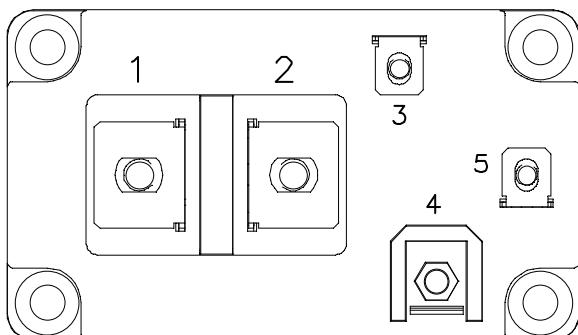
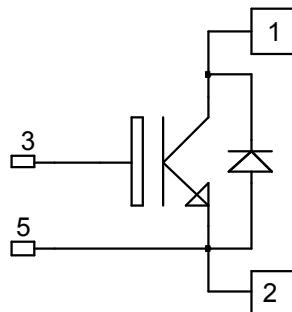


**Single switch
NPT IGBT Power Module**
 $V_{CES} = 600V$
 $I_C = 500A @ T_c = 80^\circ C$

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

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

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	$V_{GE} = 0\text{V}$	$T_j = 25^\circ\text{C}$			500	μA
			$T_j = 125^\circ\text{C}$			1	mA
$V_{CE(\text{sat})}$	Collector Emitter saturation Voltage	$V_{GE} = 15\text{V}$	$T_j = 25^\circ\text{C}$		1.95	2.45	V
			$T_j = 125^\circ\text{C}$		2.2		
$V_{GE(\text{th})}$	Gate Threshold Voltage	$V_{GE} = V_{CE}$, $I_C = 9\text{mA}$		4.5	5.5	6.5	V
I_{GES}	Gate – Emitter Leakage Current	$V_{GE} = 20\text{V}$, $V_{CE} = 0\text{V}$				1900	nA

