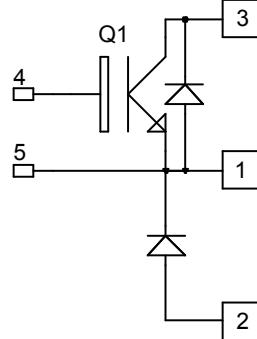


**Buck Chopper
Trench + Field Stop IGBT3
Power Module**
 $V_{CES} = 1200V$
 $I_C = 300A @ T_c = 80^\circ C$

Application

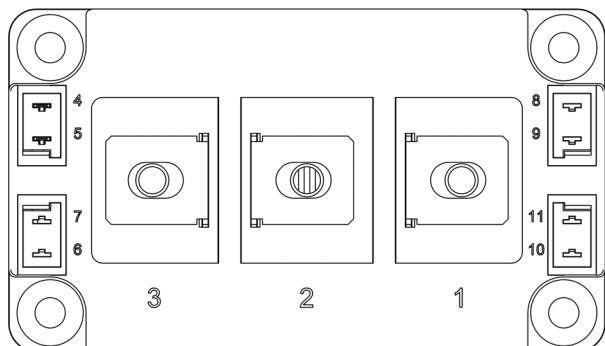
- AC and DC motor control
- Switched Mode Power Supplies

Features

- Trench + Field Stop IGBT3 Technology
 - Low voltage drop
 - Low tail current
 - Switching frequency up to 20 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	$T_c = 25^\circ C$	A
		$T_c = 80^\circ C$	
I_{CM}	Pulsed Collector Current	$T_c = 25^\circ C$	
V_{GE}	Gate – Emitter Voltage	± 20	V
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	W
RBSOA	Reverse Bias Safe Operating Area	$T_j = 125^\circ C$	$600A @ 1100V$

 **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	$V_{GE} = 0\text{V}$, $V_{CE} = 1200\text{V}$	$T_j = 25^\circ\text{C}$			500	μA	
$V_{CE(\text{sat})}$	Collector Emitter saturation Voltage			1.7	2.1		V	
$V_{GE(\text{th})}$	Gate Threshold Voltage	$V_{GE} = V_{CE}$, $I_C = 12\text{mA}$		5.0	5.8	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	$V_{GE} = 0\text{V}$; $V_{CE} = 25\text{V}$ $f = 1\text{MHz}$		21			nF	
C_{res}	Reverse Transfer Capacitance			1				
Q_G	Gate charge	$V_{GE} = \pm 15\text{V}$, $I_C = 300\text{A}$ $V_{CE} = 600\text{V}$		2.8			μC	
$T_{d(on)}$	Turn-on Delay Time	$V_{GE} = \pm 15\text{V}$ $V_{Bus} = 600\text{V}$ $I_C = 300\text{A}$ $R_G = 2.2\Omega$	Inductive Switching (25°C)	250			ns	
T_r	Rise Time			90				
$T_{d(off)}$	Turn-off Delay Time			550				
T_f	Fall Time			130				
$T_{d(on)}$	Turn-on Delay Time	$V_{GE} = \pm 15\text{V}$ $V_{Bus} = 600\text{V}$ $I_C = 300\text{A}$ $R_G = 2.2\Omega$		300			ns	
T_r	Rise Time			100				
$T_{d(off)}$	Turn-off Delay Time			650				
T_f	Fall Time			180				
E_{on}	Turn on Energy	$V_{GE} = \pm 15\text{V}$ $V_{Bus} = 600\text{V}$ $I_C = 300\text{A}$ $R_G = 2.2\Omega$	$T_j = 125^\circ\text{C}$	25			mJ	
E_{off}	Turn off Energy			44				
I_{sc}	Short Circuit data	$V_{GE} \leq 15\text{V}$; $V_{Bus} = 900\text{V}$ $t_p \leq 10\mu\text{s}$; $T_j = 125^\circ\text{C}$			1200		A	

