

Dual Buck Chopper NPT IGBT Power Module

$V_{CES} = 1200V$
 $I_C = 75A @ T_c = 80^\circ C$

Application

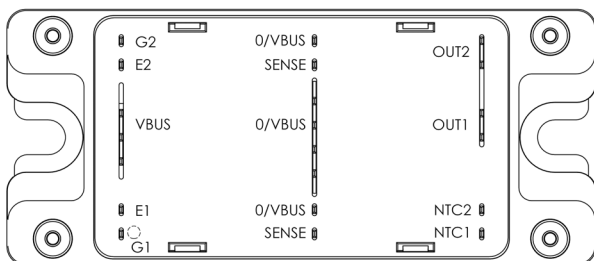
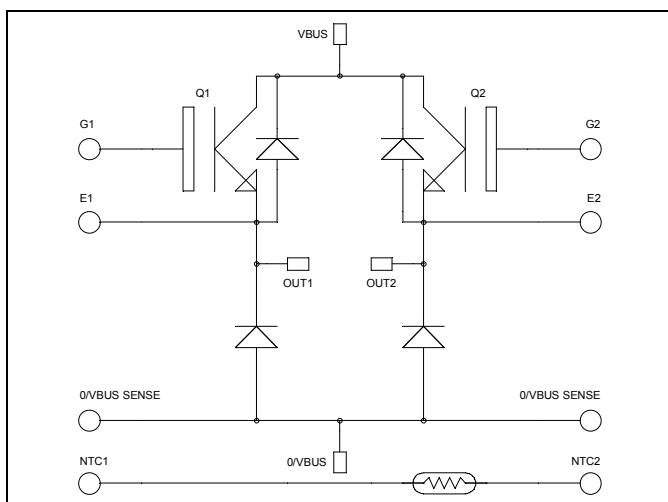
- AC and DC motor control
- Switched Mode Power Supplies

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
 - RBSOA and SCSOA rated
- Kelvin emitter for easy drive
- Very low stray inductance
 - Symmetrical design
 - Lead frames for power connections
- Internal thermistor for temperature monitoring
- High level of integration

Benefits

- Outstanding performance at high frequency operation
- Stable temperature behavior
- Very rugged
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Solderable terminals both for power and signal for easy PCB mounting
- Easy paralleling due to positive TC of VCEsat
- Low profile
- RoHS compliant



Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V_{CES}	Collector - Emitter Breakdown Voltage	1200	V
I_C	Continuous Collector Current	$T_c = 25^\circ C$ 100 $T_c = 80^\circ C$ 75	A
I_{CM}	Pulsed Collector Current	$T_c = 25^\circ C$ 150	
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$ 500	W
RBSOA	Reverse Bias Safe Operating Area	$T_j = 150^\circ C$ 150A @ 1200V	

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	$V_{GE} = 0V$ $V_{CE} = 1200V$	$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$			250 500	μA
$V_{CE(sat)}$	Collector Emitter saturation Voltage	$V_{GE} = 15V$ $I_C = 75A$	$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$		3.2 3.9	3.7	V
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 2.5\text{ mA}$		4.5		6.5	V
I_{GES}	Gate – Emitter Leakage Current	$V_{GE} = \pm 20V, V_{CE} = 0V$				± 500	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0V$			5.1		nF
C_{oes}	Output Capacitance	$V_{CE} = 25V$			0.7		
C_{res}	Reverse Transfer Capacitance	$f = 1\text{MHz}$			0.4		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{GE} = 15V$ $V_{Bus} = 600V$ $I_C = 75A$ $R_G = 7.5\Omega$			120		ns
T_r	Rise Time				50		
$T_{d(off)}$	Turn-off Delay Time				310		
T_f	Fall Time				20		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (125°C) $V_{GE} = 15V$ $V_{Bus} = 600V$ $I_C = 75A$ $R_G = 7.5\Omega$			130		ns
T_r	Rise Time				60		
$T_{d(off)}$	Turn-off Delay Time				360		
T_f	Fall Time				30		
E_{on}	Turn-on Switching Energy	$V_{GE} = 15V$ $V_{Bus} = 600V$	$T_j = 125^\circ\text{C}$		9		mJ
E_{off}	Turn-off Switching Energy	$I_C = 75A$ $R_G = 7.5\Omega$	$T_j = 125^\circ\text{C}$		4		

