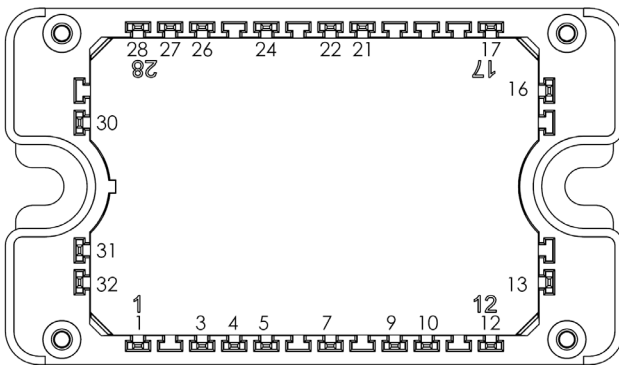
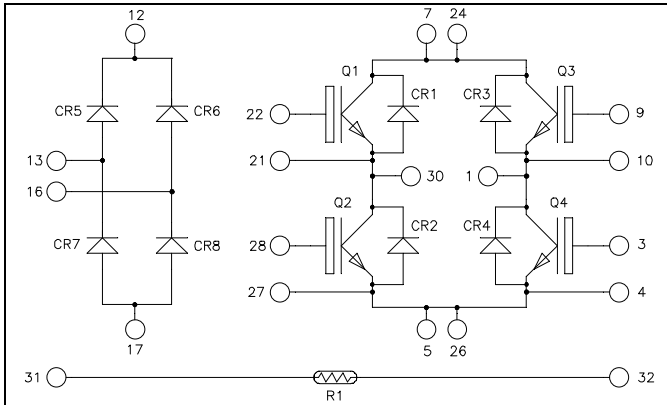


**Full bridge + rectifier bridge
Trench + Field Stop IGBT3
Power Module**

**$V_{CES} = 600V$
 $I_C = 50A @ T_c = 80^\circ C$**



All multiple inputs and outputs must be shorted together
7/24 ; 5/26

Application

- Solar converter

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
- Very low stray inductance
- High level of integration
- Internal thermistor for temperature monitoring

Benefits

- Stable temperature behavior
- Very rugged
- Solderable terminals both for power and signal for easy PCB mounting
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Easy paralleling due to positive TC of V_{CESat}
- Low profile
- RoHS Compliant

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

1. Full bridge
Absolute maximum ratings (per IGBT)

<i>Symbol</i>	<i>Parameter</i>	<i>Max ratings</i>	<i>Unit</i>
V _{CES}	Collector - Emitter Breakdown Voltage	600	V
I _C	Continuous Collector Current	T _C = 25°C	80
		T _C = 80°C	50
I _{CM}	Pulsed Collector Current	T _C = 25°C	100
V _{GE}	Gate - Emitter Voltage	±20	V
P _D	Maximum Power Dissipation	T _C = 25°C	176
RBSOA	Reverse Bias Safe Operating Area	T _J = 150°C	100A @ 550V

Electrical Characteristics (per IGBT)

<i>Symbol</i>	<i>Characteristic</i>	<i>Test Conditions</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
I _{CES}	Zero Gate Voltage Collector Current	V _{GE} = 0V, V _{CE} = 600V			250	μA
V _{CE(sat)}	Collector Emitter Saturation Voltage	V _{GE} = 15V		1.5	1.9	V
		I _C = 50A	T _J = 25°C			
				1.7		
V _{GE(th)}	Gate Threshold Voltage	V _{GE} = V _{CE} , I _C = 600μA	5.0	5.8	6.5	V
I _{GES}	Gate - Emitter Leakage Current	V _{GE} = 20V, V _{CE} = 0V			600	nA

Dynamic Characteristics (per IGBT)

