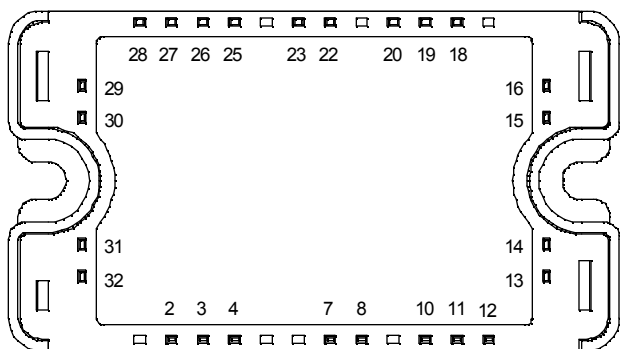
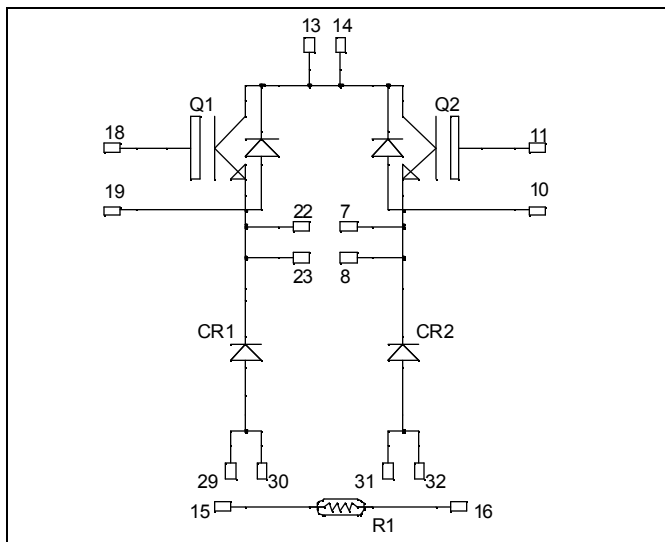


Dual Buck chopper NPT IGBT Power Module

$$V_{CES} = 1200V$$

$$I_C = 25A @ T_c = 80^{\circ}C$$



All multiple inputs and outputs must be shorted together
 Example: 13/14 ; 29/30 ; 22/23 ...

Application

- AC and DC motor control
- Switched Mode Power Supplies

Features

- Non Punch Through (NPT) Fast IGBT®
 - Low voltage drop
 - Low tail current
 - Switching frequency up to 50 kHz
 - Soft recovery parallel diodes
 - Low diode VF
 - Low leakage current
 - Avalanche energy rated
 - RBSOA and SCSOA rated
 - Symmetrical design
- Kelvin emitter for easy drive
- Very low stray inductance
- High level of integration
- Internal thermistor for temperature monitoring

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
- Easy paralleling due to positive TC of VCEsat
- Each leg can be easily paralleled to achieve a single buck of twice the current capability.
- RoHS compliant

Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V_{CES}	Collector - Emitter Breakdown Voltage	1200	V
I_C	Continuous Collector Current	$T_c = 25^{\circ}C$	A
		$T_c = 80^{\circ}C$	
I_{CM}	Pulsed Collector Current	$T_c = 25^{\circ}C$	100
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Maximum Power Dissipation	$T_c = 25^{\circ}C$	208
RBSOA	Reverse Bias Safe Operating Area	$T_j = 125^{\circ}C$	50A@1150V

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

<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	$V_{GE} = 0\text{V}$ $V_{CE} = 1200\text{V}$	$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$			250 500	μA
$V_{CE(sat)}$	Collector Emitter saturation Voltage	$V_{GE} = 15\text{V}$ $I_C = 25\text{A}$	$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$	2.5	3.2 4.0	3.7	V
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 1\text{mA}$		4		6	V
I_{GES}	Gate – Emitter Leakage Current	$V_{GE} = 20\text{V}, V_{CE} = 0\text{V}$				400	nA

