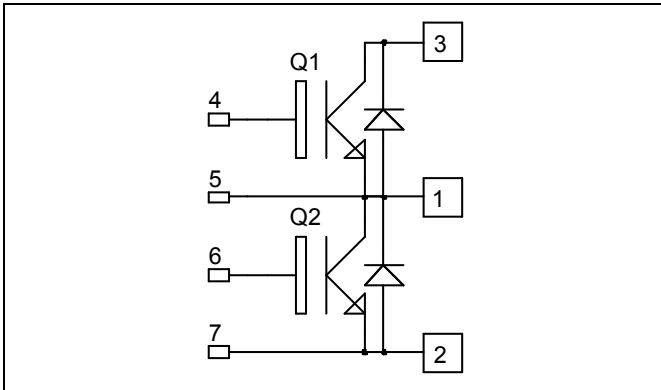


**Phase leg
Trench + Field Stop IGBT
Power Module**

**$V_{CES} = 1700V$
 $I_C = 300A @ T_c = 80^\circ C$**



Application

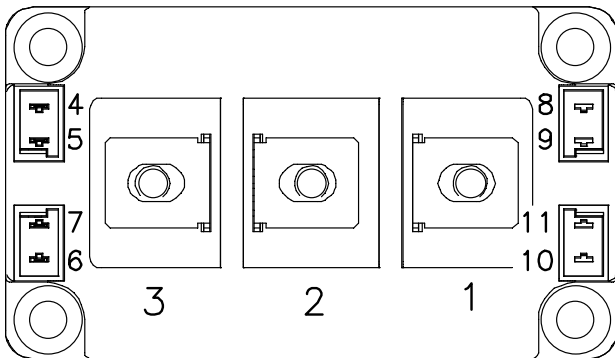
- Welding converters
- Switched Mode Power Supplies
- Uninterruptible Power Supplies
- Motor control

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
 - 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	1700	V
I_C	Continuous Collector Current	$T_C = 25^\circ C$	400
		$T_C = 80^\circ C$	300
I_{CM}	Pulsed Collector Current	$T_C = 25^\circ C$	600
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Maximum Power Dissipation	$T_C = 25^\circ C$	1470
RBSOA	Reverse Bias Safe Operating Area	$T_j = 125^\circ C$	600A@1650V

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	$V_{GE} = 0\text{V}, V_{CE} = 1700\text{V}$			3	mA
$V_{CE(on)}$	Collector Emitter on Voltage	$V_{GE} = 15\text{V}$ $I_C = 300\text{A}$	$T_j = 25^\circ\text{C}$	2.0	2.5	V
			$T_j = 125^\circ\text{C}$	2.4		
$V_{GE(th)}$	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	$V_{GE} = 20\text{V}, V_{CE} = 0\text{V}$			400	nA

