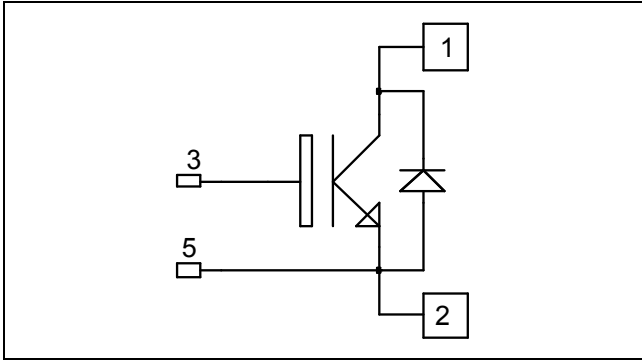


Single switch NPT IGBT Power Module

$V_{CES} = 1200V$
 $I_C = 400A @ T_c = 80^\circ C$



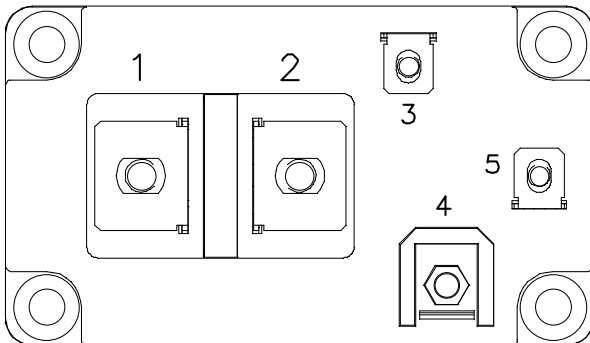
Application

- 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 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		1200	V
I_C	Continuous Collector Current	$T_c = 25^\circ C$	510	A
		$T_c = 80^\circ C$	400	
I_{CM}	Pulsed Collector Current	$T_c = 25^\circ C$	800	
V_{GE}	Gate - Emitter Voltage		± 20	V
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	2500	W
RBSOA	Reverse Bias Safe Operating Area	$T_j = 150^\circ C$	800A @ 1100V	

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	$V_{GE} = 0\text{V}$; $V_{CE} = 1200\text{V}$			5	mA
$V_{CE(sat)}$	Collector Emitter saturation Voltage	$V_{GE} = 15\text{V}$ $I_C = 400\text{A}$	$T_j = 25^\circ\text{C}$	3.2	3.7	V
			$T_j = 125^\circ\text{C}$	3.9		
$V_{GE(th)}$	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	$V_{GE} = 20\text{V}$, $V_{CE} = 0\text{V}$			400	nA

