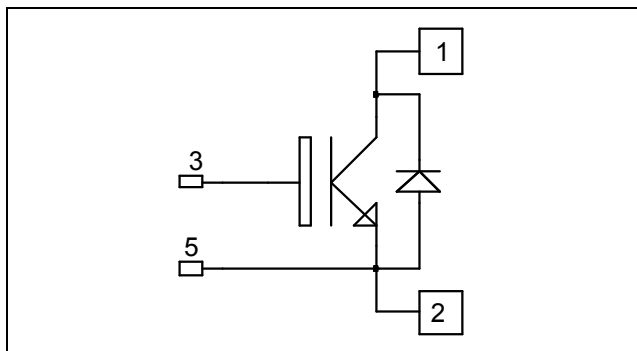


Single switch NPT IGBT Power Module

$V_{CES} = 600V$
 $I_C = 500A @ T_c = 80^\circ C$

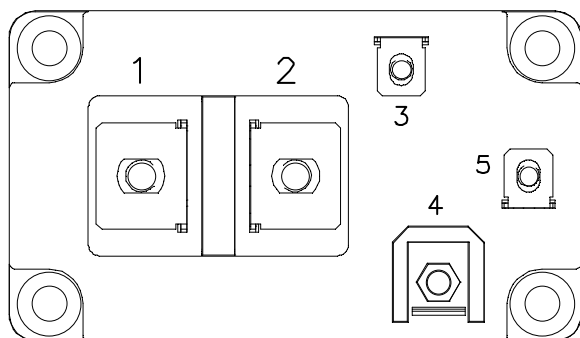


Application

- 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

Symbol	Parameter	Max ratings	Unit
V_{CES}	Collector - Emitter Breakdown Voltage	600	V
I_C	Continuous Collector Current	$T_C = 25^\circ C$	670
		$T_C = 80^\circ C$	500
I_{CM}	Pulsed Collector Current	$T_C = 25^\circ C$	1000
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Maximum Power Dissipation	$T_C = 25^\circ C$	2200
RBSOA	Reverse Bias Safe Operating Area	$T_J = 125^\circ C$	1200A@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	$V_{GE} = 0V$			500	μA
		$V_{CE} = 600V$			1	mA
$V_{CE(sat)}$	Collector Emitter saturation Voltage	$V_{GE} = 15V$		1.95	2.45	V
		$I_C = 600A$		2.2		
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 9mA$	4.5	5.5	6.5	V
I_{GES}	Gate – Emitter Leakage Current	$V_{GE} = 20V, V_{CE} = 0V$			1900	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0V, V_{CE} = 25V$		26		nF
C_{res}	Reverse Transfer Capacitance	$f = 1MHz$		2.4		
Q_G	Gate charge	$V_{GE}=15V, I_C=600A$ $V_{CE}=300V$		1.5		μC
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{GE} = \pm 15V$ $V_{Bus} = 300V$ $I_C = 600A$ $R_G = 12\Omega$		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) $V_{GE} = \pm 15V$ $V_{Bus} = 300V$ $I_C = 600A$ $R_G = 12\Omega$		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	$V_{GE} = \pm 15V$ $V_{Bus} = 300V$	$T_j = 125^\circ\text{C}$	28		mJ
E_{off}	Turn off Energy	$I_C = 600A$ $R_G = 12\Omega$	$T_j = 125^\circ\text{C}$	26		mJ
I_{sc}	Short Circuit data	$V_{GE} \leq 15V ; V_{Bus} = 360V$ $t_p \leq 10\mu s ; T_j = 125^\circ\text{C}$		2700		A