Dynamic Characteristics

<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	$V_{GE} = 0\text{V}$			1650		pF
C_{oes}	Output Capacitance	$V_{CE} = 25\text{V}$			250		
C_{res}	Reverse Transfer Capacitance	$f = 1\text{MHz}$			110		
Q_g	Total gate Charge	$V_{GE} = 15\text{V}$			160		nC
Q_{ge}	Gate – Emitter Charge	$V_{Bus} = 300\text{V}$			10		
Q_{gc}	Gate – Collector Charge	$I_C = 25\text{A}$			70		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{GE} = 15\text{V}$ $V_{Bus} = 400\text{V}$ $I_C = 25\text{A}$ $R_G = 22\Omega$			60		ns
T_r	Rise Time				50		
$T_{d(off)}$	Turn-off Delay Time				305		
T_f	Fall Time				30		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (125°C) $V_{GE} = 15\text{V}$ $V_{Bus} = 400\text{V}$ $I_C = 25\text{A}$ $R_G = 22\Omega$			60		ns
T_r	Rise Time				50		
$T_{d(off)}$	Turn-off Delay Time				346		
T_f	Fall Time				40		
E_{on}	Turn-on Switching Energy	$V_{GE} = 15\text{V}$ $V_{Bus} = 400\text{V}$	$T_j = 125^\circ\text{C}$		3.5		mJ
E_{off}	Turn-off Switching Energy	$I_C = 25\text{A}$ $R_G = 22\Omega$	$T_j = 125^\circ\text{C}$		1.5		

Chopper diode ratings and characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit	
V _{RRM}	Maximum Peak Repetitive Reverse Voltage			1200			V	
I _{RM}	Maximum Reverse Leakage Current	V _R =1200V	T _j = 25°C			250	μA	
			T _j = 125°C			500		
I _F	Forward Current		T _c = 70°C		60		A	
V _F	Diode Forward Voltage	I _F = 60A			2	2.5	V	
		I _F = 120A			2.3			
		I _F = 60A	T _j = 125°C		1.8			
t _{rr}	Reverse Recovery Time	I _F = 60A V _R = 800V di/dt =200A/μs	T _j = 25°C		400		ns	
			T _j = 125°C		470			
Q _{rr}	Reverse Recovery Charge			T _j = 25°C		1.2		μC
				T _j = 125°C		4		

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		kΩ
B _{25/85}	T ₂₅ = 298.15 K		3952		K