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	$V_R = 1200V$	$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$			250 500	μA
I_F	DC Forward Current		$T_c = 70^\circ\text{C}$		100		A
V_F	Diode Forward Voltage	$I_F = 100A$ $I_F = 200A$ $I_F = 100A$	$T_j = 125^\circ\text{C}$		2.0 2.3 1.8	2.5	V
t_{rr}	Reverse Recovery Time	$I_F = 100A$ $V_R = 800V$ $di/dt = 200A/\mu s$	$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$		420 580		ns
Q_{rr}	Reverse Recovery Charge		$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$		1.2 5.3		μC



<i>Symbol</i>	<i>Characteristic</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
R ₂₅	Resistance @ 25°C		50		kΩ
B _{25/85}	T ₂₅ = 298.15 K		3952		K

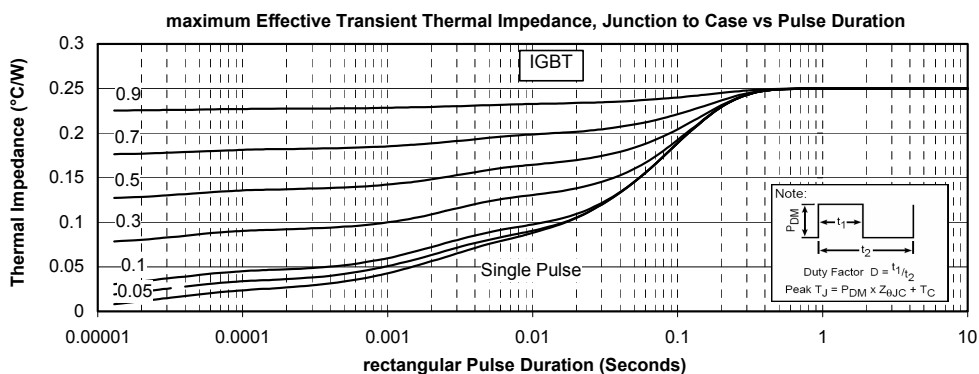
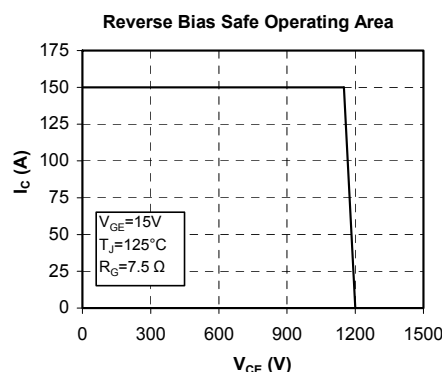
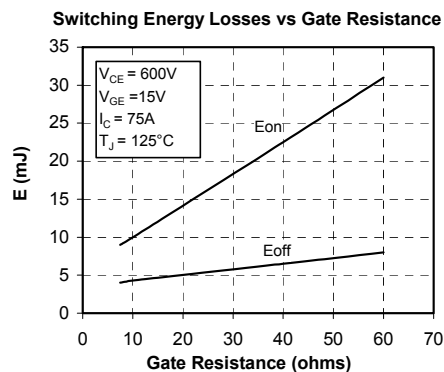
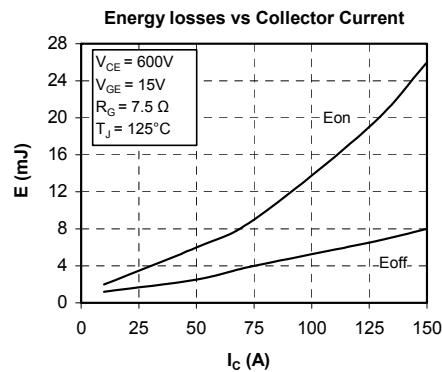
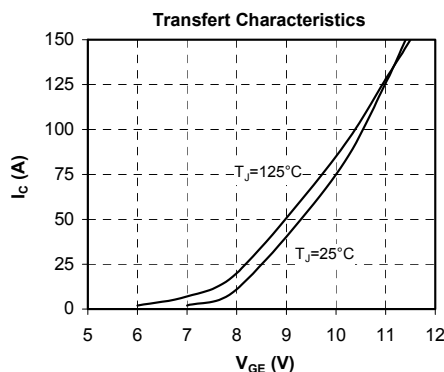
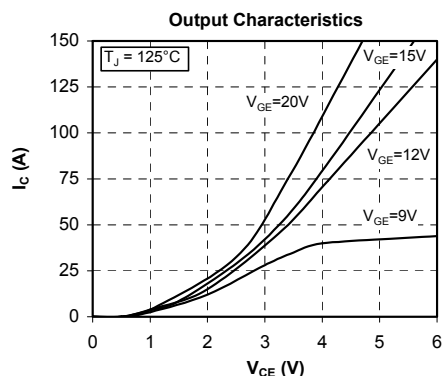
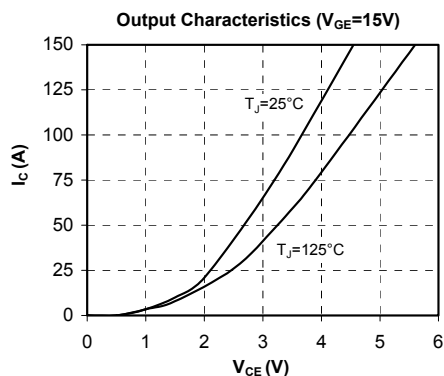
T: Thermistor temperature
R_T: Thermistor value at T

