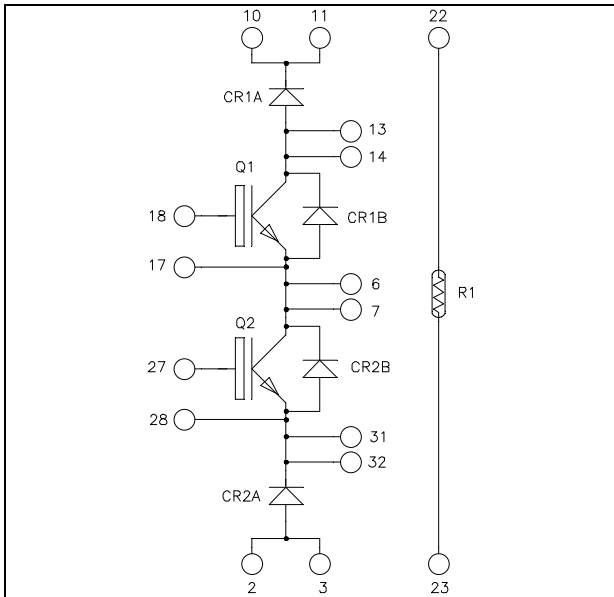


**Boost buck chopper
Trench + Field Stop IGBT3
Power Module**

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

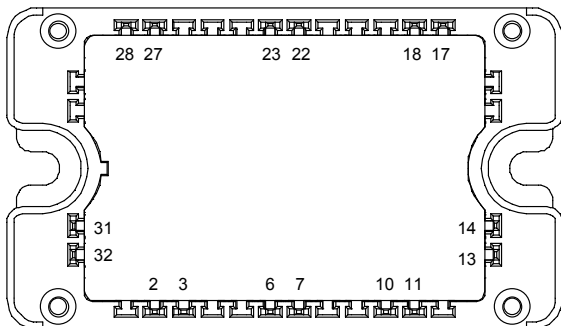


Application

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

Features

- Trench + Field Stop 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
- Very low stray inductance
- Kelvin emitter for easy drive
- Internal thermistor for temperature monitoring
- High level of integration



Benefits

- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Solderable terminals both for power and signal for easy PCB mounting
- Low profile
- RoHS Compliant

All multiple inputs and outputs must be shorted together

Example: 10/11 ; 13/14 ; 6/7 ...

All ratings @ $T_j = 25^\circ C$ unless otherwise specified

CAUTION: These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed. See application note APT0502 on www.microsemi.com

Absolute maximum ratings (Per IGBT)

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

* Specification of device but output current must be limited due to size of output pins.

Electrical Characteristics (Per IGBT)

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	$V_{GE} = 15\text{V}$		1.5	1.9	V
		$I_C = 100\text{A}$	$T_j = 25^\circ\text{C}$			
				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 (Per IGBT)

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		
Q_G	Gate charge	$V_{GE} = \pm 15\text{V}; V_{CE} = 300\text{V}$ $I_C = 100\text{A}$		1.1		μC
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{GE} = \pm 15\text{V}$ $V_{Bus} = 300\text{V}$ $I_C = 100\text{A}$ $R_G = 3.3\Omega$		115		ns
T_r	Rise Time			45		
$T_{d(off)}$	Turn-off Delay Time			225		
T_f	Fall Time			55		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (150°C) $V_{GE} = \pm 15\text{V}$ $V_{Bus} = 300\text{V}$ $I_C = 100\text{A}$ $R_G = 3.3\Omega$		130		ns
T_r	Rise Time			50		
$T_{d(off)}$	Turn-off Delay Time			300		
T_f	Fall Time			70		
E_{on}	Turn on Energy	$V_{GE} = \pm 15\text{V}$ $V_{Bus} = 300\text{V}$ $I_C = 100\text{A}$ $R_G = 3.3\Omega$	$T_j = 25^\circ\text{C}$	0.4		mJ
			$T_j = 150^\circ\text{C}$	0.875		
E_{off}	Turn off Energy	$I_C = 100\text{A}$ $R_G = 3.3\Omega$	$T_j = 25^\circ\text{C}$	2.5		mJ
			$T_j = 150^\circ\text{C}$	3.5		
I_{sc}	Short Circuit data	$V_{GE} \leq 15\text{V}; V_{Bus} = 360\text{V}$ $t_p \leq 6\mu\text{s}; T_j = 150^\circ\text{C}$		500		A