<i>Symbol</i>	<i>Characteristic</i>	<i>Test Conditions</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
C _{ies}	Input Capacitance	V _{GE} = 0V V _{CE} = 25V f = 1MHz		3150		pF
C _{oes}	Output Capacitance			200		
C _{res}	Reverse Transfer Capacitance			95		
Q _G	Gate charge	V _{GE} = ±15V, I _C = 50A V _{CE} = 300V		0.5		μC
T _{d(on)}	Turn-on Delay Time	Inductive Switching (25°C) V _{GE} = ±15V V _{Bus} = 300V I _C = 50A R _G = 8.2Ω		110		ns
T _r	Rise Time			45		
T _{d(off)}	Turn-off Delay Time			200		
T _f	Fall Time			40		
T _{d(on)}	Turn-on Delay Time	Inductive Switching (150°C) V _{GE} = ±15V V _{Bus} = 300V I _C = 50A R _G = 8.2Ω		120		ns
T _r	Rise Time			50		
T _{d(off)}	Turn-off Delay Time			250		
T _f	Fall Time			60		
E _{on}	Turn-on Switching Energy	V _{GE} = ±15V V _{Bus} = 300V I _C = 50A	T _J = 25°C	0.3		mJ
			T _J = 150°C	0.43		
E _{off}	Turn-off Switching Energy	R _G = 8.2Ω	T _J = 25°C	1.35		mJ
			T _J = 150°C	1.75		
I _{sc}	Short Circuit data	V _{GE} ≤ 15V ; V _{Bus} = 360V t _p ≤ 6μs ; T _J = 150°C		250		A
R _{thJC}	Junction to Case Thermal Resistance				0.85	°C/W

Reverse diode ratings and characteristics (per diode)

<i>Symbol</i>	<i>Characteristic</i>	<i>Test Conditions</i>		<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
V _{RRM}	Maximum Peak Repetitive Reverse Voltage			600			V
I _{RM}	Maximum Reverse Leakage Current	V _R =600V	T _j = 25°C			250	μA
			T _j = 150°C			500	
I _F	DC Forward Current	T _c = 80°C			50		A
V _F	Diode Forward Voltage	I _F = 50A V _{GE} = 0V	T _j = 25°C		1.6	2	V
			T _j = 150°C		1.5		
t _{rr}	Reverse Recovery Time		T _j = 25°C		100		ns
			T _j = 150°C		150		
Q _{rr}	Reverse Recovery Charge	I _F = 50A V _R = 300V di/dt = 1800A/μs	T _j = 25°C		2.6		μC
			T _j = 150°C		5.4		
E _{rr}	Reverse Recovery Energy		T _j = 25°C		0.6		mJ
			T _j = 150°C		1.2		
R _{thJC}	Junction to Case Thermal Resistance					1.42	°C/W

2. Rectifier bridge
Absolute maximum ratings (per diode)

<i>Symbol</i>	<i>Parameter</i>			<i>Max ratings</i>	<i>Unit</i>
V _R	Maximum DC reverse Voltage			600	V
V _{RRM}	Maximum Peak Repetitive Reverse Voltage				
I _{F(AV)}	Maximum Average Forward Current	Duty cycle = 50%	T _C = 80°C	40	A
I _{FSM}	Non-Repetitive Forward Surge Current	8.3ms	T _J = 45°C	320	

Electrical Characteristics (per diode)

<i>Symbol</i>	<i>Characteristic</i>	<i>Test Conditions</i>		<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
V _F	Diode Forward Voltage	I _F = 30A			1.8	2.2	V
		I _F = 60A			2.2		
		I _F = 30A	T _j = 125°C		1.5		
I _{RM}	Maximum Reverse Leakage Current	V _R = 600V	T _j = 25°C			250	μA
			T _j = 125°C			500	

Dynamic Characteristics (per diode)