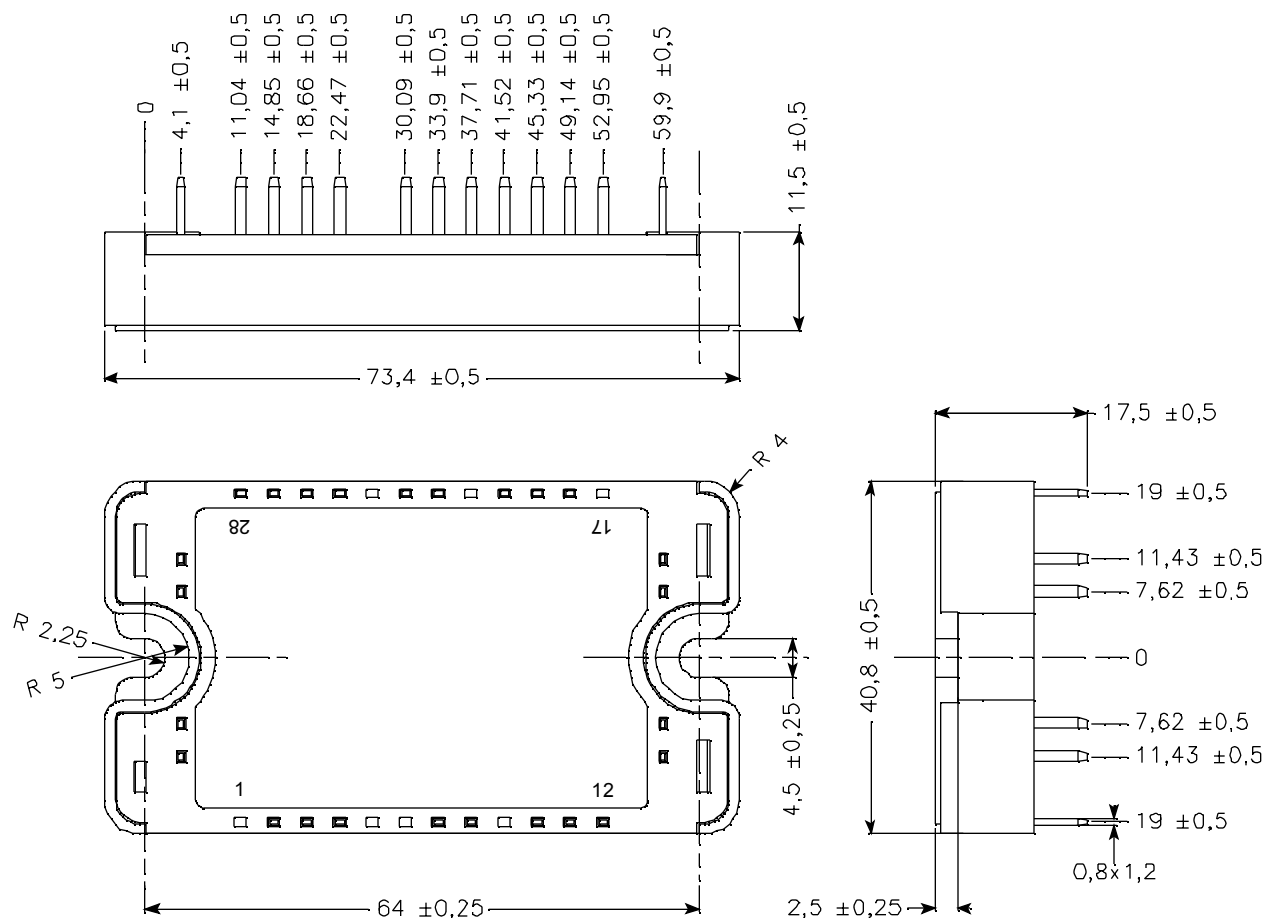
$$R_T = \frac{R_{25}}{\exp \left[B_{25/85} \left(\frac{1}{T_{25}} - \frac{1}{T} \right) \right]}$$