Dynamic Characteristics

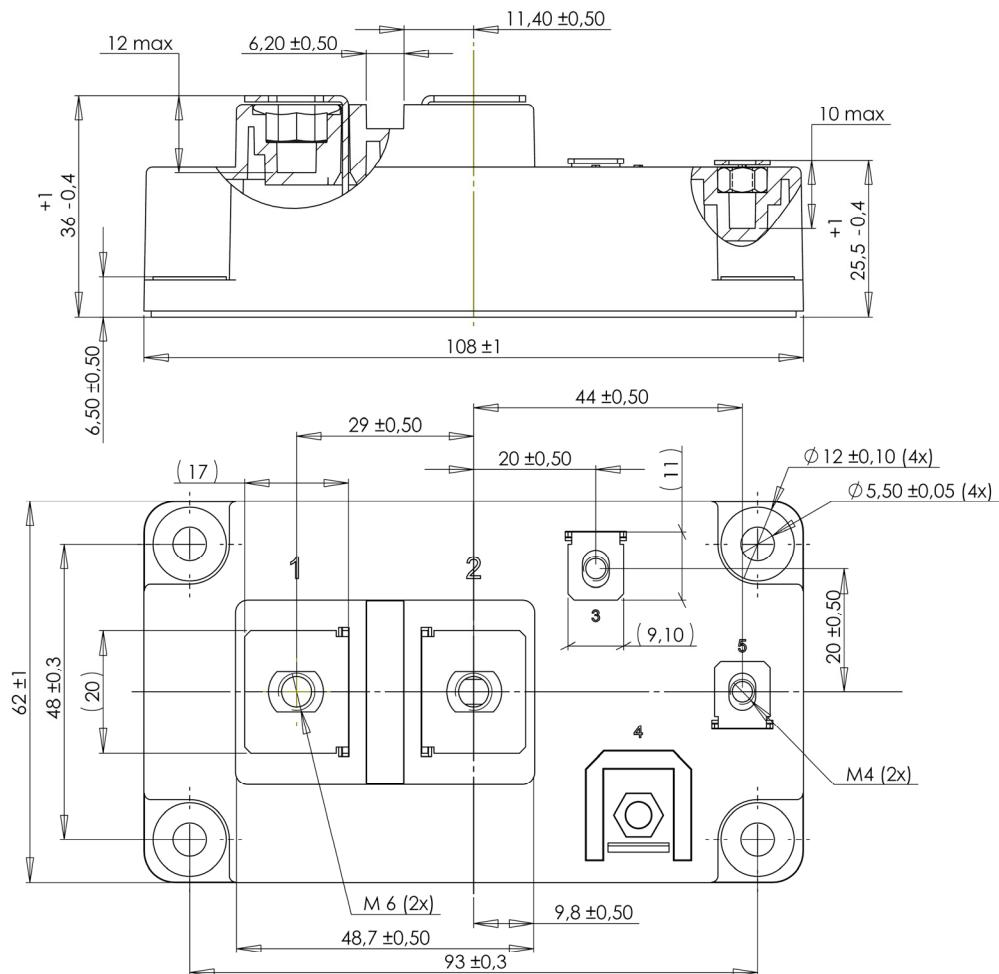
Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0\text{V}$, $V_{CE} = 25\text{V}$ $f = 1\text{MHz}$			26		nF
C_{res}	Reverse Transfer Capacitance				2.4		
Q_G	Gate charge	$V_{GE}=15\text{V}$, $I_C=600\text{A}$ $V_{CE}=300\text{V}$			1.5		μC
$T_{d(on)}$	Turn-on Delay Time		Inductive Switching (25°C) $V_{GE} = \pm 15\text{V}$ $V_{Bus} = 300\text{V}$ $I_C = 600\text{A}$ $R_G = 12\Omega$		150		
T_r	Rise Time				72		ns
$T_{d(off)}$	Turn-off Delay Time				530		
T_f	Fall Time				40		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (125°C) $V_{GE} = \pm 15\text{V}$ $V_{Bus} = 300\text{V}$ $I_C = 600\text{A}$ $R_G = 12\Omega$		160			ns
T_r	Rise Time			75			
$T_{d(off)}$	Turn-off Delay Time			550		ns	
T_f	Fall Time			50			
E_{on}	Turn on Energy	$V_{GE} = \pm 15\text{V}$ $V_{Bus} = 300\text{V}$ $I_C = 600\text{A}$ $R_G = 12\Omega$	$T_j = 125^\circ\text{C}$		28		mJ
E_{off}	Turn off Energy		$T_j = 125^\circ\text{C}$		26		mJ
I_{sc}	Short Circuit data	$V_{GE} \leq 15\text{V}$; $V_{Bus} = 360\text{V}$ $t_p \leq 10\mu\text{s}$; $T_j = 125^\circ\text{C}$			2700		A