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
t_{rr}	Reverse Recovery Time	$I_F=1A, V_R=30V$ $di/dt = 100A/\mu s$	$T_j = 25^\circ C$		22		ns
t_{rr}	Reverse Recovery Time	$I_F = 30A$ $V_R = 400V$ $di/dt = 200A/\mu s$	$T_j = 25^\circ C$		25		ns
			$T_j = 125^\circ C$		160		
Q_{rr}	Reverse Recovery Charge		$T_j = 25^\circ C$		35		nC
			$T_j = 125^\circ C$		480		
I_{RRM}	Reverse Recovery Current		$T_j = 25^\circ C$		3		A
		$T_j = 125^\circ C$		6			
t_{rr}	Reverse Recovery Time	$I_F = 30A$ $V_R = 400V$ $di/dt = 1000A/\mu s$	$T_j = 125^\circ C$		85		ns
Q_{rr}	Reverse Recovery Charge				920		μC
I_{RRM}	Reverse Recovery Current				20		A
R_{thJC}	Junction to Case Thermal Resistance					1.2	$^\circ C/W$

3. Thermal and package characteristics
Temperature sensor NTC (see application note APT0406 on www.microsemi.com for more information).

Symbol	Characteristic	Min	Typ	Max	Unit
R_{25}	Resistance @ 25°C		50		k Ω
$\Delta R_{25}/R_{25}$			5		%
$B_{25/85}$	$T_{25} = 298.15 K$		3952		K
$\Delta B/B$	$T_C = 100^\circ C$		4		%

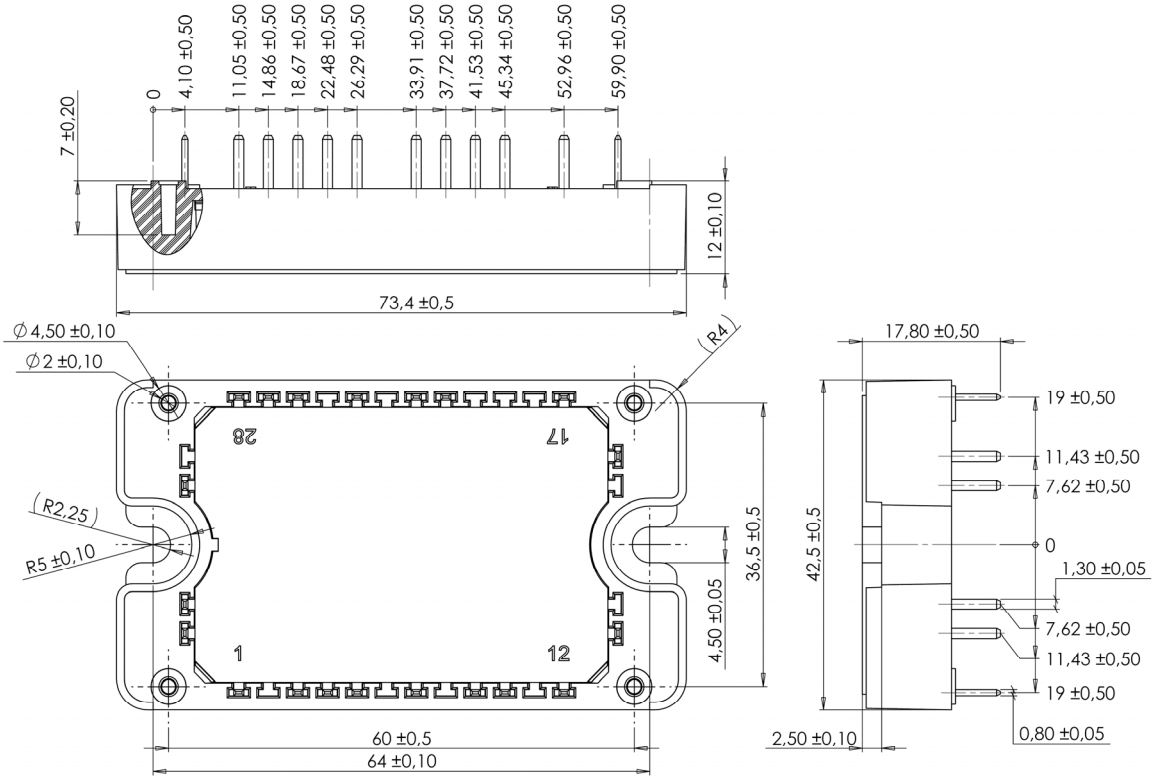
$$R_T = \frac{R_{25}}{\exp\left[B_{25/85}\left(\frac{1}{T_{25}} - \frac{1}{T}\right)\right]}$$