T: Thermistor temperature
 R_T: Thermistor value at T

Thermal and package characteristics

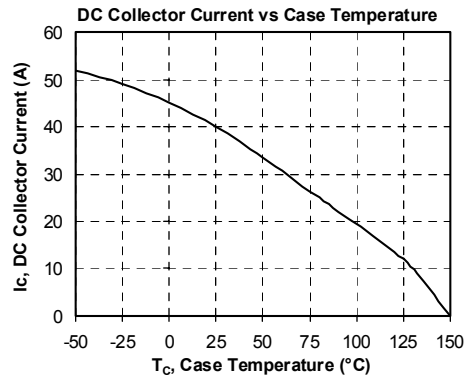
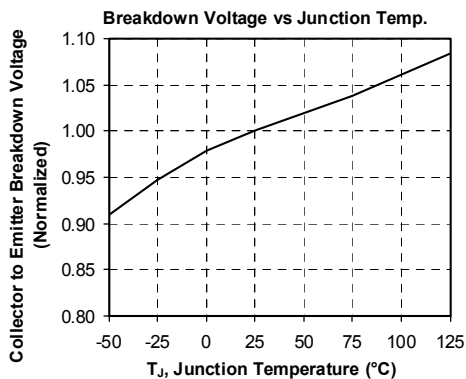
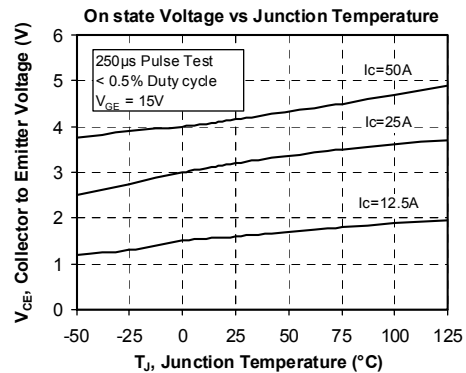
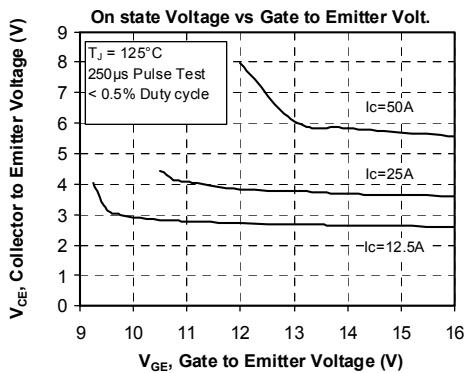
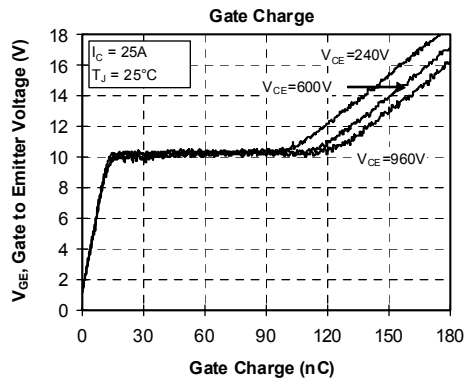
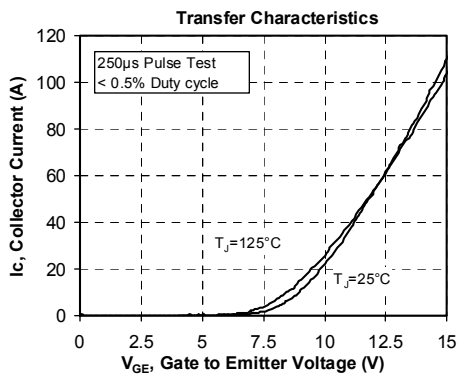
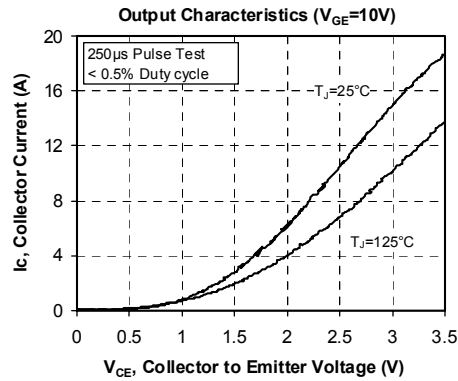
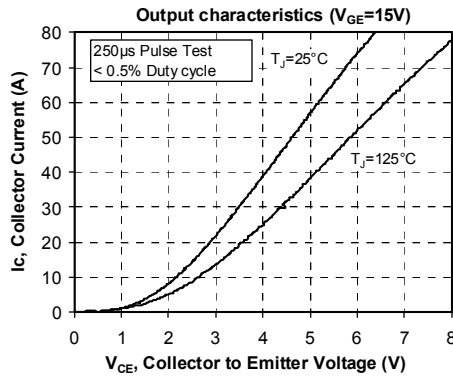
Symbol	Characteristic	Min	Typ	Max	Unit
R _{thJC}	Junction to Case Thermal Resistance	IGBT		0.6	°C/W
		Diode		0.9	
V _{ISOL}	RMS Isolation Voltage, any terminal to case t = 1 min, I _{isol} < 1mA, 50/60Hz	2500			V
T _J	Operating junction temperature range	-40		150	°C
T _{STG}	Storage Temperature Range	-40		125	
T _C	Operating Case Temperature	-40		100	
Torque	Mounting torque	To heatsink	M4	2.5	N.m
Wt	Package Weight			110	g