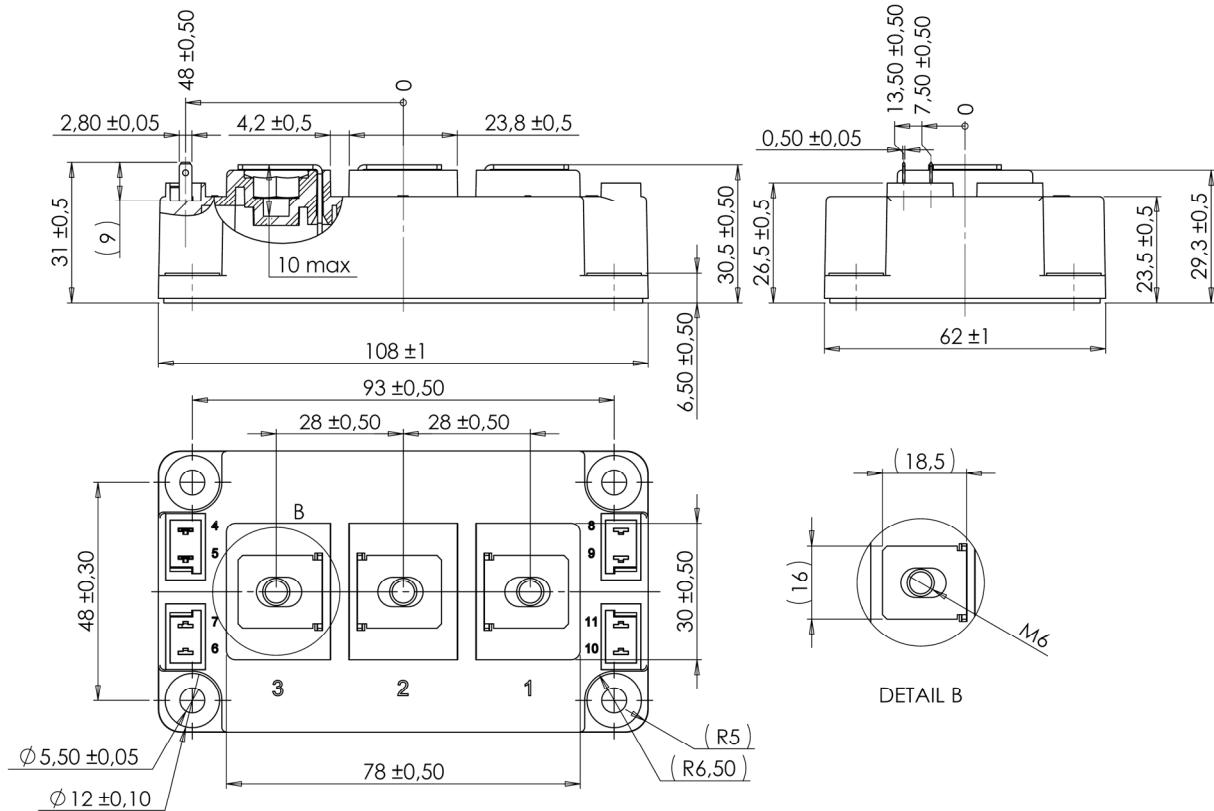
Reverse diode ratings and characteristics

