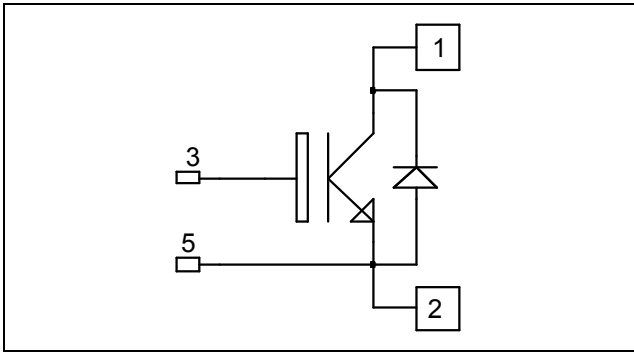


Single switch
NPT IGBT Power Module

$V_{CES} = 600V$
 $I_C = 660A @ T_c = 80^\circ C$


Application

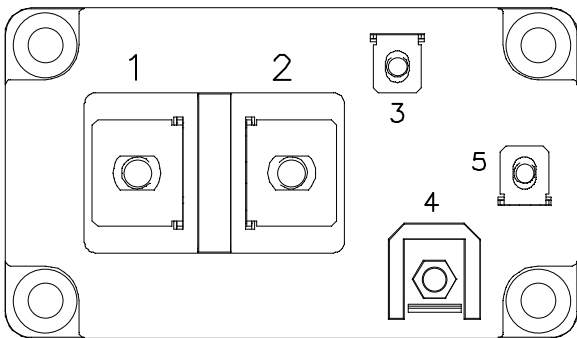
- Welding converters
- Switched Mode Power Supplies
- Uninterruptible Power Supplies
- Motor control

Features

- Non Punch Through (NPT) 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
- M6 connectors for power
- M4 connectors for signal
- 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}
- RoHS Compliant


Absolute maximum ratings

<i>Symbol</i>	<i>Parameter</i>	<i>Max ratings</i>	<i>Unit</i>
V_{CES}	Collector - Emitter Breakdown Voltage	600	V
I_C	Continuous Collector Current	$T_C = 25^\circ C$	860
		$T_C = 80^\circ C$	660
I_{CM}	Pulsed Collector Current	$T_C = 25^\circ C$	1320
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Maximum Power Dissipation	$T_C = 25^\circ C$	2800
RBSOA	Reverse Bias Safe Operating Area	$T_J = 125^\circ C$	1600A@520V

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	$V_{GE} = 0V$ $V_{CE} = 600V$	$T_j = 25^\circ\text{C}$		500	μA
			$T_j = 125^\circ\text{C}$		1	mA
$V_{CE(sat)}$	Collector Emitter saturation Voltage	$V_{GE} = 15V$ $I_C = 800A$	$T_j = 25^\circ\text{C}$	1.95	2.45	V
			$T_j = 125^\circ\text{C}$	2.2		
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 16\text{mA}$	4.5	5.5	6.5	V
I_{GES}	Gate – Emitter Leakage Current	$V_{GE} = 20V, V_{CE} = 0V$			2400	nA