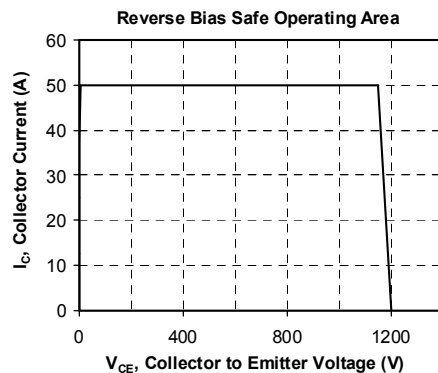
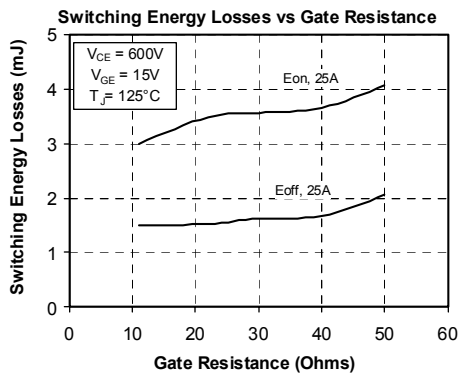
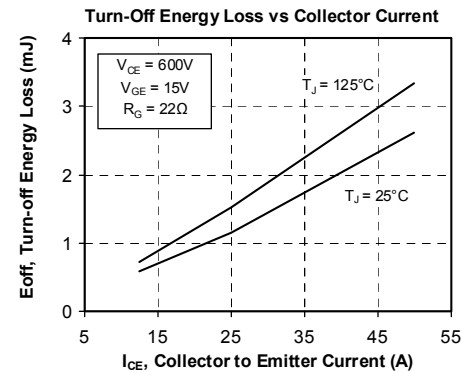
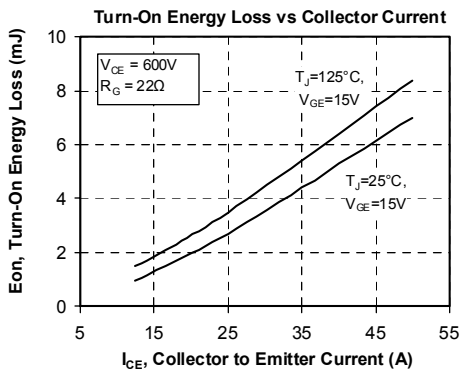
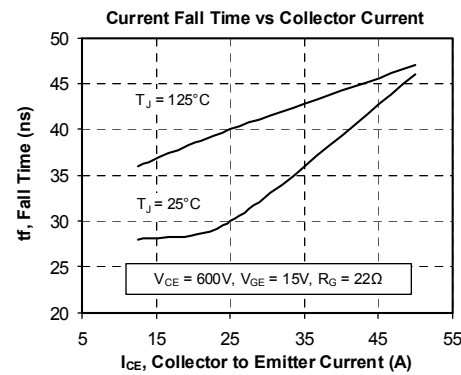
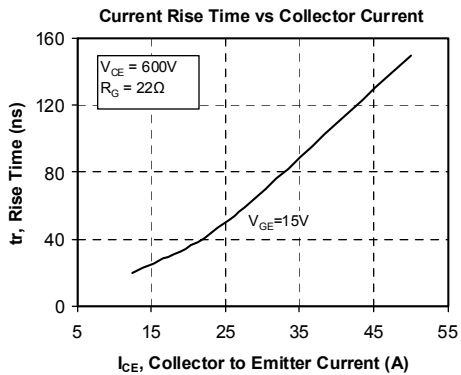
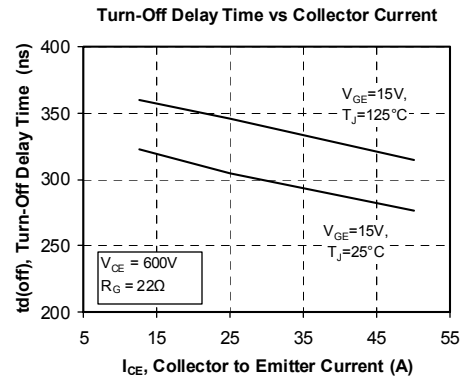
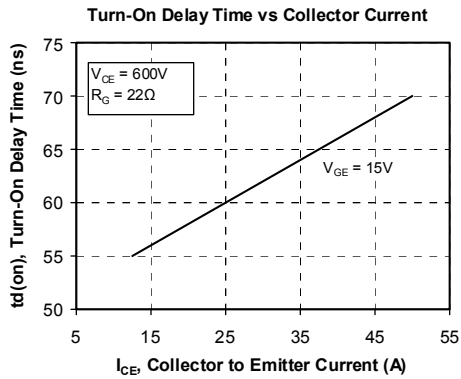
SP3 Package outline (dimensions in mm)

