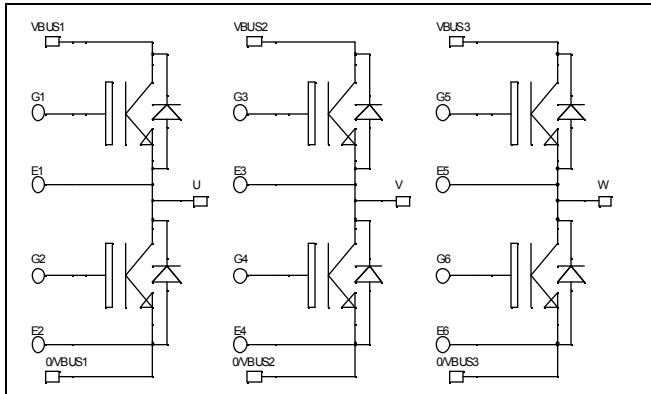


**Triple phase leg
Trench + Field Stop IGBT®
Power Module**

**$V_{CES} = 600V$
 $I_C = 100A @ T_c = 80^\circ C$**

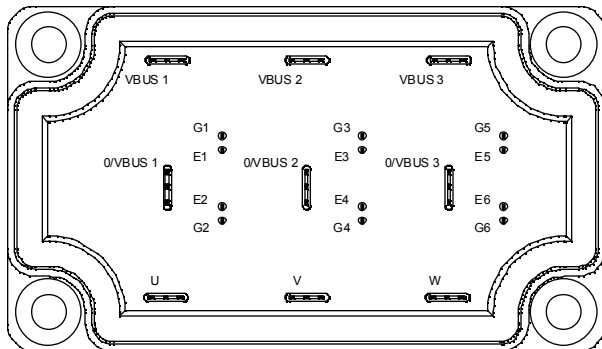


Application

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

Features

- Trench + Field Stop IGBT® Technology
 - Low voltage drop
 - Low tail current
 - Switching frequency up to 20 kHz
 - Soft recovery parallel diodes
 - Low diode VF
 - Low leakage current
 - Avalanche energy rated
 - RBSOA and SCSOA rated
- Kelvin emitter for easy drive
- Very low stray inductance
 - Symmetrical design
 - Lead frames for power connections
- High level of integration



Benefits

- Stable temperature behavior
- Very rugged
- Solderable terminals for easy PCB mounting
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Easy paralleling due to positive TC of VCEsat
- Very low (12mm) profile
- Each leg can be easily paralleled to achieve a phase leg of three times the current capability
- Module can be configured as a three phase bridge
- Module can be configured as a boost followed by a full bridge
- RoHS Compliant

Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V_{CES}	Collector - Emitter Breakdown Voltage	600	V
I_C	Continuous Collector Current	$T_c = 25^\circ C$	150
		$T_c = 80^\circ C$	100
I_{CM}	Pulsed Collector Current	$T_c = 25^\circ C$	200
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	340
RBSOA	Reverse Bias Safe Operating Area	$T_j = 150^\circ C$	200A @ 550V

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	$V_{GE} = 0\text{V}, V_{CE} = 600\text{V}$			250	μA
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	$V_{GE} = 15\text{V}$ $I_C = 100\text{A}$	$T_j = 25^\circ\text{C}$	1.5	1.9	V
			$T_j = 150^\circ\text{C}$	1.7		
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 1.5\text{ mA}$	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