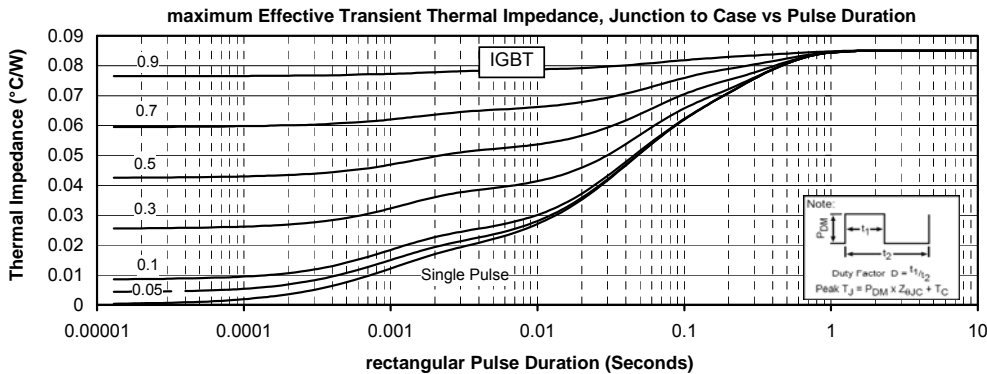
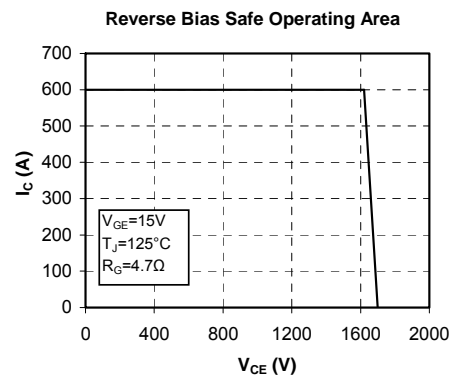
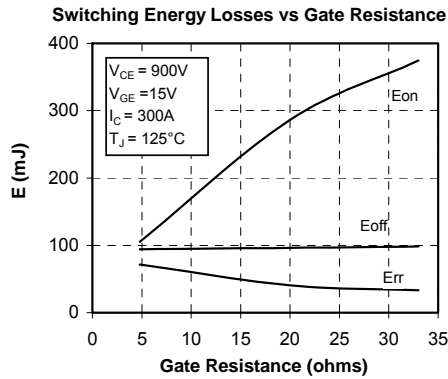
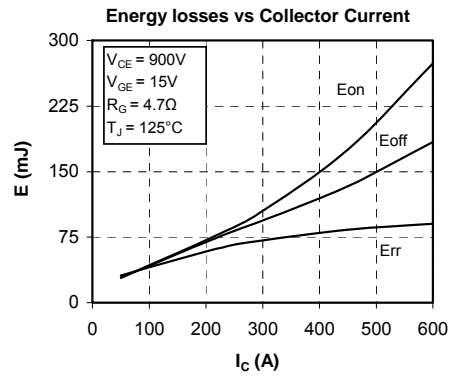
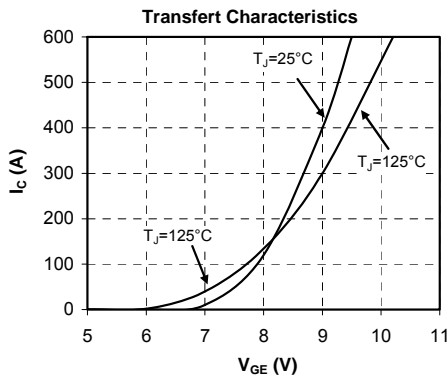
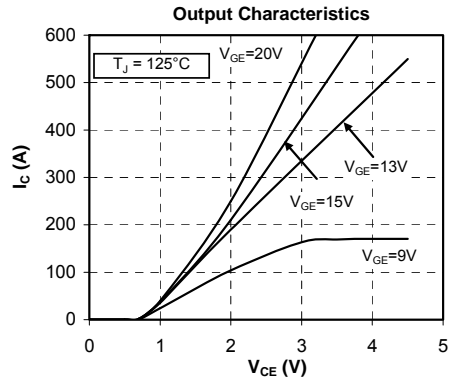
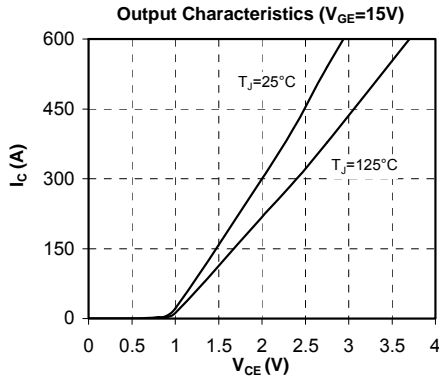
Dynamic Characteristics