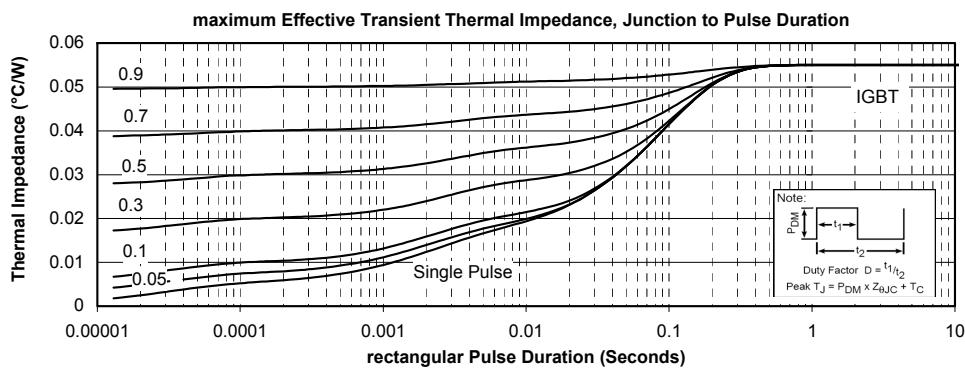
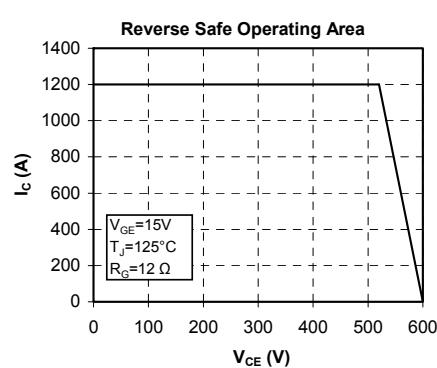
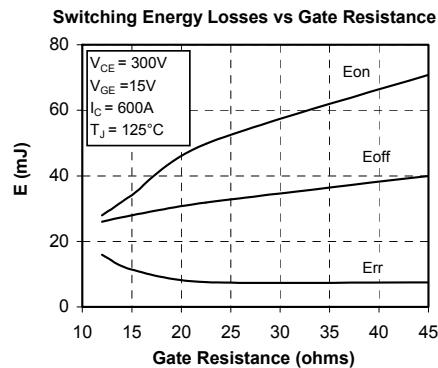
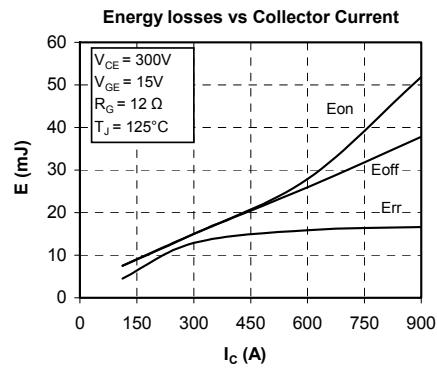
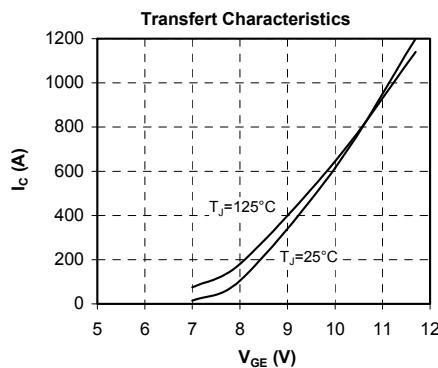
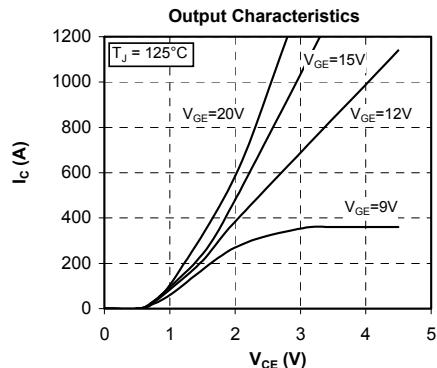
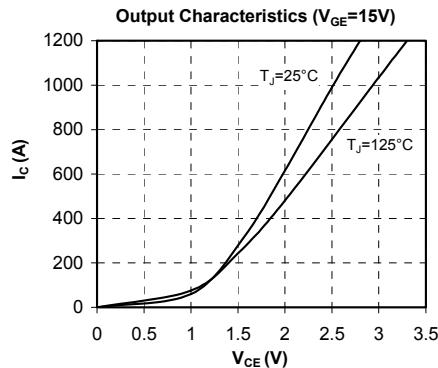
Reverse diode ratings and characteristics

