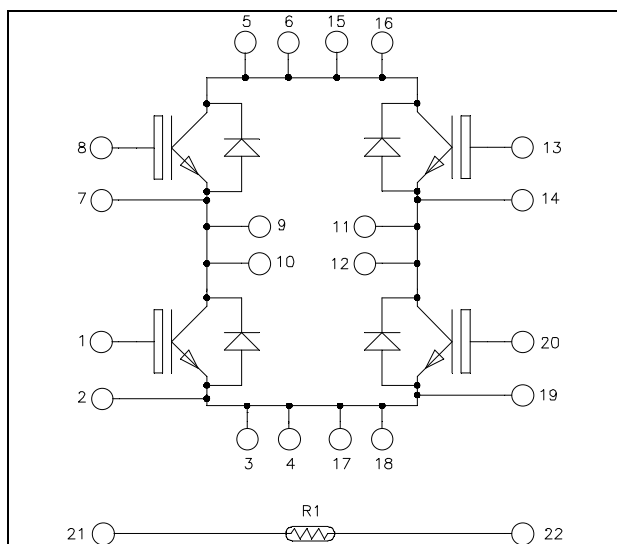


Full - Bridge NPT IGBT Power Module

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

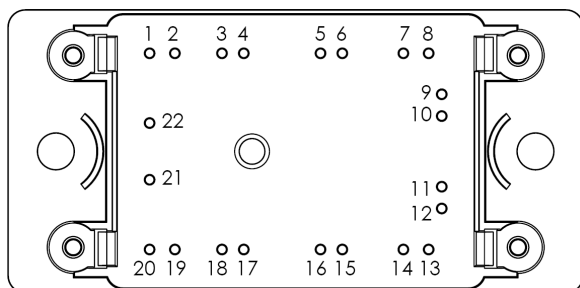


Application

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

Features

- Non Punch Through (NPT) Fast IGBT
 - Low voltage drop
 - Low tail current
 - Switching frequency up to 100 kHz
 - Soft recovery parallel diodes
 - Low diode VF
 - Low leakage current
 - RBSOA and SCSOA rated
- Very low stray inductance
- Internal thermistor for temperature monitoring
- High level of integration



Pins 5/6/15/16 ; 3/4/17/18 ; 9/10 ; 11/12 must be shorted together

Benefits

- Outstanding performance at high frequency operation
- 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 ratings @ $T_j = 25^\circ C$ unless otherwise specified

Absolute maximum ratings (per IGBT)

Symbol	Parameter	Max ratings	Unit
V_{CES}	Collector - Emitter Breakdown Voltage	600	V
I_C	Continuous Collector Current	$T_C = 25^\circ C$	65
		$T_C = 80^\circ C$	50
I_{CM}	Pulsed Collector Current	$T_C = 25^\circ C$	230
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Maximum Power Dissipation	$T_C = 25^\circ C$	250
RBSOA	Reverse Bias Safe Operating Area	$T_j = 125^\circ C$	100A @ 500V

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

Electrical Characteristics (per IGBT)

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
I_{CES}	Zero Gate Voltage Collector Current	$V_{GE} = 0V ; V_{CE} = 600V$			250	μA
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	$V_{GE} = 15V$ $I_C = 50A$	$T_j = 25^\circ C$ $T_j = 125^\circ C$	1.7 2.2	2.45	V
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 1mA$	4		6	V
I_{GES}	Gate – Emitter Leakage Current	$V_{GE} = 20V, V_{CE} = 0V$			400	nA

Dynamic Characteristics (per IGBT)

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0V$		2200		pF
C_{oes}	Output Capacitance	$V_{CE} = 25V$		323		
C_{res}	Reverse Transfer Capacitance	$f = 1MHz$		200		
Q_g	Total gate Charge	$V_{GE} = 15V$		166		nC
Q_{ge}	Gate – Emitter Charge	$V_{Bus} = 300V$		20		
Q_{gc}	Gate – Collector Charge	$I_C = 50A$		100		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching ($25^\circ C$)		40		ns
T_r	Rise Time	$V_{GE} = 15V$		9		
$T_{d(off)}$	Turn-off Delay Time	$V_{Bus} = 400V$		120		
T_f	Fall Time	$I_C = 50A$ $R_G = 2.7\Omega$		12		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching ($125^\circ C$)		42		ns
T_r	Rise Time	$V_{GE} = 15V$		10		
$T_{d(off)}$	Turn-off Delay Time	$V_{Bus} = 400V$		130		
T_f	Fall Time	$I_C = 50A$ $R_G = 2.7\Omega$		21		
E_{on}	Turn-on Switching Energy	$V_{GE} = 15V$ $V_{Bus} = 400V$	$T_j = 125^\circ C$	0.5		mJ
E_{off}	Turn-off Switching Energy	$I_C = 50A$ $R_G = 2.7\Omega$	$T_j = 125^\circ C$	1		
I_{sc}	Short Circuit data	$V_{GE} \leq 15V ; V_{Bus} = 360V$ $t_p \leq 10\mu s ; T_j = 125^\circ C$		225		A
R_{thJC}	Junction to Case Thermal Resistance				0.5	$^\circ C/W$