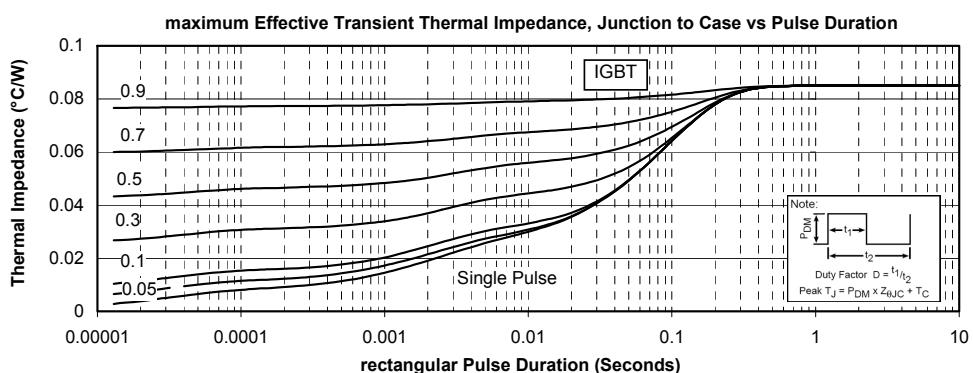
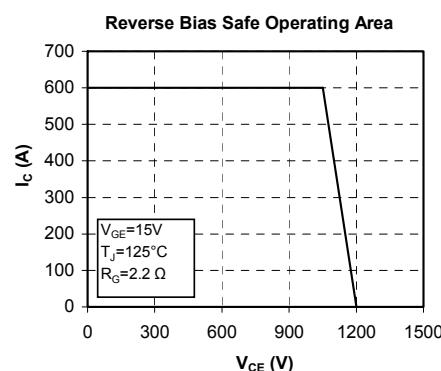
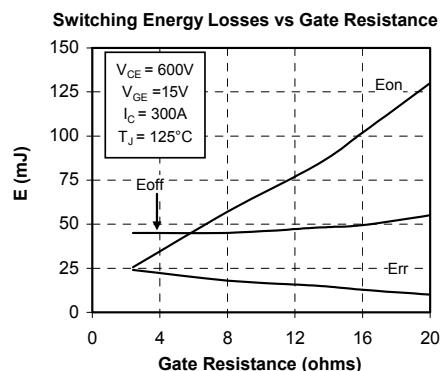
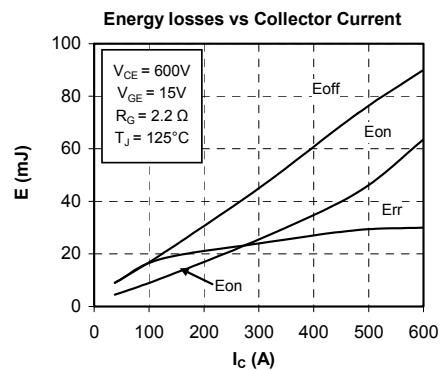
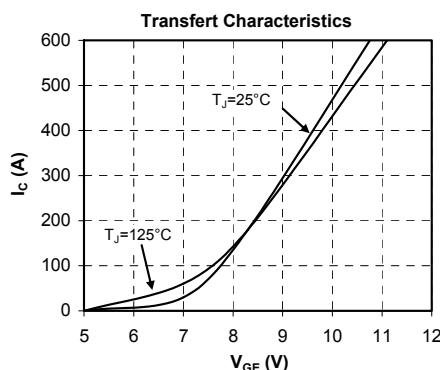
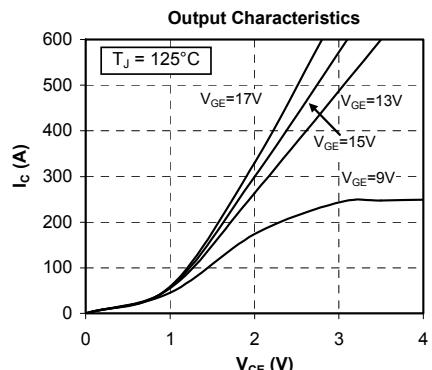
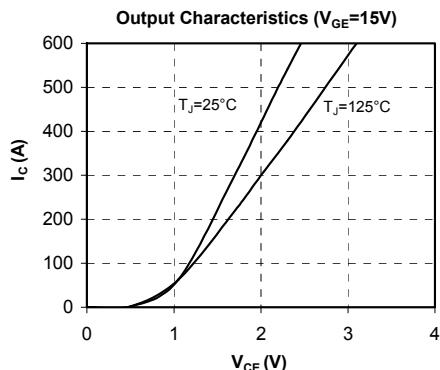
Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
V_{RRM}	Maximum Peak Repetitive Reverse Voltage	$V_R = 1200\text{V}$	$T_j = 25^\circ\text{C}$	1200			V
I_{RRM}	Maximum Reverse Leakage Current					750	μA
I_F	DC Forward Current		$T_j = 125^\circ\text{C}$			1000	
V_F	Diode Forward Voltage	$I_F = 300\text{A}$	$T_c = 80^\circ\text{C}$	300			A
		$V_{GE} = 0\text{V}$	$T_j = 25^\circ\text{C}$	1.6	2.1		V
			$T_j = 125^\circ\text{C}$	1.6			
t_{rr}	Reverse Recovery Time	$I_F = 300\text{A}$ $V_R = 600\text{V}$ $di/dt = 3500\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$	170			ns
Q_{rr}	Reverse Recovery Charge		$T_j = 125^\circ\text{C}$	280			
			$T_j = 25^\circ\text{C}$	28			μC
			$T_j = 125^\circ\text{C}$	56			
			$T_j = 25^\circ\text{C}$	12			mJ
E_{rr}	Reverse Recovery Energy		$T_j = 125^\circ\text{C}$	22			