Dynamic Characteristics

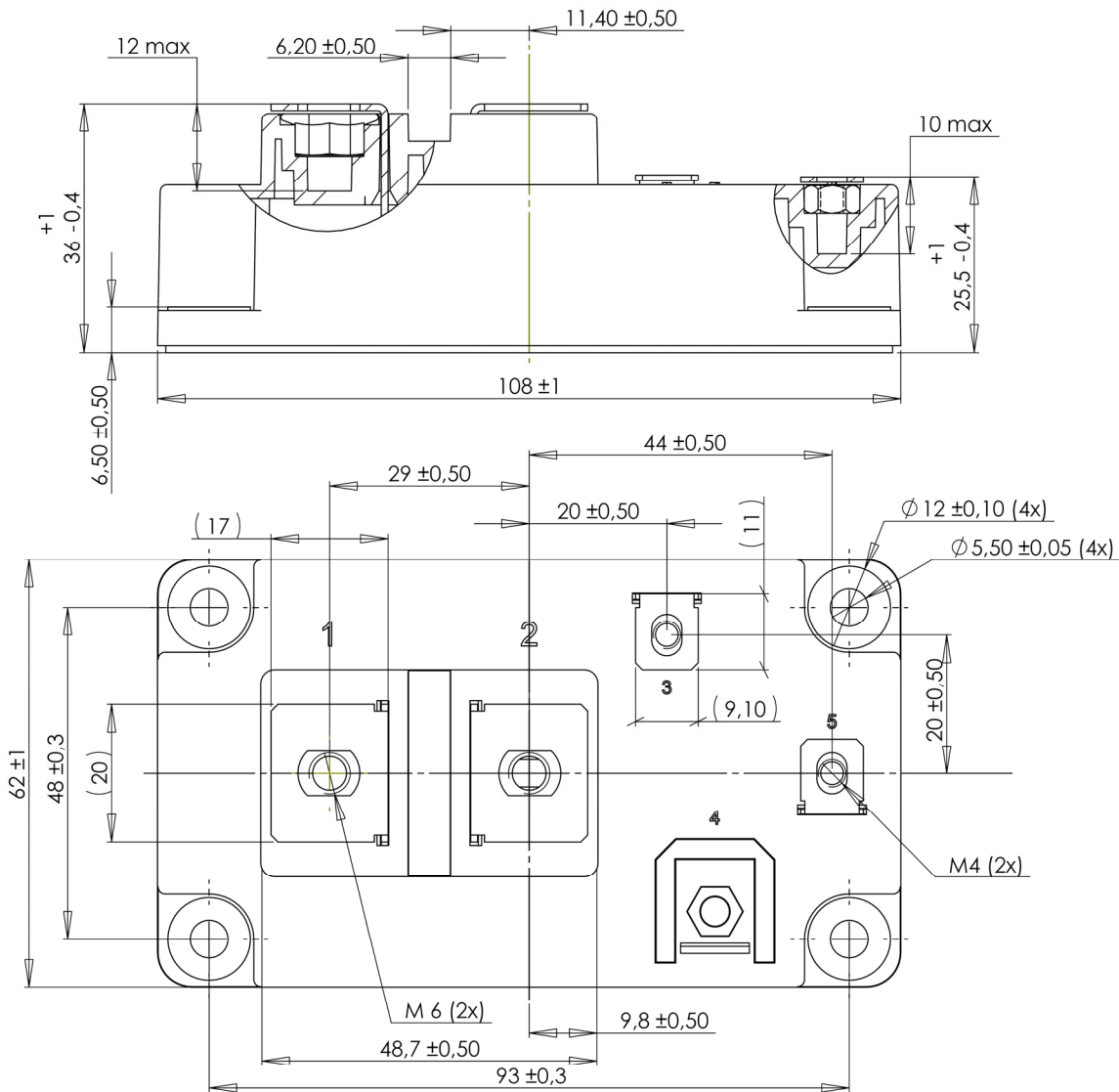
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0V, V_{CE} = 25V$ $f = 1\text{MHz}$		36		nF
C_{res}	Reverse Transfer Capacitance			3.2		
Q_G	Gate charge	$V_{GE} = 15V, I_C = 800A$ $V_{CE} = 300V$		2		μC
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{GE} = \pm 15V$ $V_{Bus} = 300V$ $I_C = 800A$ $R_G = 16\Omega$		150		ns
T_r	Rise Time			72		
$T_{d(off)}$	Turn-off Delay Time			530		
T_f	Fall Time			40		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (125°C) $V_{GE} = \pm 15V$ $V_{Bus} = 300V$ $I_C = 800A$ $R_G = 16\Omega$		160		ns
T_r	Rise Time			75		
$T_{d(off)}$	Turn-off Delay Time			550		
T_f	Fall Time			50		
E_{on}	Turn on Energy	$V_{GE} = \pm 15V$ $V_{Bus} = 300V$	$T_j = 125^\circ\text{C}$	36		mJ
E_{off}	Turn off Energy	$I_C = 800A$ $R_G = 16\Omega$		$T_j = 125^\circ\text{C}$	33	
I_{sc}	Short Circuit data	$V_{GE} \leq 15V; V_{Bus} = 360V$ $t_p \leq 10\mu\text{s}; T_j = 125^\circ\text{C}$		3600		A

