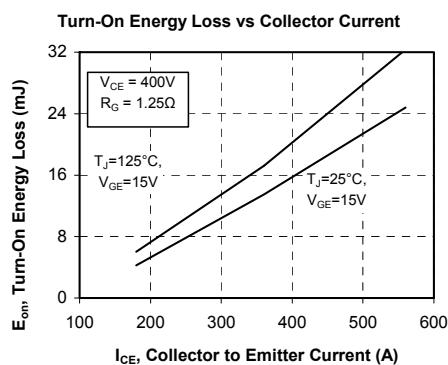
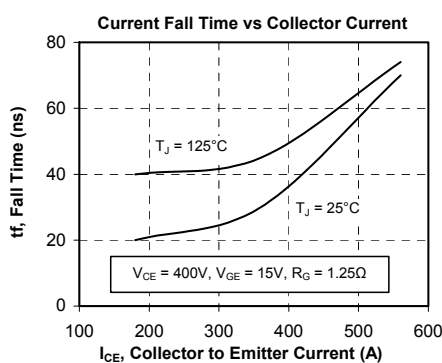
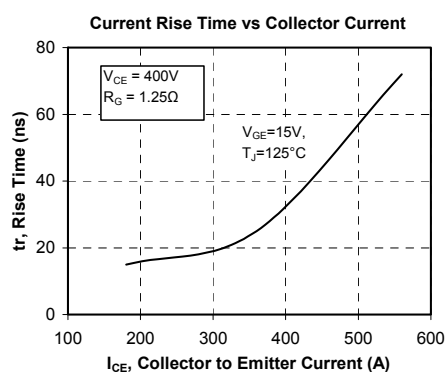
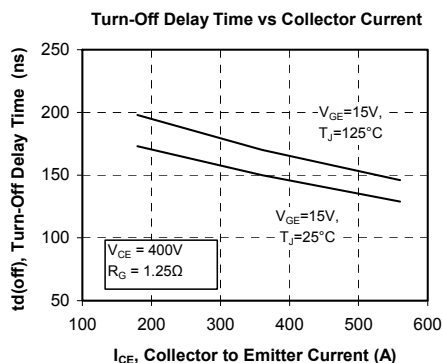
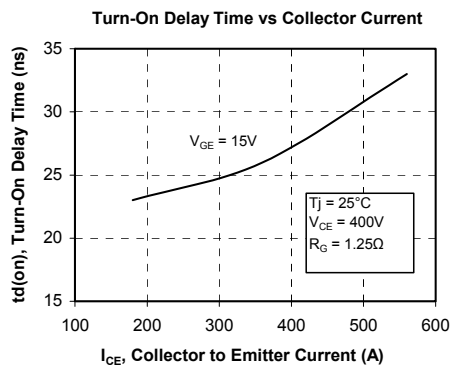
Symbol	Characteristic		Min	Typ	Max	Unit
R _{thJC}	Junction to Case Thermal Resistance	IGBT			0.08	°C/W
		Diode			0.16	
V _{ISOL}	RMS Isolation Voltage, any terminal to case t = 1 min, 50/60Hz		4000			V
T _J	Operating junction temperature range		-40		150	°C
T _{STG}	Storage Temperature Range		-40		125	
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				300	g

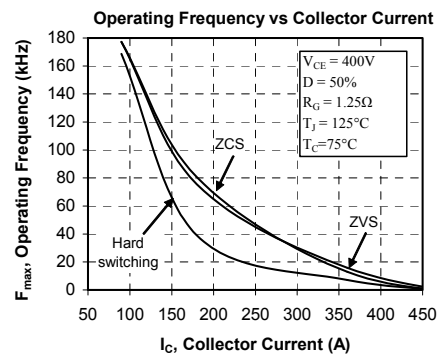
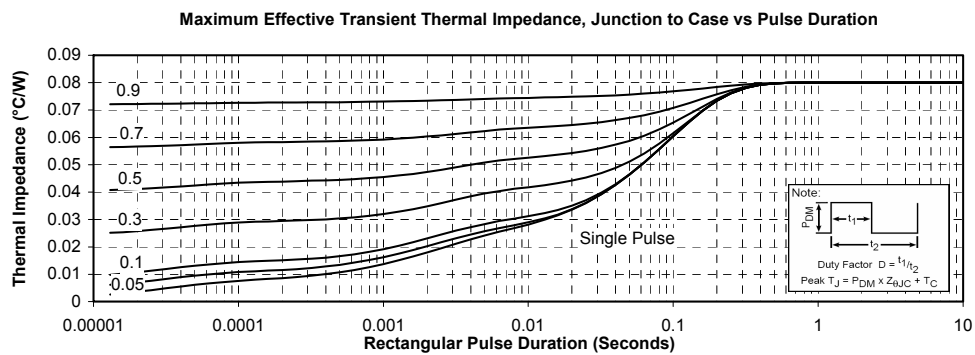
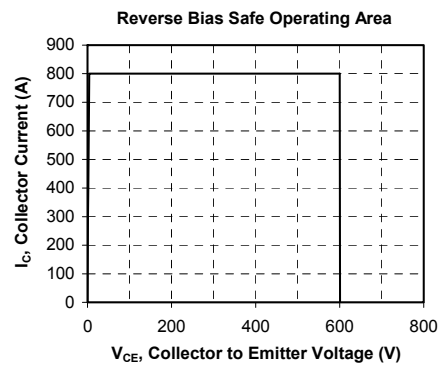
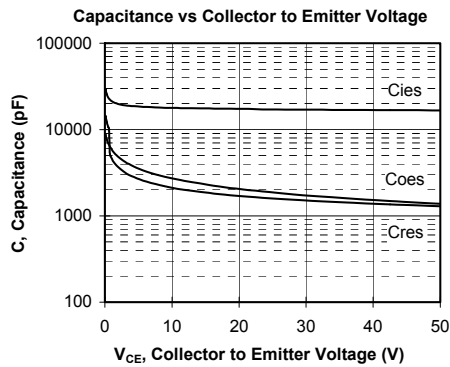
SP6 Package outline (dimensions in mm)


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

Typical Performance Curve







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