Reverse diode ratings and characteristics (Per diode)

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 =600V			150	μA
					400	
I _F	DC Forward Current			100		A
V _F	Diode Forward Voltage	I _F = 100A V _{GE} = 0V		1.6	2	V
				1.5		
t _{rr}	Reverse Recovery Time			100		ns
				150		
Q _{rr}	Reverse Recovery Charge	I _F = 100A V _R = 300V di/dt = 2500A/μs		5.1		μC
				10.7		
E _r	Reverse Recovery Energy			1.2		mJ
				2.4		

Thermal and package characteristics

Symbol	Characteristic	Min	Typ	Max	Unit	
R _{thJC}	Junction to Case Thermal Resistance	Per IGBT		0.44	°C/W	
		Per Diode		0.77		
V _{ISOL}	RMS Isolation Voltage, any terminal to case t=1 min, I _{isol} <1mA, 50/60Hz	4000			V	
T _J	Operating junction temperature range	-40		175	°C	
T _{STG}	Storage Temperature Range	-40		125		
T _C	Operating Case Temperature	-40		100		
Torque	Mounting torque	To heatsink	M4	2.5	4.7	N.m
Wt	Package Weight				110	g

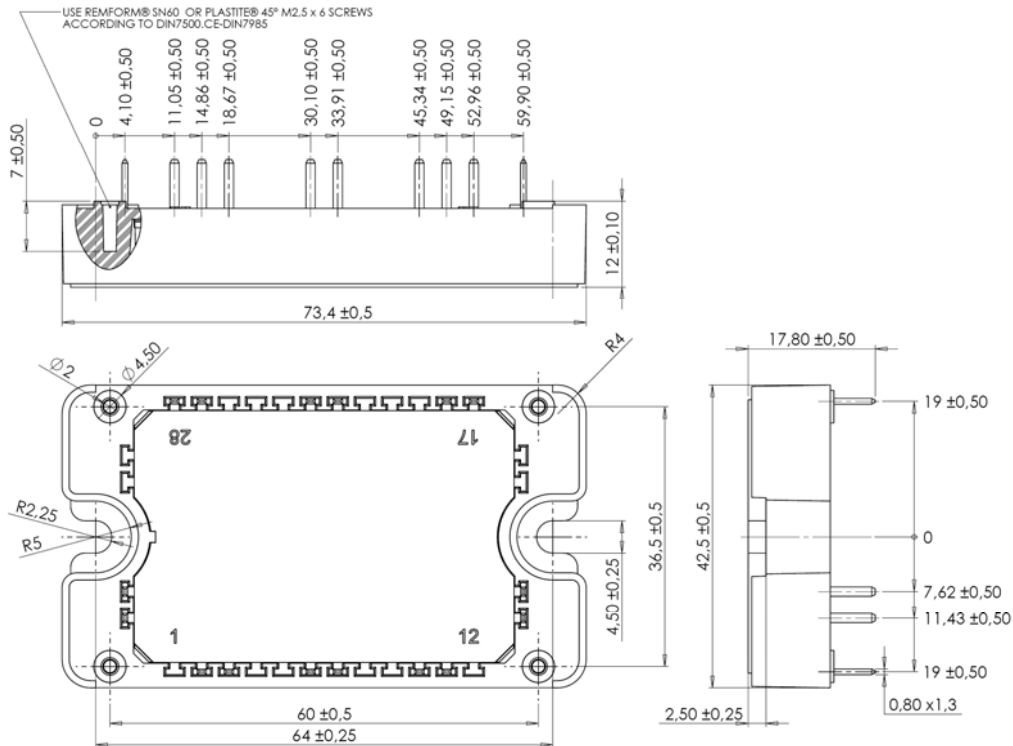
Temperature sensor NTC

Symbol	Characteristic	Min	Typ	Max	Unit
R ₂₅	Resistance @ 25°C		22		kΩ
ΔR ₂₅ /R ₂₅	Resistance tolerance			5	%
ΔB/B	Beta tolerance			3	
B _{25/100}	T ₂₅ = 298.16 K		3980		K

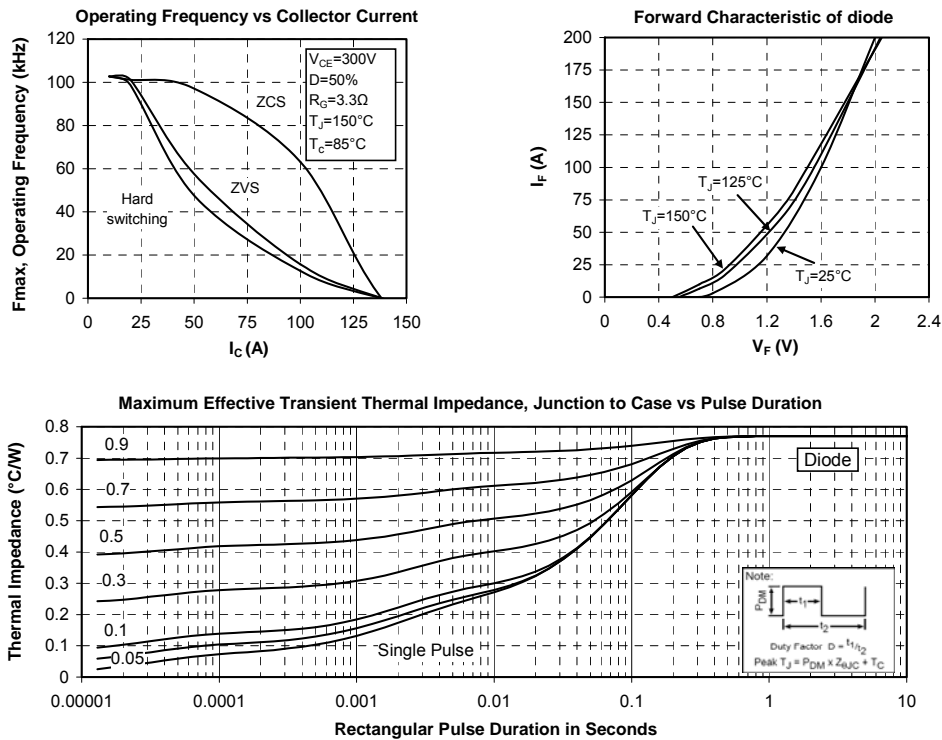
$$R_T = \frac{R_{25}}{\exp \left[B_{25/100} \left(\frac{1}{T_{25}} - \frac{1}{T} \right) \right]}$$