Reverse diode ratings and characteristics

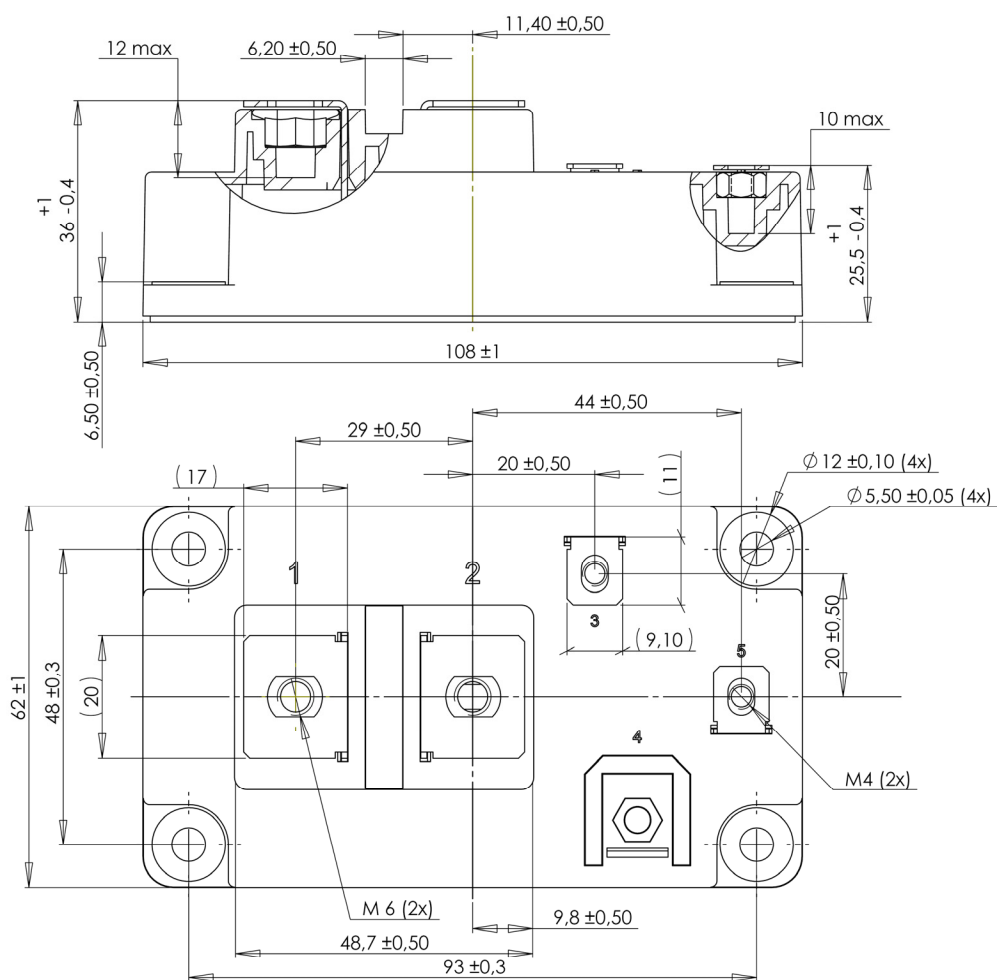
Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
V _{RRM}	Maximum Peak Repetitive Reverse Voltage			600			V
I _{RRM}	Maximum Reverse Leakage Current	V _R = 600V	T _j = 25°C			750	μA
			T _j = 125°C			1000	
I _F	DC Forward Current		T _c = 80°C		600		A
V _F	Diode Forward Voltage	I _F = 600A V _{GE} = 0V	T _j = 25°C		1.25	1.6	V
			T _j = 125°C		1.2		
t _{rr}	Reverse Recovery Time	I _F = 600A V _R = 300V di/dt = 7000A/μs	T _j = 25°C		150		ns
			T _j = 125°C		250		
Q _{rr}	Reverse Recovery Charge		T _j = 25°C		36		μC
			T _j = 125°C		56		
E _{rr}	Reverse Recovery Energy		T _j = 25°C		8		mJ
			T _j = 125°C		16		