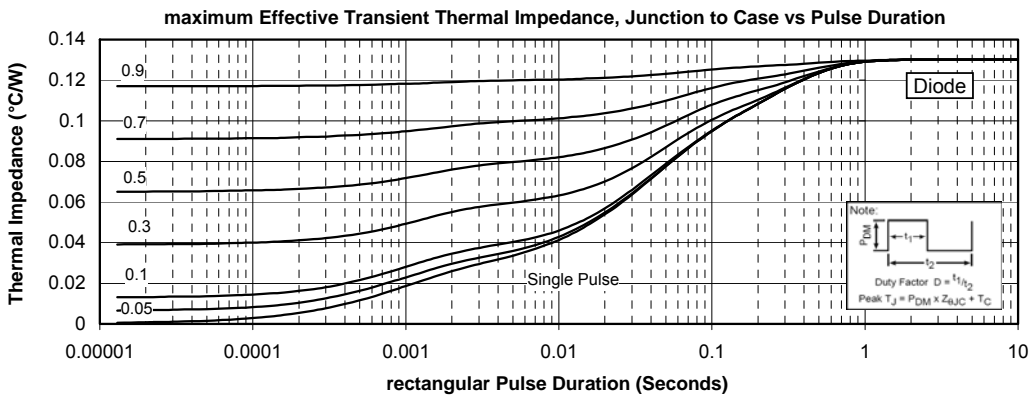
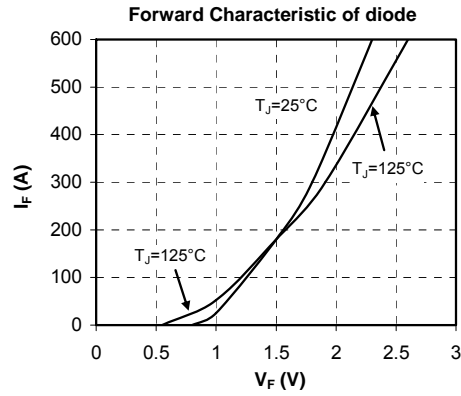
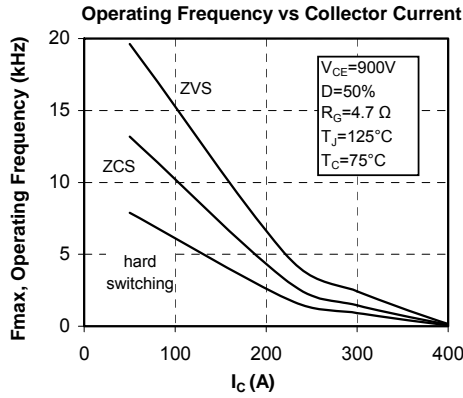
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0\text{V}, V_{CE} = 25\text{V}$		27		nF
C_{res}	Reverse Transfer Capacitance	$f = 1\text{MHz}$		0.9		
Q_G	Gate charge	$V_{GE} = \pm 15\text{V}, I_C = 300\text{A}$ $V_{CE} = 900\text{V}$		3.5		μC
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{GE} = \pm 15\text{V}$ $V_{Bus} = 900\text{V}$ $I_C = 300\text{A}$ $R_G = 4.7\Omega$		280		ns
T_r	Rise Time			80		
$T_{d(off)}$	Turn-off Delay Time			850		
T_f	Fall Time			120		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (125°C) $V_{GE} = \pm 15\text{V}$ $V_{Bus} = 900\text{V}$ $I_C = 300\text{A}$ $R_G = 4.7\Omega$		300		ns
T_r	Rise Time			100		
$T_{d(off)}$	Turn-off Delay Time			1000		
T_f	Fall Time			200		
E_{on}	Turn On Energy	$V_{GE} = \pm 15\text{V}$ $V_{Bus} = 900\text{V}$	$T_j = 25^\circ\text{C}$	71		mJ
			$T_j = 125^\circ\text{C}$	105		
E_{off}	Turn Off Energy	$I_C = 300\text{A}$ $R_G = 4.7\Omega$	$T_j = 25^\circ\text{C}$	64		mJ
			$T_j = 125^\circ\text{C}$	94		
I_{sc}	Short Circuit data	$V_{GE} \leq 15\text{V}; V_{Bus} = 1000\text{V}$ $t_p \leq 10\mu\text{s}; T_j = 125^\circ\text{C}$		1200		A

Reverse diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_{RRM}	Maximum Peak Repetitive Reverse Voltage		1700			V
I_{RRM}	Maximum Reverse Leakage Current	$V_R = 1700\text{V}$	$T_j = 25^\circ\text{C}$		750	μA
			$T_j = 125^\circ\text{C}$		1000	
I_F	DC Forward Current		$T_c = 80^\circ\text{C}$	300		A
V_F	Diode Forward Voltage	$I_F = 300\text{A}$	$T_j = 25^\circ\text{C}$	1.8	2.2	V
			$T_j = 125^\circ\text{C}$	1.9		
t_{rr}	Reverse Recovery Time	$I_F = 300\text{A}$ $V_R = 900\text{V}$ $di/dt = 3500\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$	385		ns
			$T_j = 125^\circ\text{C}$	490		
Q_{rr}	Reverse Recovery Charge		$T_j = 25^\circ\text{C}$	76		μC
			$T_j = 125^\circ\text{C}$	124		
E_{rr}	Reverse Recovery Energy		$T_j = 25^\circ\text{C}$	35		mJ
			$T_j = 125^\circ\text{C}$	70		

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.