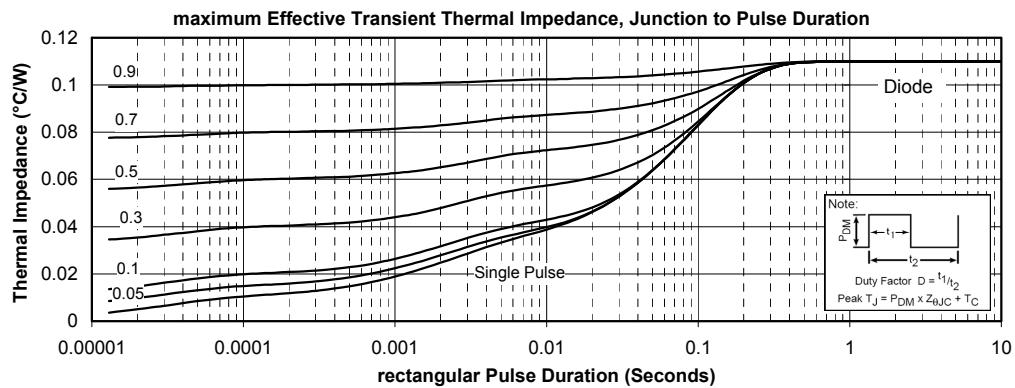
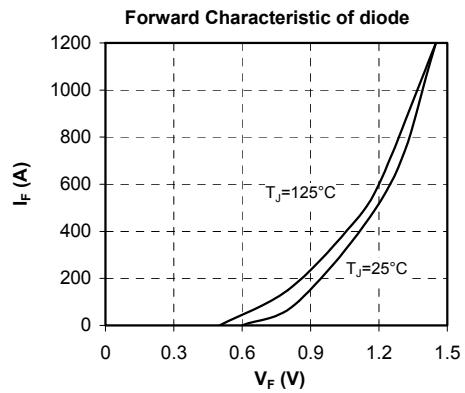
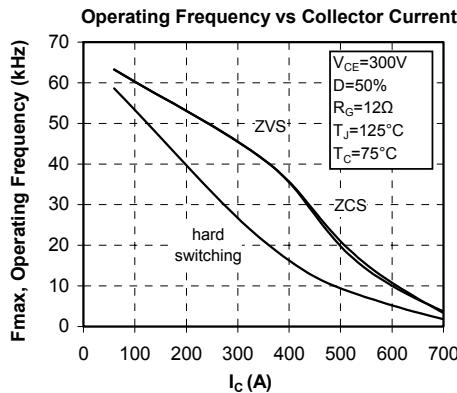
Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
V_{RRM}	Maximum Peak Repetitive Reverse Voltage	$V_R = 600\text{V}$	$T_j = 25^\circ\text{C}$	600			V
I_{RRM}	Maximum Reverse Leakage Current		$T_j = 125^\circ\text{C}$		750		μA
I_F	DC Forward Current	$I_F = 600\text{A}$ $V_{GE} = 0\text{V}$	$T_c = 80^\circ\text{C}$	600			A
V_F	Diode Forward Voltage		$T_j = 25^\circ\text{C}$	1.25	1.6		V
t_{rr}	Reverse Recovery Time	$I_F = 600\text{A}$ $V_R = 300\text{V}$ $di/dt = 7000\text{A}/\mu\text{s}$	$T_j = 125^\circ\text{C}$	1.2			
Q_{rr}	Reverse Recovery Charge		$T_j = 25^\circ\text{C}$	150			ns
E_{rr}	Reverse Recovery Energy		$T_j = 125^\circ\text{C}$	250			
			$T_j = 25^\circ\text{C}$	36			μC
			$T_j = 125^\circ\text{C}$	56			
			$T_j = 25^\circ\text{C}$	8			mJ
			$T_j = 125^\circ\text{C}$	16			

Thermal and package characteristics
Symbol **Characteristic**

			Min	Typ	Max	Unit
R_{thJC}	Junction to Case Thermal Resistance	IGBT			0.055	$^{\circ}\text{C}/\text{W}$
		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	$^{\circ}\text{C}$
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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