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			25	μA
I _F	DC Forward Current	T _c = 80°C		25		A
V _F	Diode Forward Voltage	I _F = 25A		1.8	2.2	V
		I _F = 50A		2.2		
		I _F = 25A T _j = 125°C		1.5		
t _{rr}	Reverse Recovery Time	I _F = 25A V _R = 400V di/dt = 200A/μs	T _j = 25°C	30		ns
			T _j = 125°C	175		
Q _{rr}	Reverse Recovery Charge		T _j = 25°C	55		nC
			T _j = 125°C	485		
R _{thJC}	Junction to Case Thermal Resistance				1.4	°C/W

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

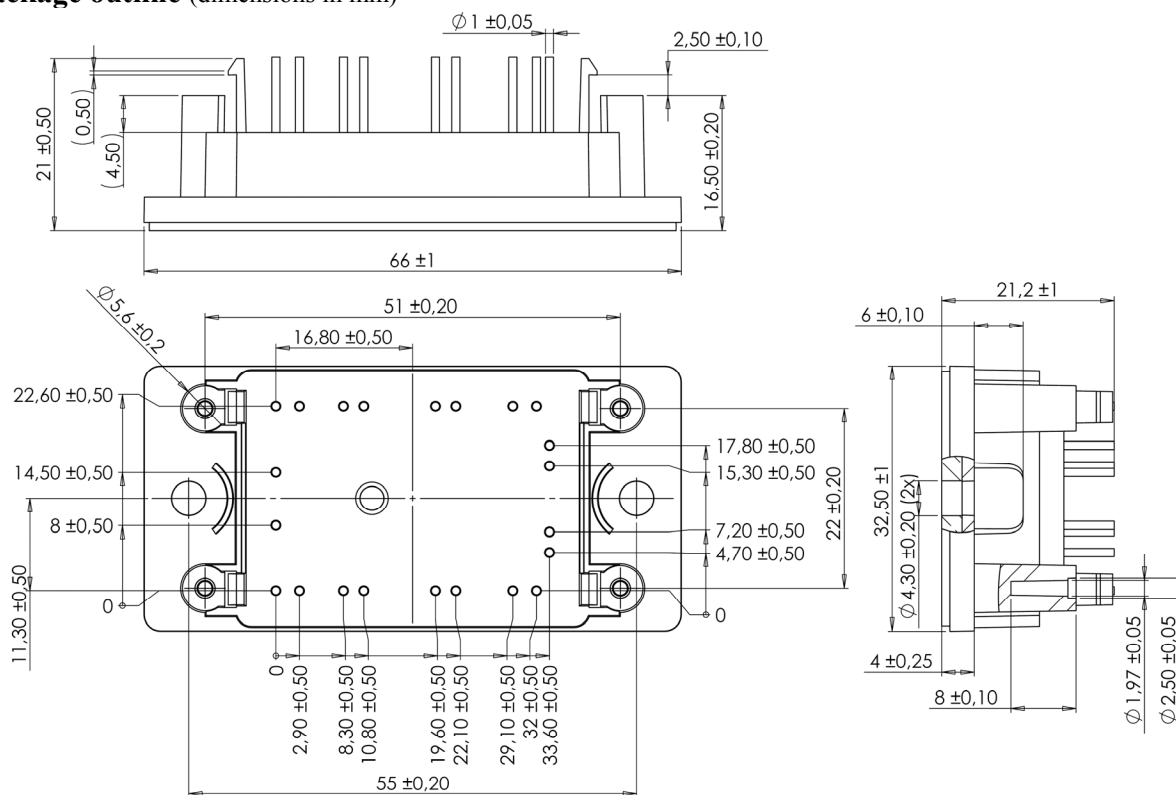
$$R_T = \frac{R_{25}}{\exp\left[B_{25/100}\left(\frac{1}{T_{25}} - \frac{1}{T}\right)\right]}$$