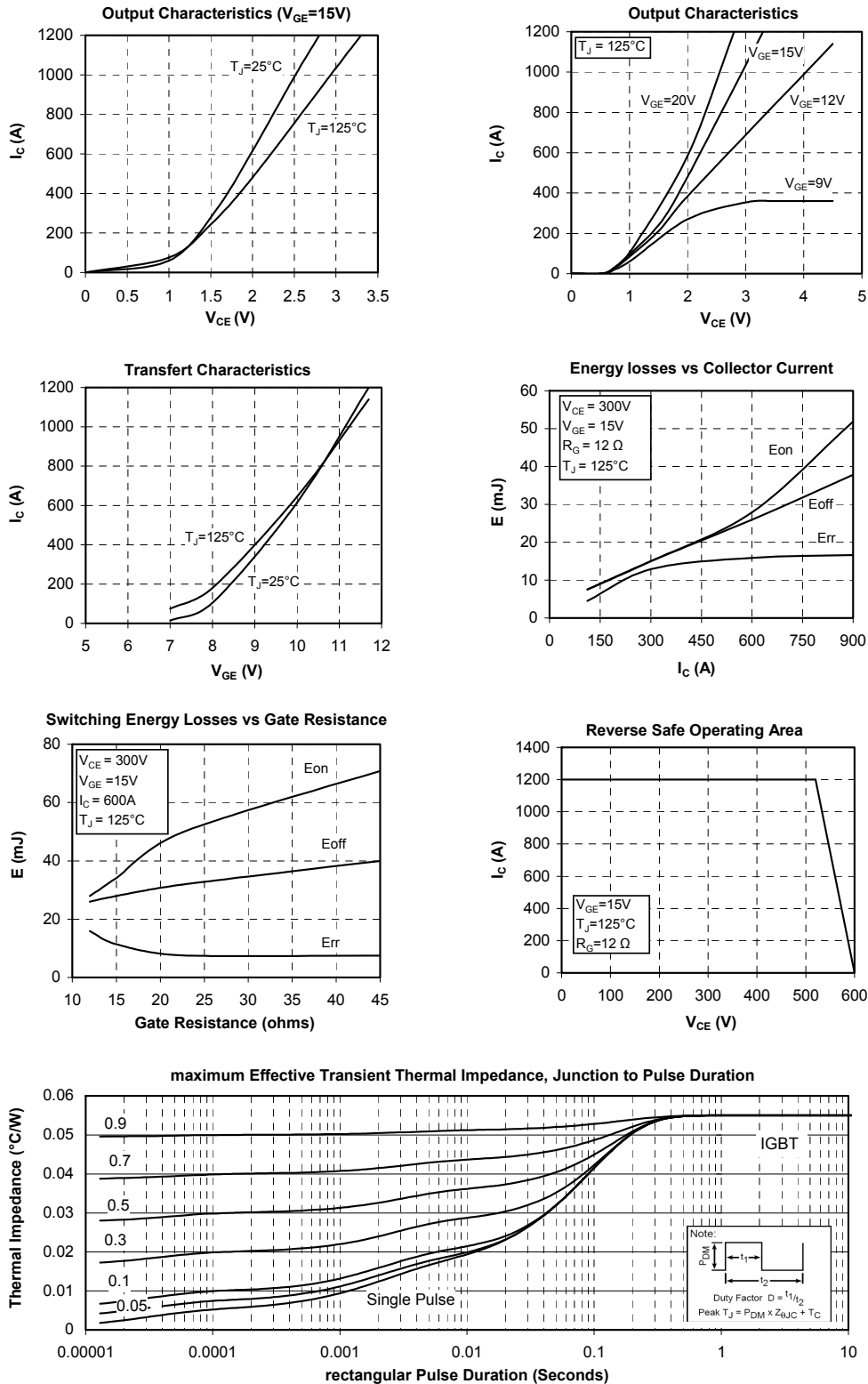
Symbol	Characteristic
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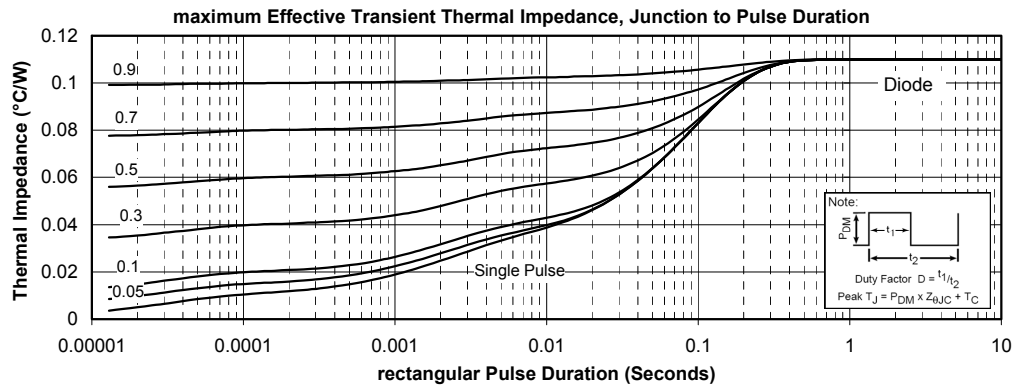
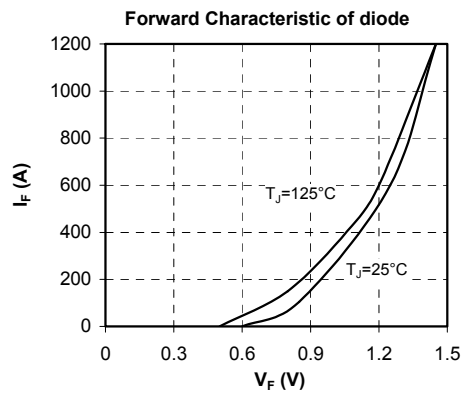
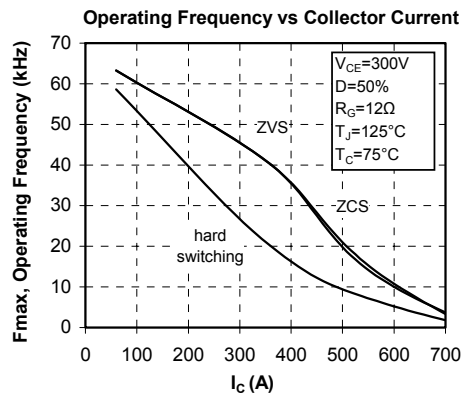
<i>Symbol</i>	<i>Characteristic</i>		<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
R _{thJC}	Junction to Case Thermal Resistance	IGBT			0.055	°C/W
		Diode			0.11	
V _{ISOL}	RMS Isolation Voltage, any terminal to case t =1 min, 50/60Hz		4000			V
T _J	Operating junction temperature range		-40		150	°C
T _{STG}	Storage Temperature Range		-40		125	
T _C	Operating Case Temperature		-40		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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