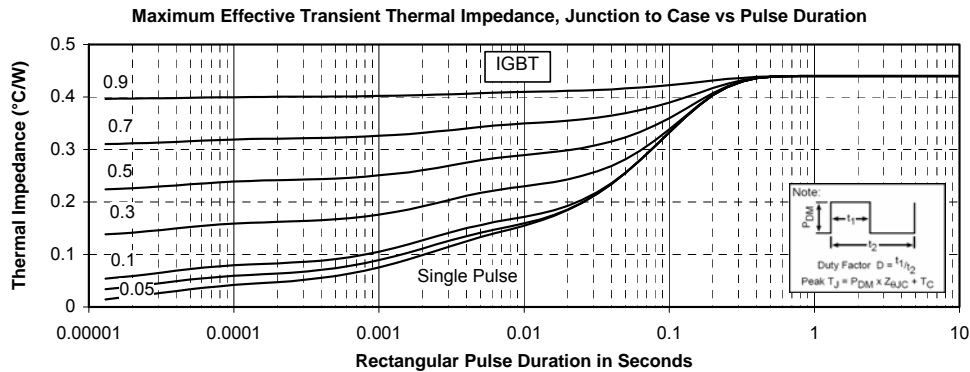
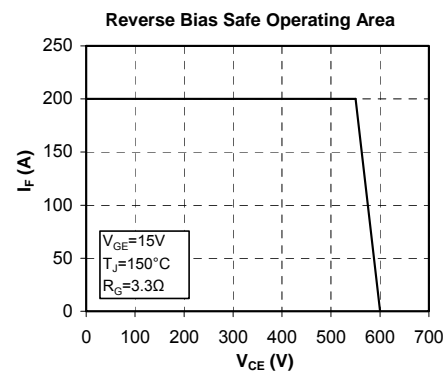
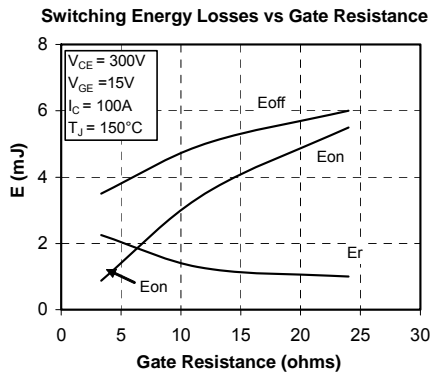
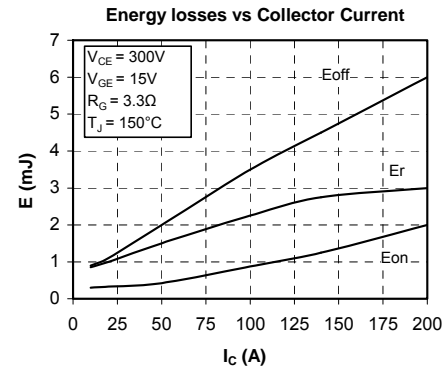
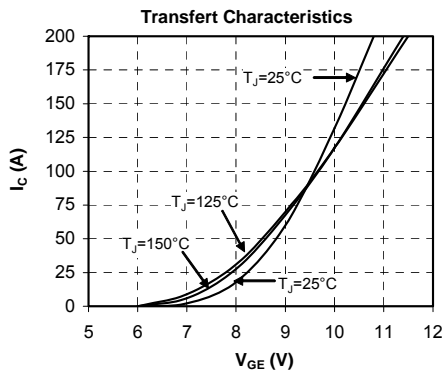
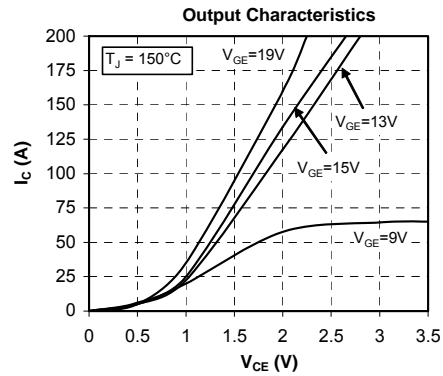
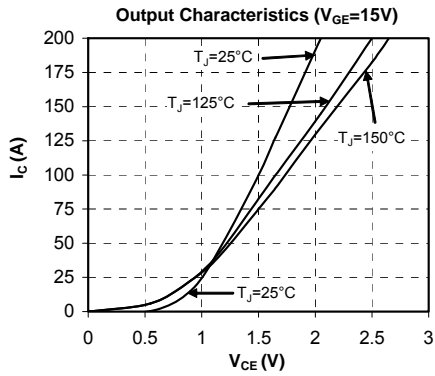
T: Thermistor temperature
R_T: Thermistor value at T

SP3F Package outline (dimensions in mm)



Typical Performance Curve





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