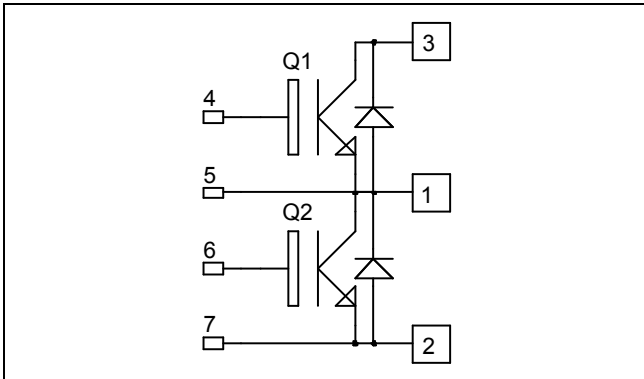


**Phase leg
NPT IGBT Power Module**

**$V_{CES} = 1200V$
 $I_C = 300A @ T_c = 80^\circ C$**



Application

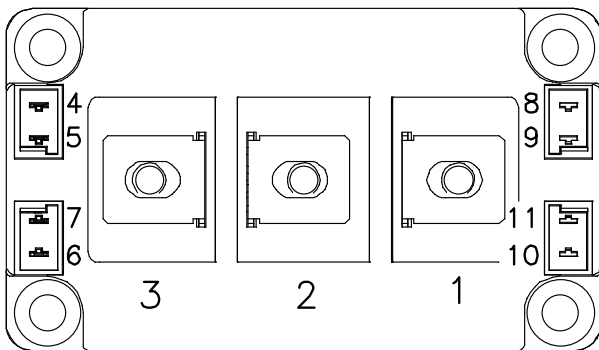
- Welding converters
- Switched Mode Power Supplies
- Uninterruptible Power Supplies
- Motor control

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
- High level of integration
- M6 power connectors

Benefits

- 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	$T_C = 25^\circ C$	420
		$T_C = 80^\circ C$	300
I_{CM}	Pulsed Collector Current	$T_C = 25^\circ C$	600
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Maximum Power Dissipation	$T_C = 25^\circ C$	2100
RBSOA	Reverse Bias Safe Operating Area	$T_j = 125^\circ C$	600A@1150V

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	$V_{GE} = 0V, V_{CE} = 1200V$			5	mA
$V_{CE(on)}$	Collector Emitter on Voltage	$V_{GE} = 15V$ $I_C = 300A$		$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$	3.2 3.9	3.7 V
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 12\text{ mA}$	5.2	5.8	6.4	V
I_{GES}	Gate – Emitter Leakage Current	$V_{GE} = 20V, V_{CE} = 0V$			400	nA