Reverse diode ratings and characteristics

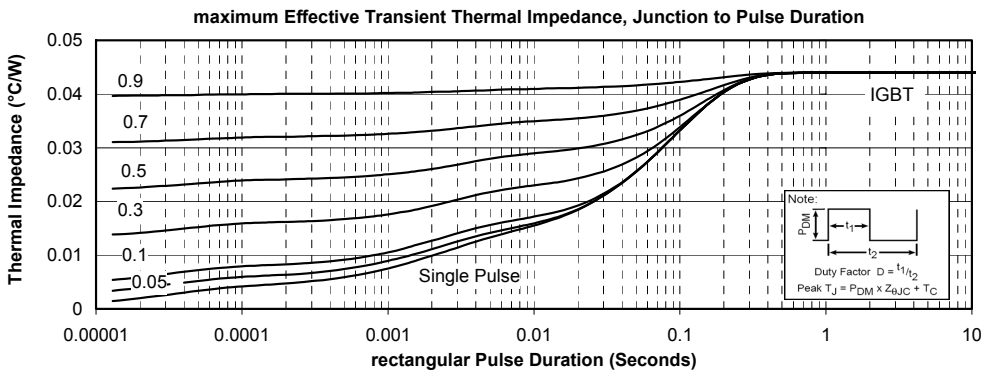
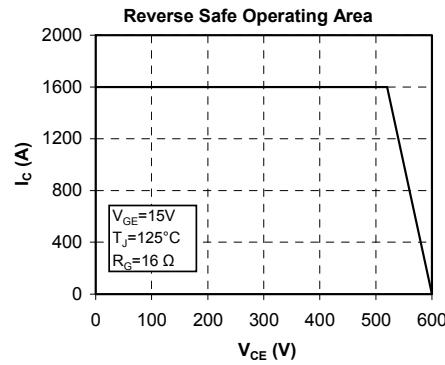
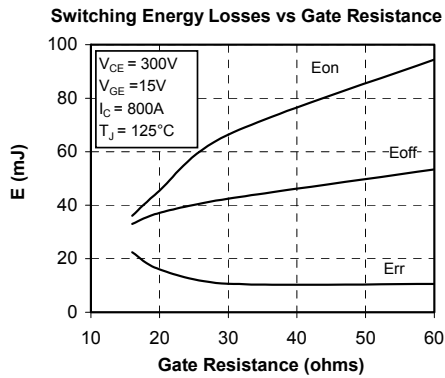
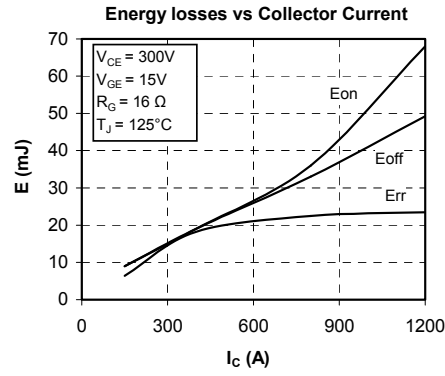
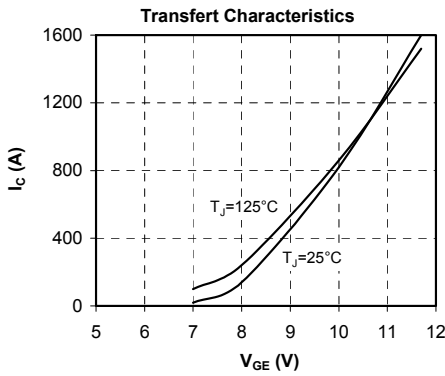
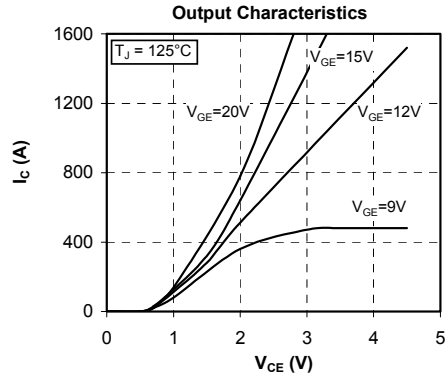
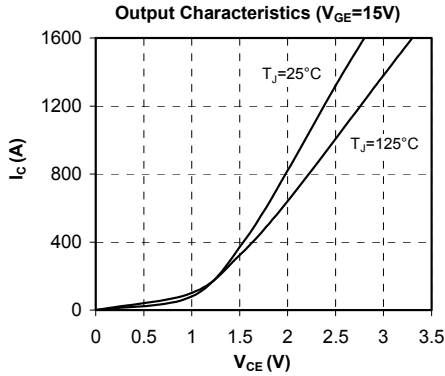
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_{RRM}	Maximum Peak Repetitive Reverse Voltage		600			V
I_{RRM}	Maximum Reverse Leakage Current	$V_R = 600V$	$T_j = 25^\circ\text{C}$		750	μA
			$T_j = 125^\circ\text{C}$		1000	
I_F	DC Forward Current			800		A
V_F	Diode Forward Voltage	$I_F = 800A$ $V_{GE} = 0V$	$T_j = 25^\circ\text{C}$	1.25	1.6	V
			$T_j = 125^\circ\text{C}$	1.2		
t_{rr}	Reverse Recovery Time	$I_F = 800A$	$T_j = 25^\circ\text{C}$	150		ns
			$T_j = 125^\circ\text{C}$	250		
Q_{rr}	Reverse Recovery Charge	$V_R = 300V$ $di/dt = 7000A/\mu\text{s}$	$T_j = 25^\circ\text{C}$	57		μC
			$T_j = 125^\circ\text{C}$	80		
E_{rr}	Reverse Recovery Energy		$T_j = 25^\circ\text{C}$	11.6		mJ
			$T_j = 125^\circ\text{C}$	22.8		