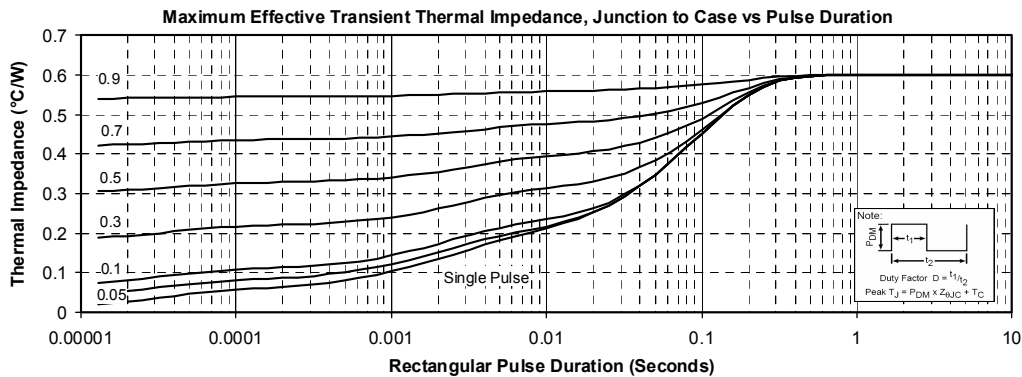
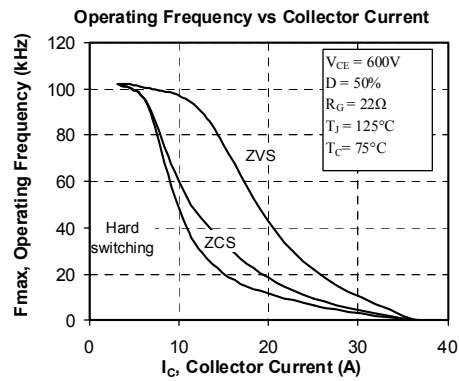
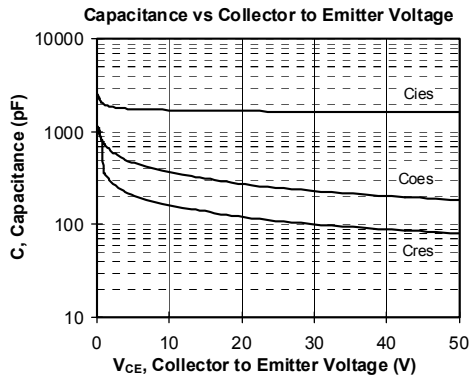


See application note 1901 - Mounting Instructions for SP3 Power Modules on www.microsemi.com

Typical Performance Curve







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