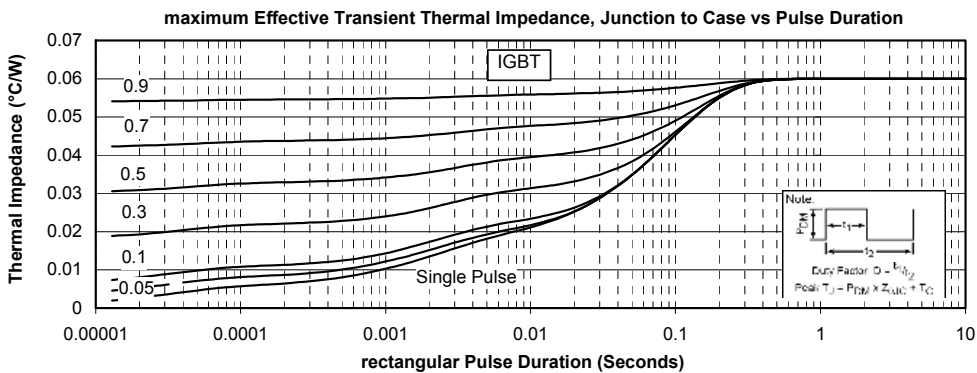
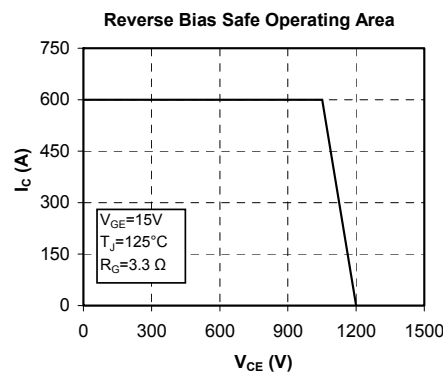
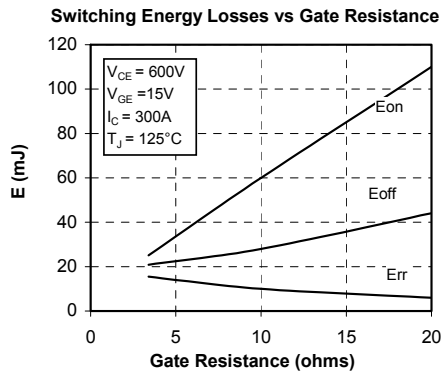
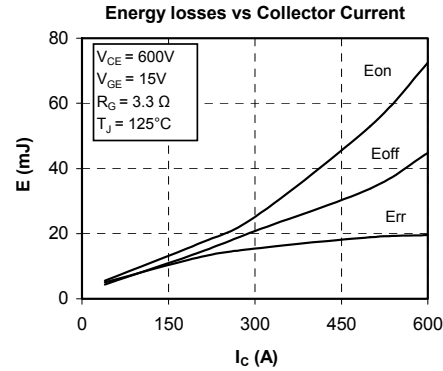
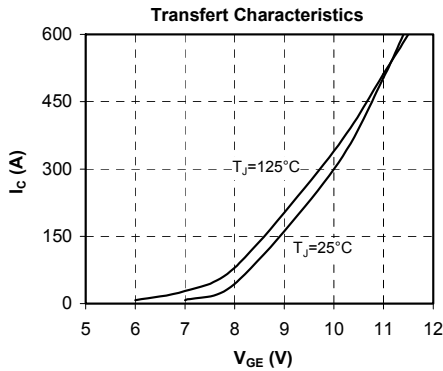
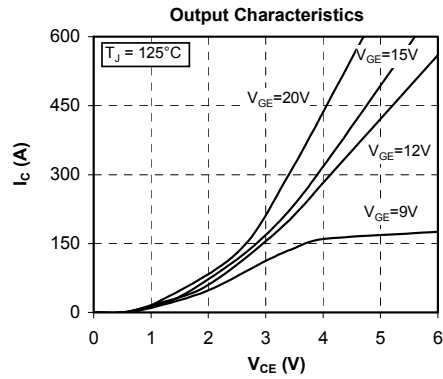
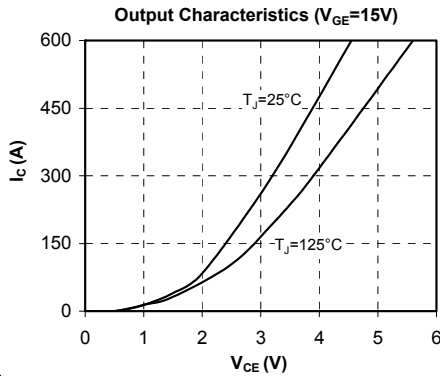
Dynamic Characteristics