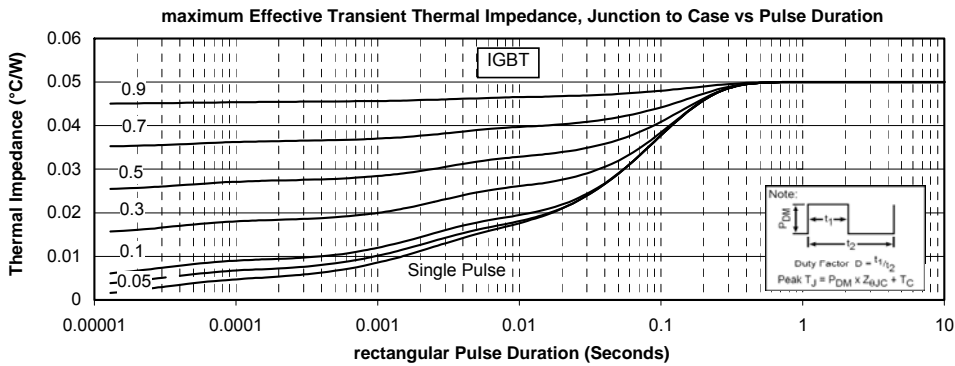
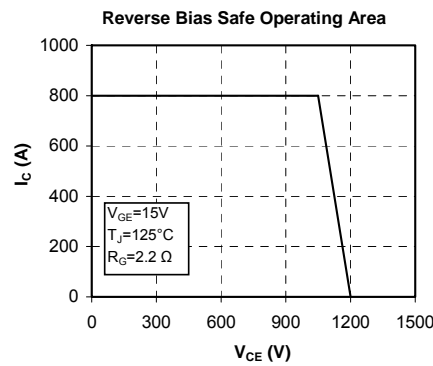
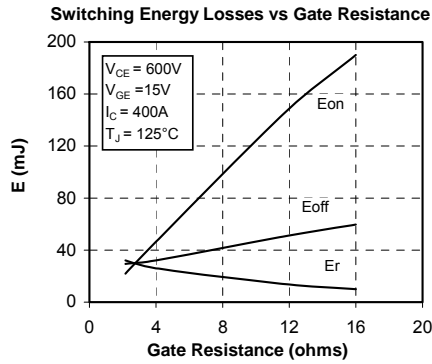
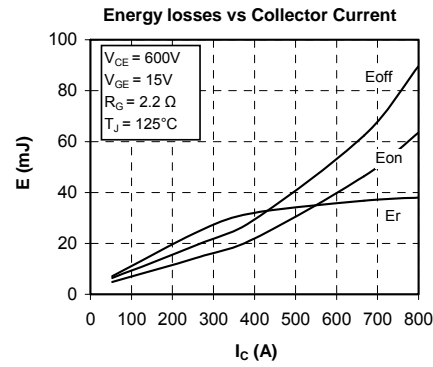
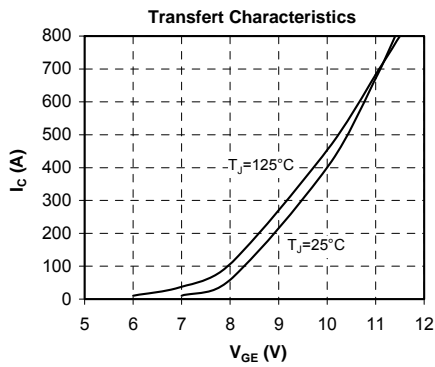
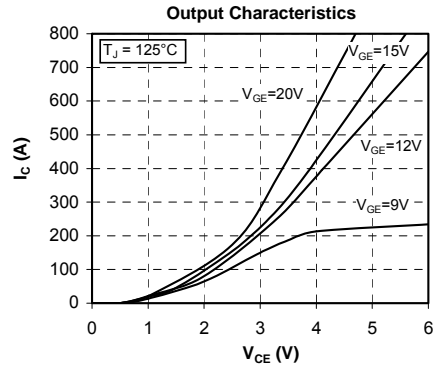
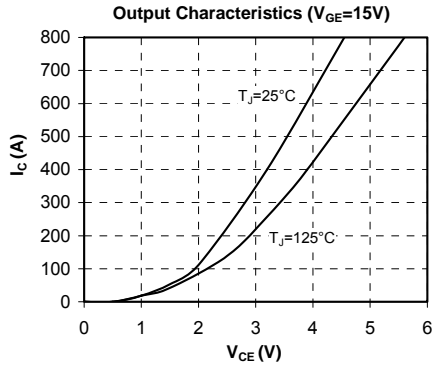
Dynamic Characteristics