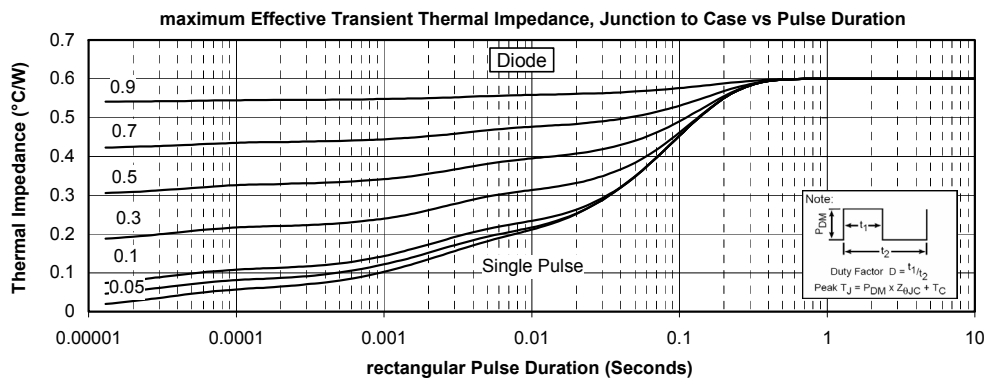
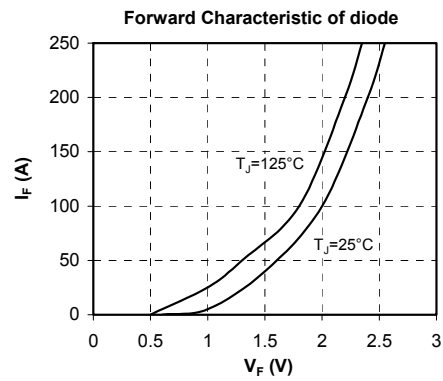
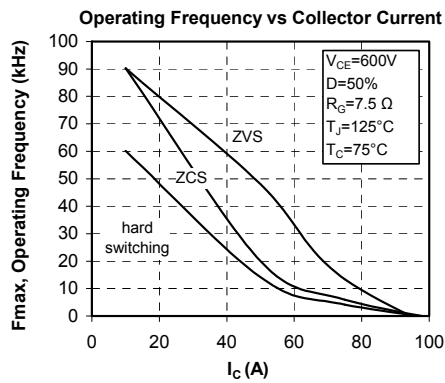
<i>Symbol</i>	<i>Characteristic</i>			<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
R _{thJC}	Junction to Case Thermal Resistance		IGBT			0.25	°C/W
			Diode			0.6	
V _{ISOL}	RMS Isolation Voltage, any terminal to case t =1 min, 50/60Hz			4000			V
T _J	Operating junction temperature range			-40		150	°C
T _{STG}	Storage Temperature Range			-40		125	
T _C	Operating Case Temperature			-40		100	
Torque	Mounting torque	To heatsink	M5	2.5		4.7	N.m
Wt	Package Weight					160	g

[illegible]

See application note APT0501 - Mounting Instructions for SP4 Power Modules on www.microsemi.com

Typical Performance Curve





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