T: Thermistor temperature
R_T: Thermistor value at T

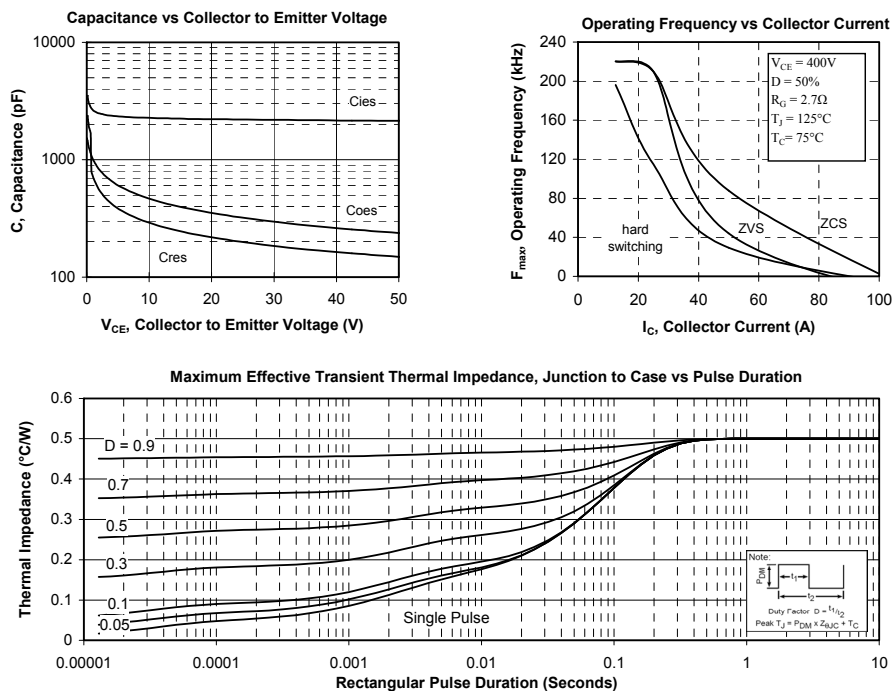
Thermal and package characteristics

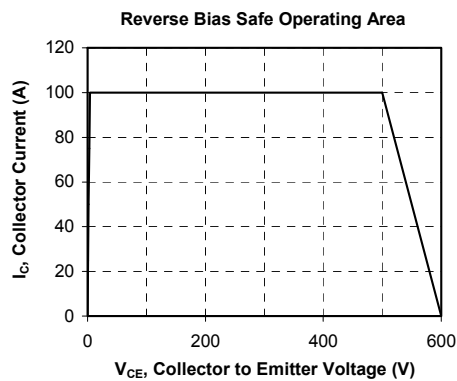
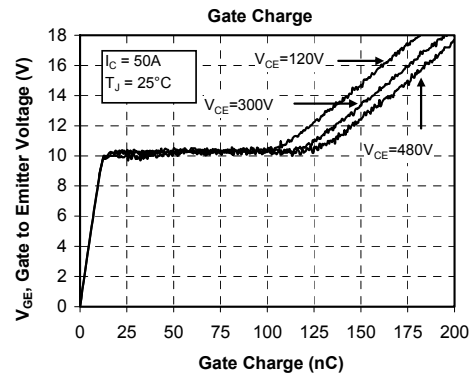
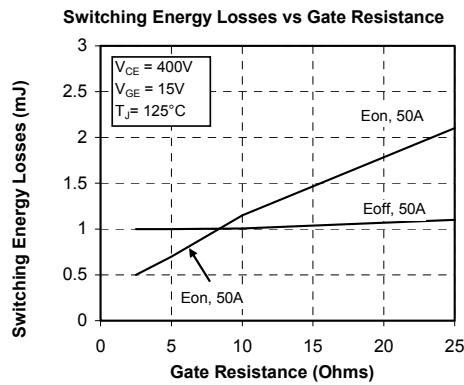
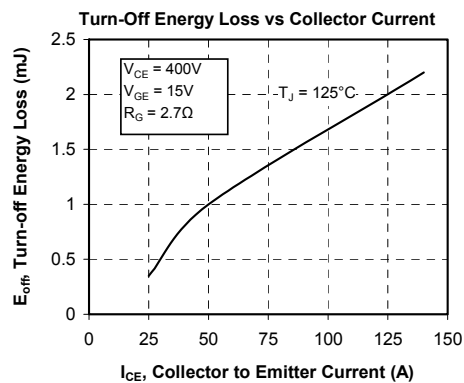
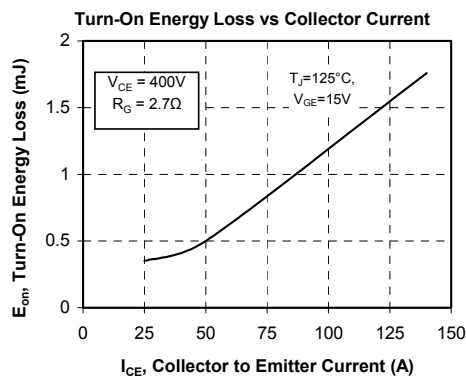
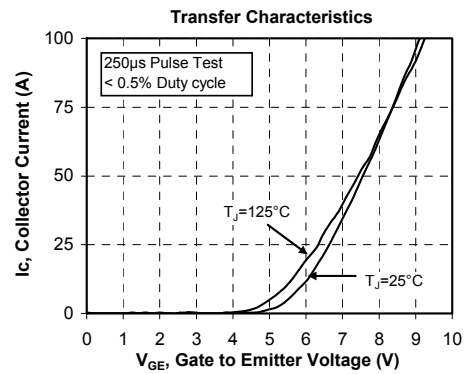
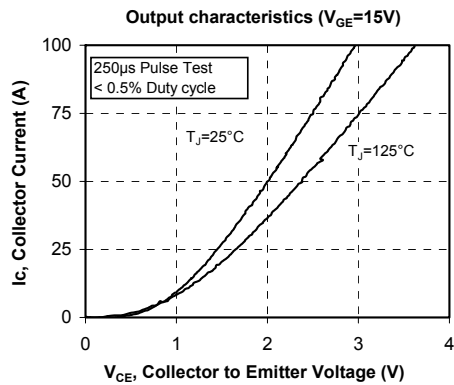
Symbol	Characteristic			Min	Typ	Max	Unit
V _{ISOL}	RMS Isolation Voltage, any terminal to case t =1 min, 50/60Hz			4000			V
T _J	Operating junction temperature range			-40		150	°C
T _{STG}	Storage Temperature Range			-40		125	
T _C	Operating Case Temperature			-40		100	
Torque	Mounting torque	To heatsink	M4	2		3	N.m
Wt	Package Weight					75	g