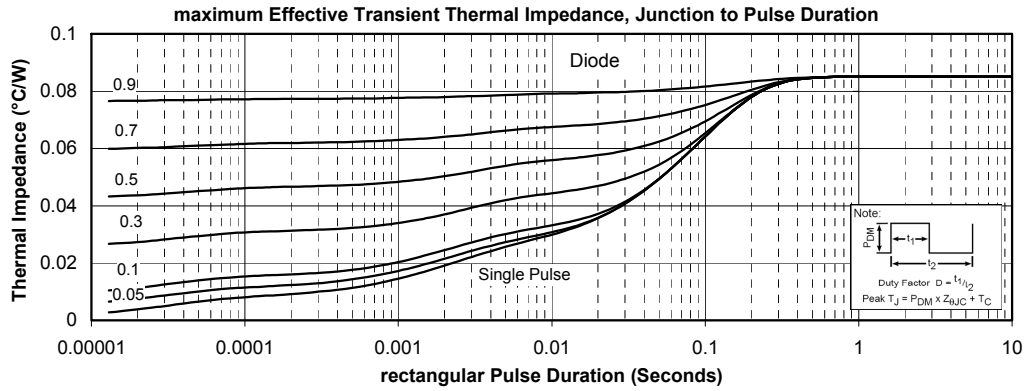
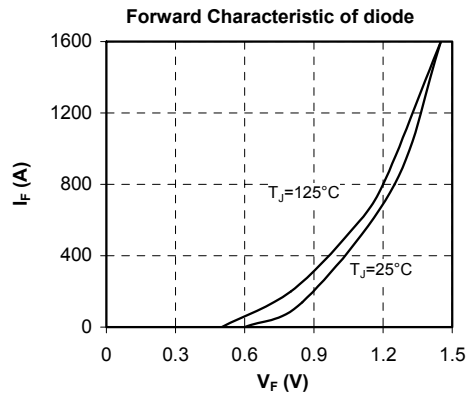
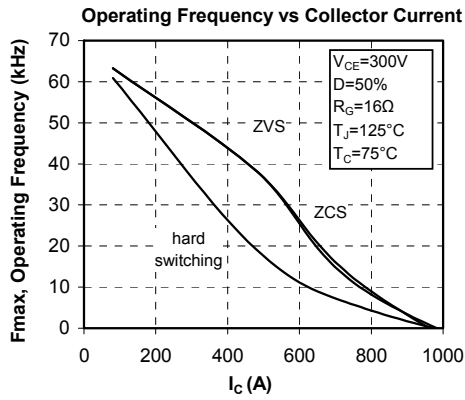
Thermal and package characteristics

Symbol	Characteristic		Min	Typ	Max	Unit
R _{thJC}	Junction to Case Thermal Resistance	IGBT			0.044	°C/W
		Diode			0.085	
V _{ISOL}	RMS Isolation Voltage, any terminal to case t=1 min, I _{isol} <1mA, 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		125	
Torque	Mounting torque	M6	3		5	N.m
		M4	1		2	
Wt	Package Weight				350	g

D4 Package outline (dimensions in mm)


Typical Performance Curve





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