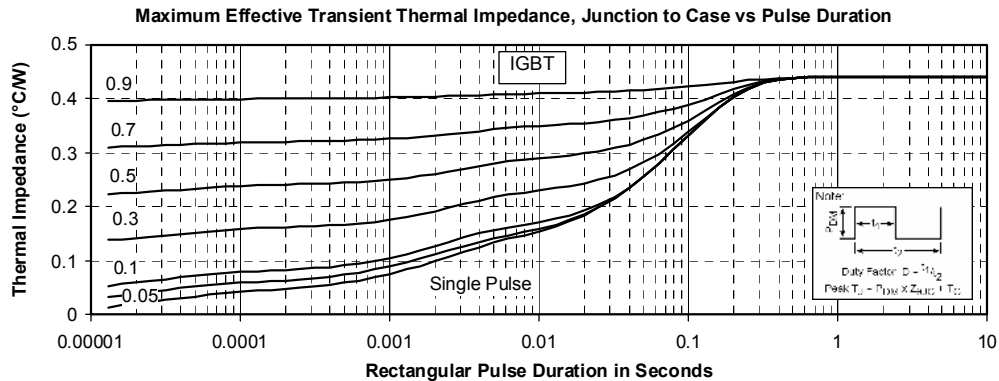
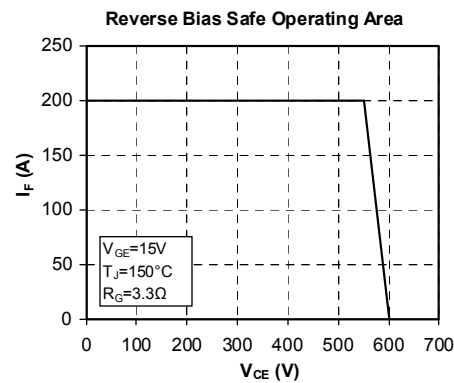
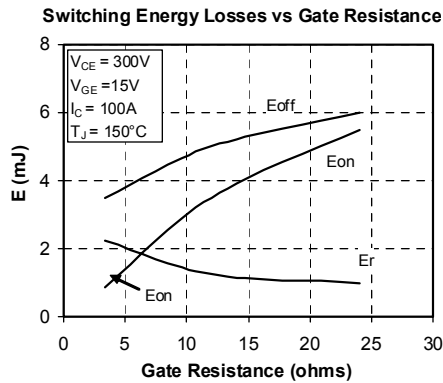
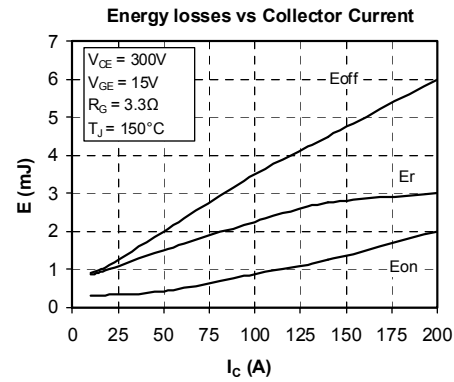
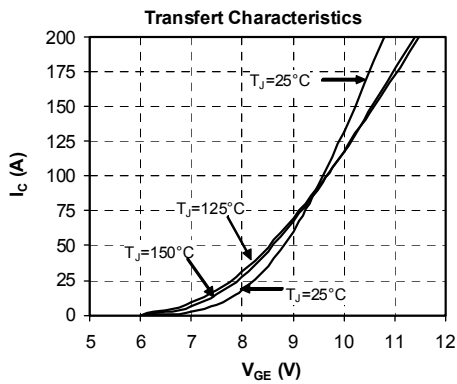
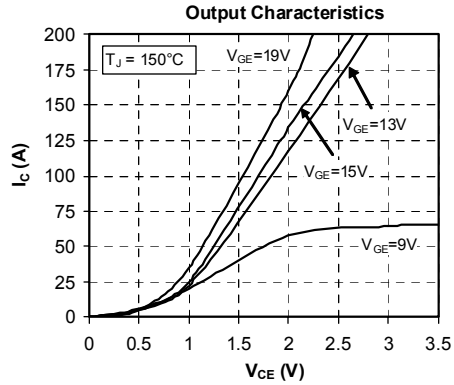
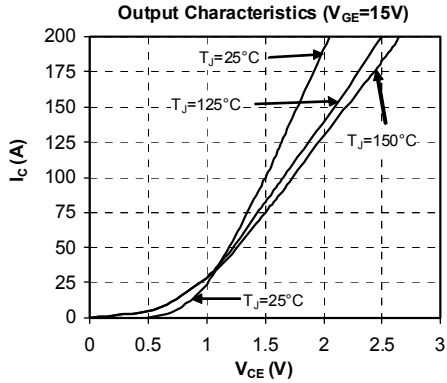
Dynamic Characteristics