T: Thermistor temperature
 R_T : Thermistor value at T

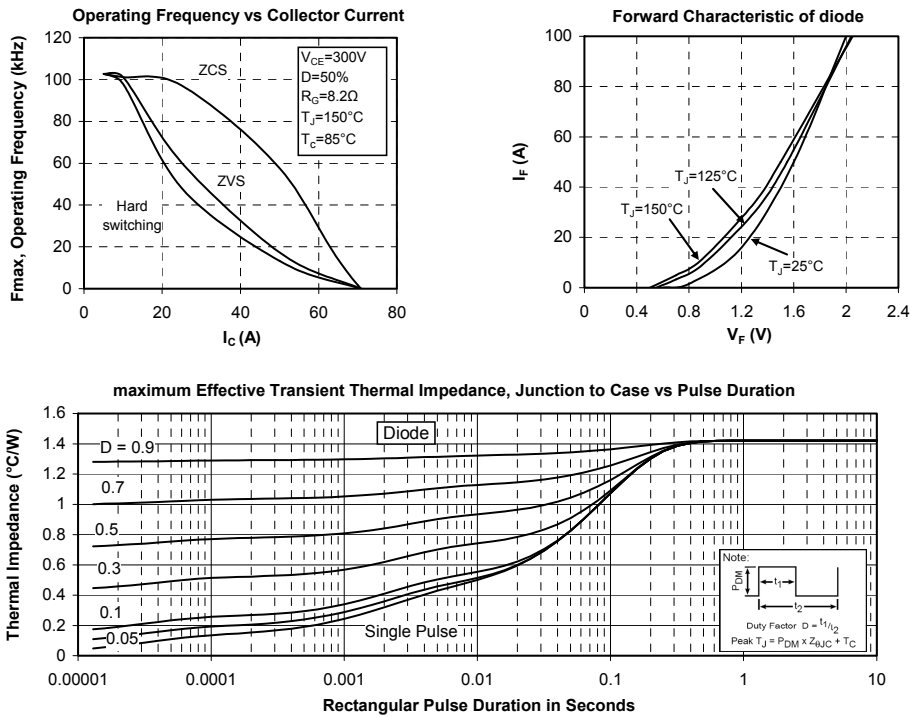
Package characteristics

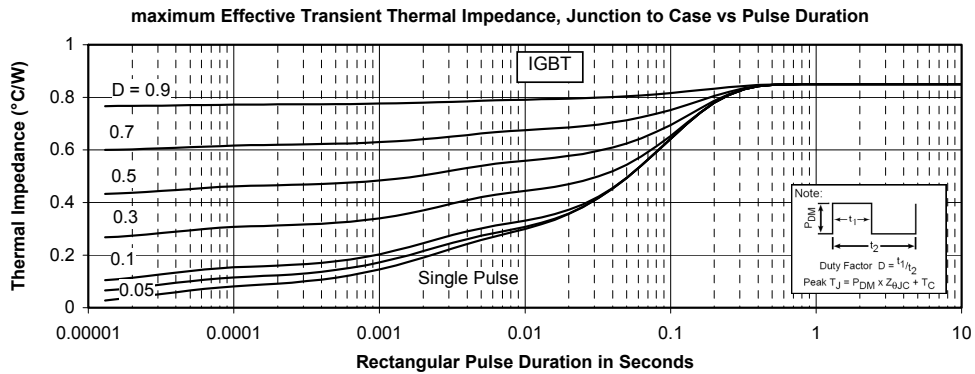
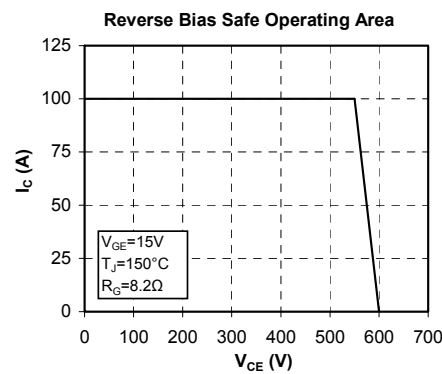
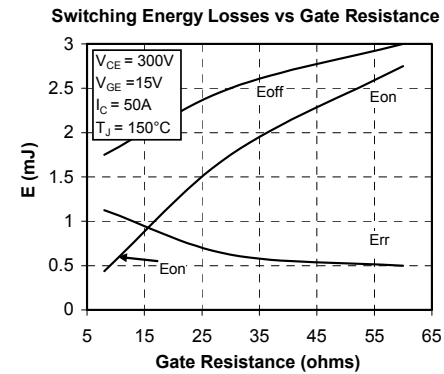
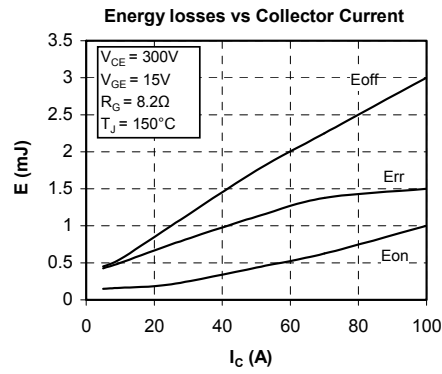
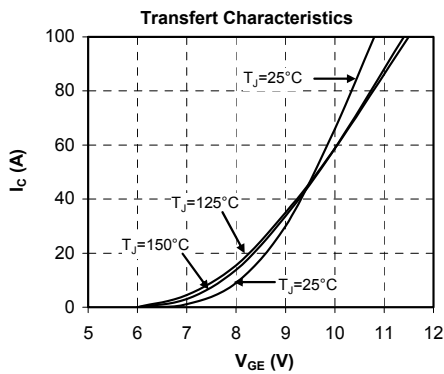
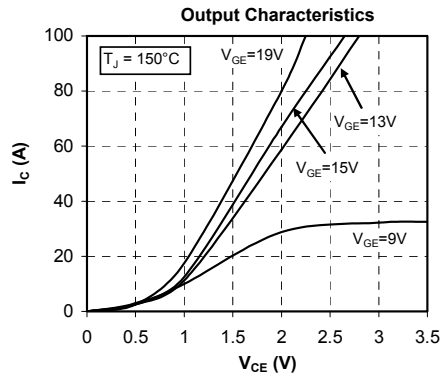
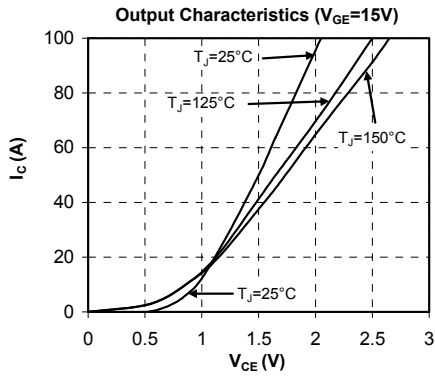
Symbol	Characteristic	Min	Typ	Max	Unit	
V_{ISOL}	RMS Isolation Voltage, any terminal to case t=1 min, 50/60Hz	4000			V	
T_J	Operating junction temperature range	-40		175	$^\circ C$	
T_{STG}	Storage Temperature Range	-40		125		
T_C	Operating Case Temperature	-40		100		
Torque	Mounting torque	To heatsink	M4	2	3	N.m
Wt	Package Weight				110	g

SP3 Package outline (dimensions in mm)