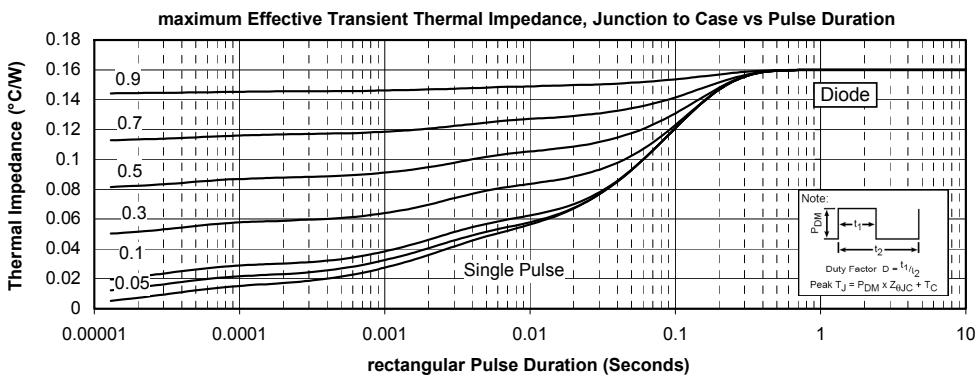
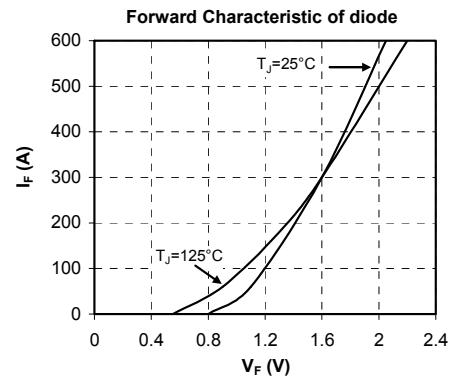
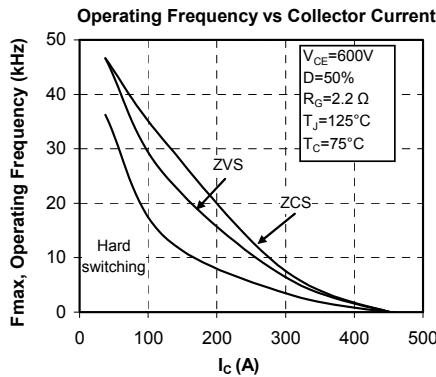
Thermal and package characteristics

Symbol	Characteristic		Min	Typ	Max	Unit
R _{thJC}	Junction to Case Thermal Resistance		IGBT		0.085	°C/W
	Diode			0.16		
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	For terminals	M6	3	5	N.m
		To Heatsink	M6	3	5	
Wt	Package Weight				350	g

D3 Package outline (dimensions in mm)



Typical Performance Curve




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