Package outline (dimensions in mm)

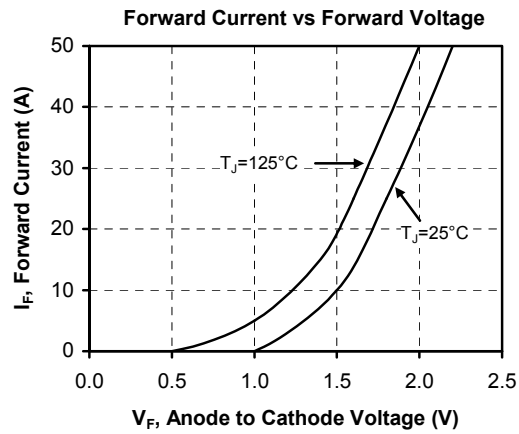
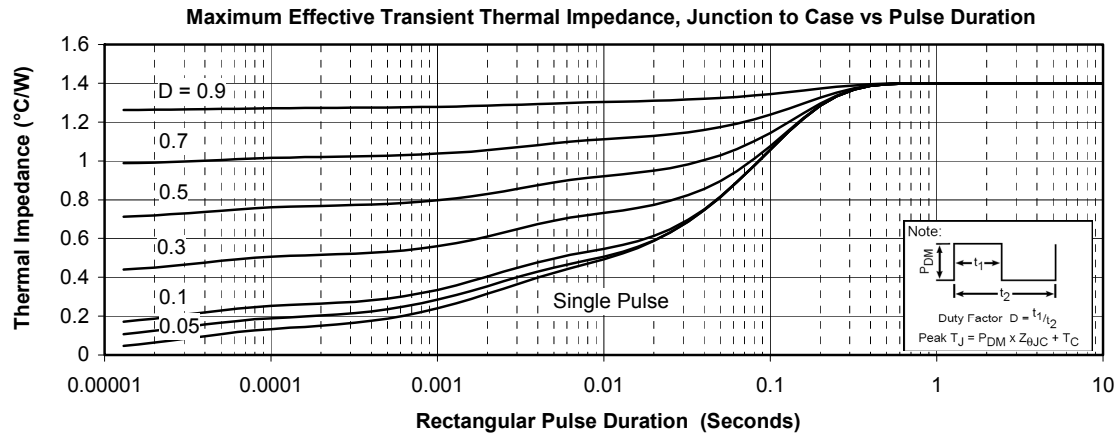


Typical IGBT Performance Curve (per IGBT)





Typical diode Performance Curve (per diode)



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