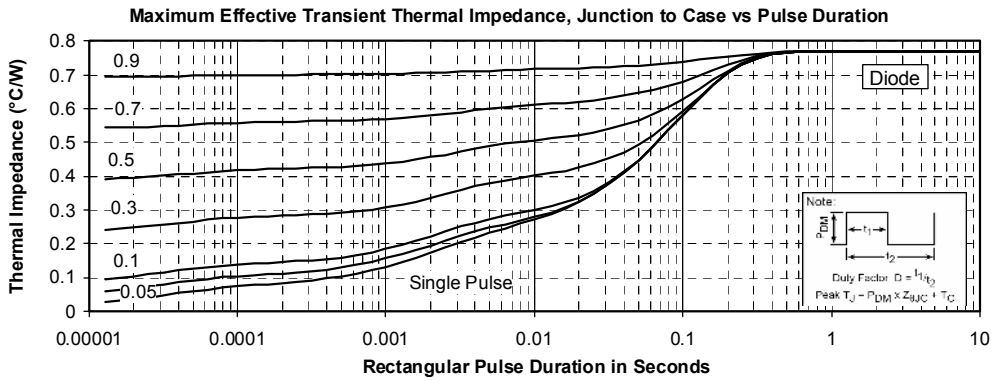
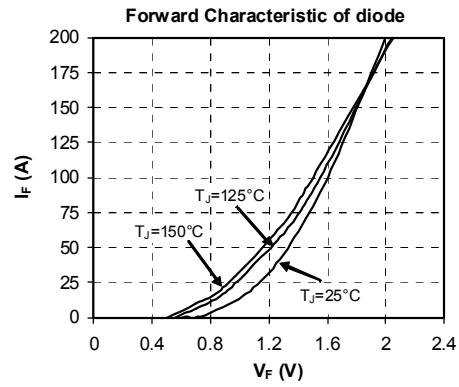
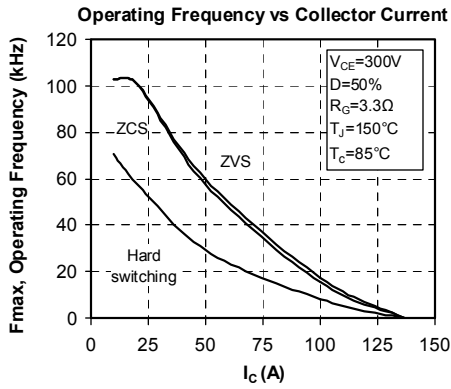
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0\text{V}$		6100		pF
C_{oes}	Output Capacitance	$V_{CE} = 25\text{V}$		390		
C_{res}	Reverse Transfer Capacitance	$f = 1\text{MHz}$		190		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C)		115		ns
T_r	Rise Time	$V_{GE} = \pm 15\text{V}$ $V_{Bus} = 300\text{V}$		45		
$T_{d(off)}$	Turn-off Delay Time	$I_C = 100\text{A}$		225		
T_f	Fall Time	$R_G = 3.3\Omega$		55		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (150°C)		130		ns
T_r	Rise Time	$V_{GE} = \pm 15\text{V}$ $V_{Bus} = 300\text{V}$		50		
$T_{d(off)}$	Turn-off Delay Time	$I_C = 100\text{A}$		300		
T_f	Fall Time	$R_G = 3.3\Omega$		70		
E_{on}	Turn on Energy	$V_{GE} = \pm 15\text{V}$ $V_{Bus} = 300\text{V}$ $I_C = 100\text{A}$	$T_j = 25^\circ\text{C}$	0.4		mJ
			$T_j = 150^\circ\text{C}$	0.875		
E_{off}	Turn off Energy	$R_G = 3.3\Omega$	$T_j = 25^\circ\text{C}$	2.5		mJ
			$T_j = 150^\circ\text{C}$	3.5		

Reverse diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_{RRM}	Maximum Peak Repetitive Reverse Voltage		600			V
I_{RM}	Maximum Reverse Leakage Current	$V_R = 600\text{V}$	$T_j = 25^\circ\text{C}$		250	μA
			$T_j = 150^\circ\text{C}$		500	
I_F	DC Forward Current			100		A
V_F	Diode Forward Voltage	$I_F = 100\text{A}$ $V_{GE} = 0\text{V}$	$T_j = 25^\circ\text{C}$	1.6	2	V
			$T_j = 150^\circ\text{C}$	1.5		
t_{rr}	Reverse Recovery Time		$T_j = 25^\circ\text{C}$	125		ns
			$T_j = 150^\circ\text{C}$	220		
Q_{rr}	Reverse Recovery Charge	$I_F = 100\text{A}$ $V_R = 300\text{V}$ $di/dt = 2000\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$	4.7		μC
			$T_j = 150^\circ\text{C}$	9.9		
E_r	Reverse Recovery Energy		$T_j = 25^\circ\text{C}$	1.1		mJ
			$T_j = 150^\circ\text{C}$	2.4		

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 and foreign patents. U.S. and Foreign patents pending. All Rights Reserved.