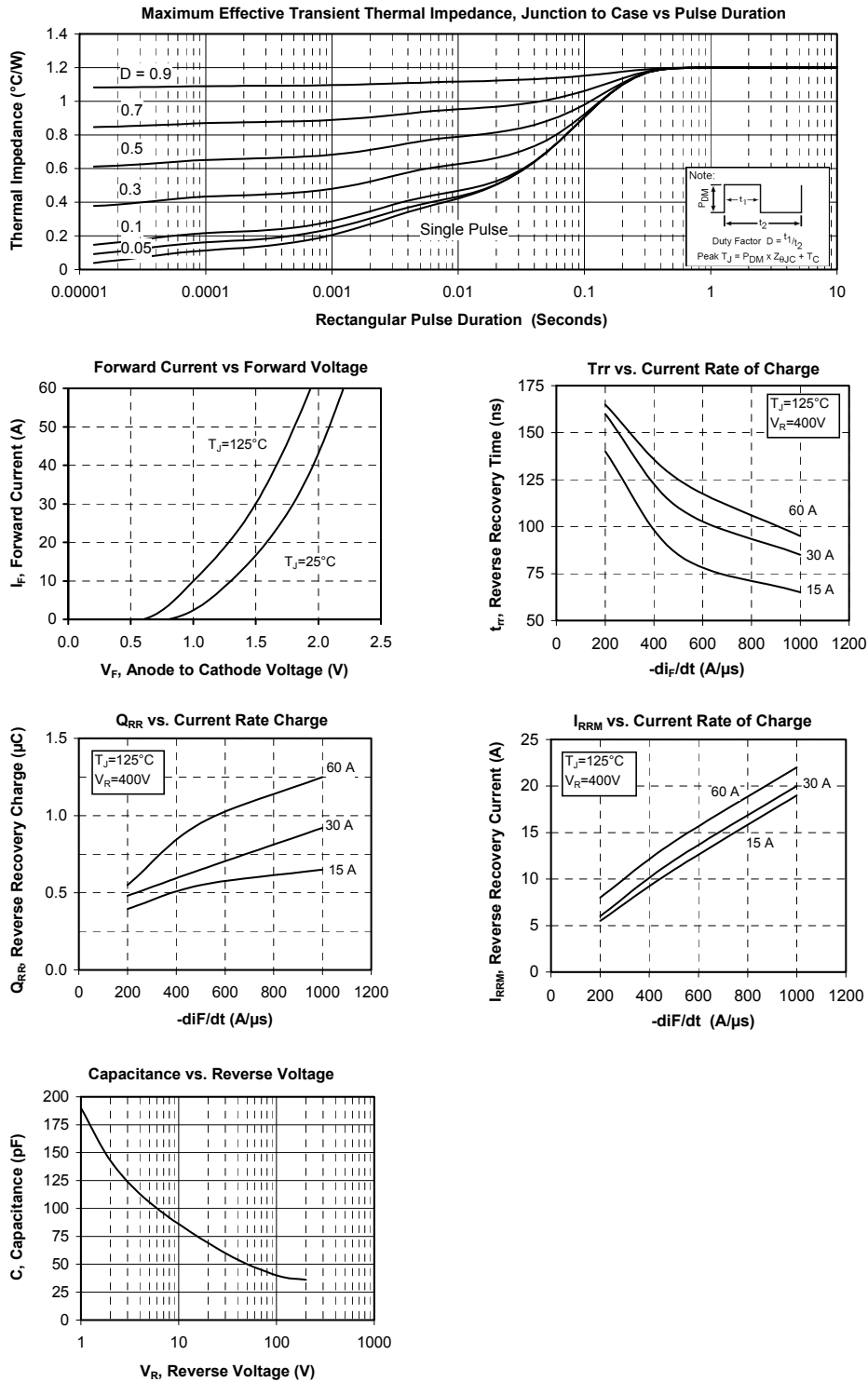


4. Typical full bridge Performance Curve (per IGBT and parallel diode)





5. Typical rectifier bridge Performance Curve (per diode)



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