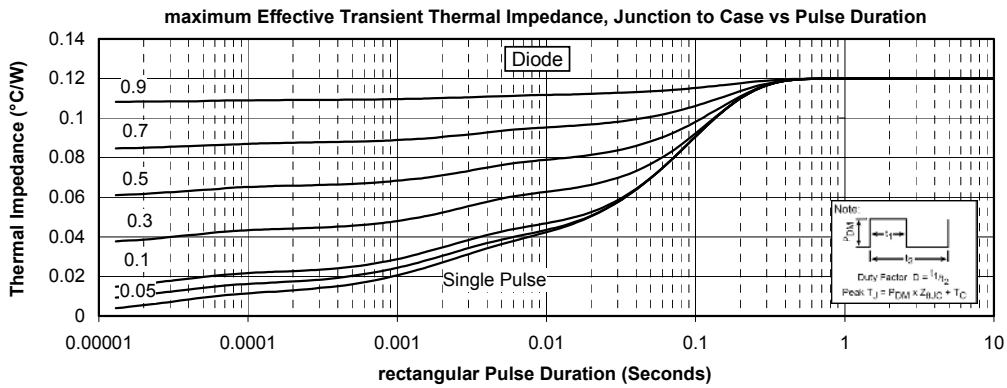
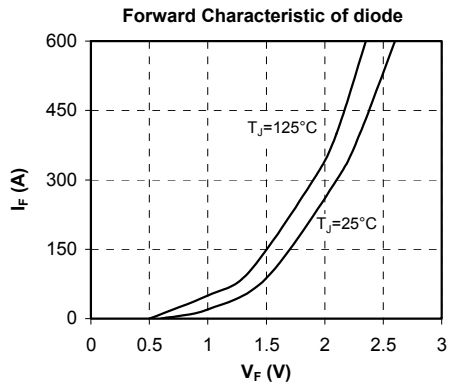
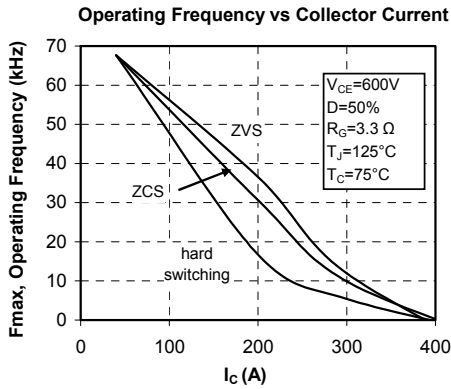
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0V, V_{CE} = 25V$		19		nF
C_{res}	Reverse Transfer Capacitance	$f = 1\text{MHz}$		1.4		
Q_G	Gate charge	$V_{GE} = \pm 15V, I_C = 300A$ $V_{CE} = 600V$		3		μC
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{GE} = \pm 15V$ $V_{Bus} = 600V$ $I_C = 300A$ $R_G = 3.3\Omega$		100		ns
T_r	Rise Time			60		
$T_{d(off)}$	Turn-off Delay Time			530		
T_f	Fall Time			30		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (125°C) $V_{GE} = \pm 15V$ $V_{Bus} = 600V$ $I_C = 300A$ $R_G = 3.3\Omega$		110		ns
T_r	Rise Time			70		
$T_{d(off)}$	Turn-off Delay Time			550		
T_f	Fall Time			40		
E_{on}	Turn On Energy	$V_{GE} = \pm 15V$ $V_{Bus} = 600V$		$T_j = 125^\circ\text{C}$	25	mJ
E_{off}	Turn Off Energy	$I_C = 300A$ $R_G = 3.3\Omega$		$T_j = 125^\circ\text{C}$	21	
I_{sc}	Short Circuit data	$V_{GE} \leq 15V; V_{Bus} = 900V$ $t_p \leq 10\mu\text{s}; T_j = 125^\circ\text{C}$		2000		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	$V_R = 1200V$		$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$	750 1000	μA
I_F	DC Forward Current			$T_c = 80^\circ\text{C}$	300	A
V_F	Diode Forward Voltage	$I_F = 300A$		$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$	2.1 1.9	V
t_{rr}	Reverse Recovery Time	$I_F = 300A$ $V_R = 600V$ $di/dt = 4500A/\mu\text{s}$		$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$	120 210	ns
Q_{rr}	Reverse Recovery Charge			$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$	19 53	μC
E_{rr}	Reverse Recovery Energy			$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$	7 15	mJ

Typical Performance Curve





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