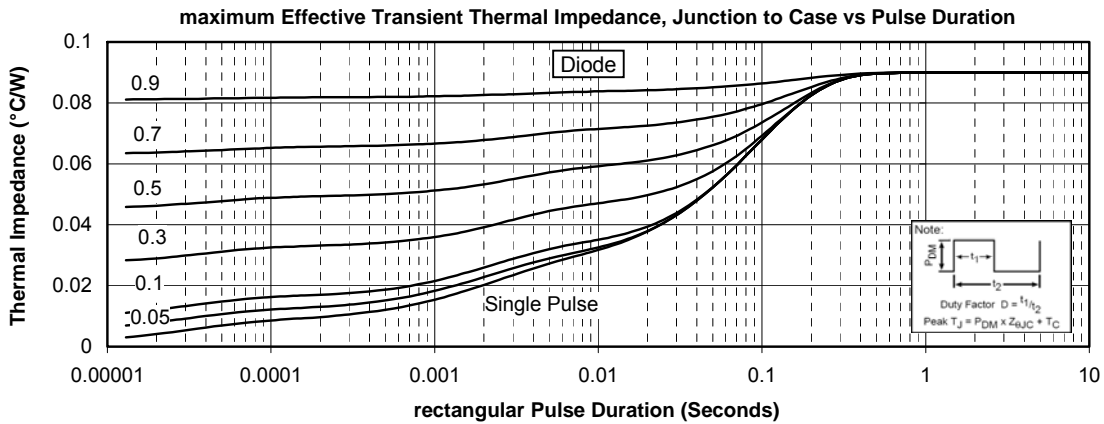
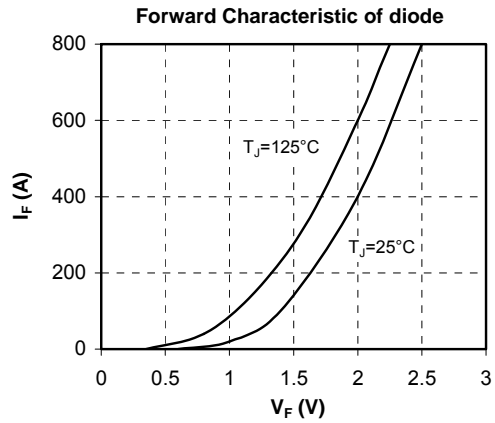
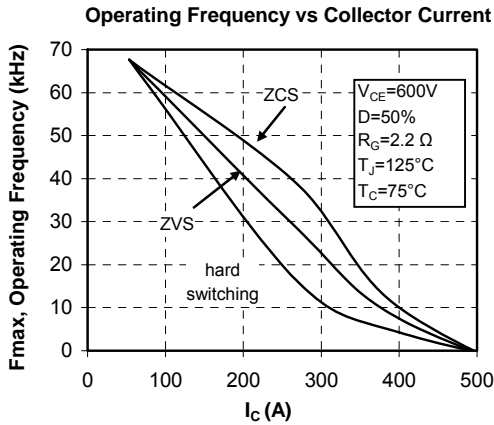
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0\text{V}$		26		nF
C_{oes}	Output Capacitance	$V_{CE} = 25\text{V}$		4		
C_{res}	Reverse Transfer Capacitance	$f = 1\text{MHz}$		2		
Q_G	Gate charge	$V_{GE} = \pm 15\text{V}$, $I_C = 400\text{A}$ $V_{CE} = 600\text{V}$		4.2		μC
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C)		100		ns
T_r	Rise Time	$V_{GE} = 15\text{V}$ $V_{Bus} = 600\text{V}$		60		
$T_{d(off)}$	Turn-off Delay Time	$I_C = 400\text{A}$		530		
T_f	Fall Time	$R_G = 2.2\Omega$		40		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (125°C)		110		ns
T_r	Rise Time	$V_{GE} = 15\text{V}$ $V_{Bus} = 600\text{V}$		70		
$T_{d(off)}$	Turn-off Delay Time	$I_C = 400\text{A}$		550		
T_f	Fall Time	$R_G = 2.2\Omega$		50		
E_{on}	Turn-on Switching Energy	$V_{GE} = 15\text{V}$ $V_{Bus} = 600\text{V}$	$T_j = 125^\circ\text{C}$	22		mJ
E_{off}	Turn-off Switching Energy	$I_C = 400\text{A}$ $R_G = 2.2\Omega$	$T_j = 125^\circ\text{C}$	29		
I_{sc}	Short Circuit data	$V_{GE} \leq 15\text{V}$; $V_{Bus} = 900\text{V}$ $t_p \leq 10\mu\text{s}$; $T_j = 125^\circ\text{C}$		2600		A

Reverse diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_{RRM}	Maximum Peak Repetitive Reverse Voltage		1200			V
I_{RRM}	Maximum Reverse Leakage Current	$V_R = 1200\text{V}$	$T_j = 25^\circ\text{C}$		750	μA
			$T_j = 125^\circ\text{C}$		1000	
I_F	DC Forward Current		$T_c = 80^\circ\text{C}$	400		A
V_F	Diode Forward Voltage	$I_F = 400\text{A}$	$T_j = 25^\circ\text{C}$	2.1		V
			$T_j = 125^\circ\text{C}$	1.9		
t_{rr}	Reverse Recovery Time	$I_F = 400\text{A}$ $V_R = 600\text{V}$ $di/dt = 4000\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$	120		ns
			$T_j = 125^\circ\text{C}$	210		
Q_{rr}	Reverse Recovery Charge		$T_j = 25^\circ\text{C}$	26		μC
			$T_j = 125^\circ\text{C}$	64		
E_{rr}	Reverse Recovery Energy		$T_j = 25^\circ\text{C}$	16		mJ
			$T_j = 125^\circ\text{C}$	32		

Typical Performance Curve





Microsemi reserves the right to change, without notice, the specifications and information contained herein

Microsemi's products are covered by one or more of U.S. patents 4,895,810 5,045,903 5,089,434 5,182,234 5,019,522 5,262,336 6,503,786 5,256,583 4,748,103 5,283,202 5,231,474 5,434,095 5,528,058 6,939,743 7,352,045 5,283,201 5,801,417 5,648,283 7,196,634 6,664,594 7,157,886 6,939,743 7,342,262 and foreign patents. U.S and Foreign patents pending. All Rights Reserved.