

Full - Bridge Trench IGBT® Power Module

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$V_{CES} = 1700V$
 $I_C = 30A @ T_c = 80^\circ C$

Application

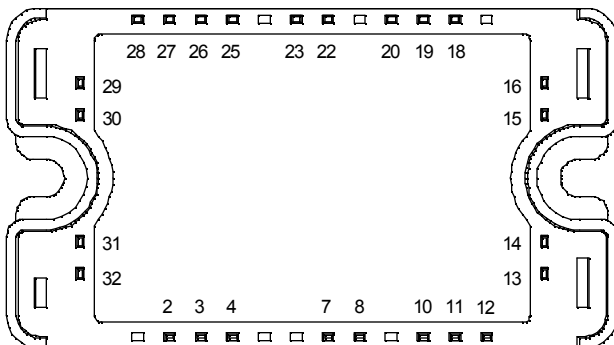
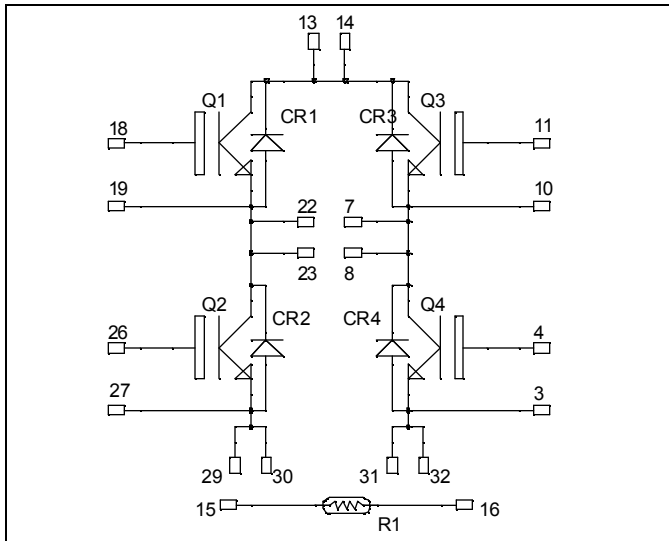
- Welding converters
- Switched Mode Power Supplies
- Uninterruptible Power Supplies
- Motor control

Features

- Trench + Field Stop IGBT® Technology
 - Low voltage drop
 - Low tail current
 - Switching frequency up to 20 kHz
 - Soft recovery parallel diodes
 - Low diode VF
 - Low leakage current
 - Avalanche energy rated
 - RBSOA and SCSOA rated
- Kelvin emitter for easy drive
- 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 phase leg of twice the current capability



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

Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V_{CES}	Collector - Emitter Breakdown Voltage	1700	V
I_C	Continuous Collector Current	$T_C = 25^\circ C$	A
		$T_C = 80^\circ C$	
I_{CM}	Pulsed Collector Current	$T_C = 25^\circ C$	70
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Maximum Power Dissipation	$T_C = 25^\circ C$	210
RBSOA	Reverse Bias Safe Operation Area	$T_j = 125^\circ C$	120A@1600V

CAUTION: These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed.

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

Electrical Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
BV_{CES}	Collector - Emitter Breakdown Voltage	$V_{GE} = 0V, I_C = 1.5mA$	1700			V
I_{CES}	Zero Gate Voltage Collector Current	$V_{GE} = 0V, V_{CE} = 1700V$			3	mA
$V_{CE(on)}$	Collector Emitter on Voltage	$V_{GE} = 15V$ $I_C = 30A$		2.0	2.4	V
		$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$		2.4		
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 1.5mA$	5.2	5.8	6.4	V
I_{GES}	Gate - Emitter Leakage Current	$V_{GE} = 20V, V_{CE} = 0V$			600	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0V, V_{CE} = 25V$		2500		pF
C_{res}	Reverse Transfer Capacitance	$f = 1MHz$		90		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C)		100		ns
T_r	Rise Time	$V_{GE} = \pm 15V$ $V_{Bus} = 900V$ $I_C = 30A$ $R_G = 18\Omega$		70		
$T_{d(off)}$	Turn-off Delay Time			650		
T_f	Fall Time			80		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (125°C)		100		ns
T_r	Rise Time	$V_{GE} = \pm 15V$ $V_{Bus} = 900V$ $I_C = 30A$ $R_G = 18\Omega$		70		
$T_{d(off)}$	Turn-off Delay Time			750		
T_f	Fall Time			100		
E_{on}	Turn-on Switching Energy ❶			18		mJ
E_{off}	Turn-off Switching Energy ❷			19		

Reverse diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_{RRM}	Maximum Peak Repetitive Reverse Voltage		1700			V
I_{RM}	Maximum Reverse Leakage Current	$V_R = 1700V$			250	μA
		$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$			500	
V_F	Diode Forward Voltage	$I_F = 50A$ $V_{GE} = 0V$		1.8	2.2	V
		$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$		1.9		
E_r	Reverse Recovery Energy	$I_F = 50A$ $V_R = 900V$ $di/dt = 990A/\mu s$		8		mJ
		$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$		15		
Q_{rr}	Reverse Recovery Charge	$I_F = 50A$ $V_R = 900V$ $di/dt = 990A/\mu s$		18		μC
		$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$		29		

Temperature sensor NTC

Symbol	Characteristic	Min	Typ	Max	Unit
R_{25}	Resistance @ 25°C		68		k Ω
$B_{25/85}$	$T_{25} = 298.16\text{ K}$		4080		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

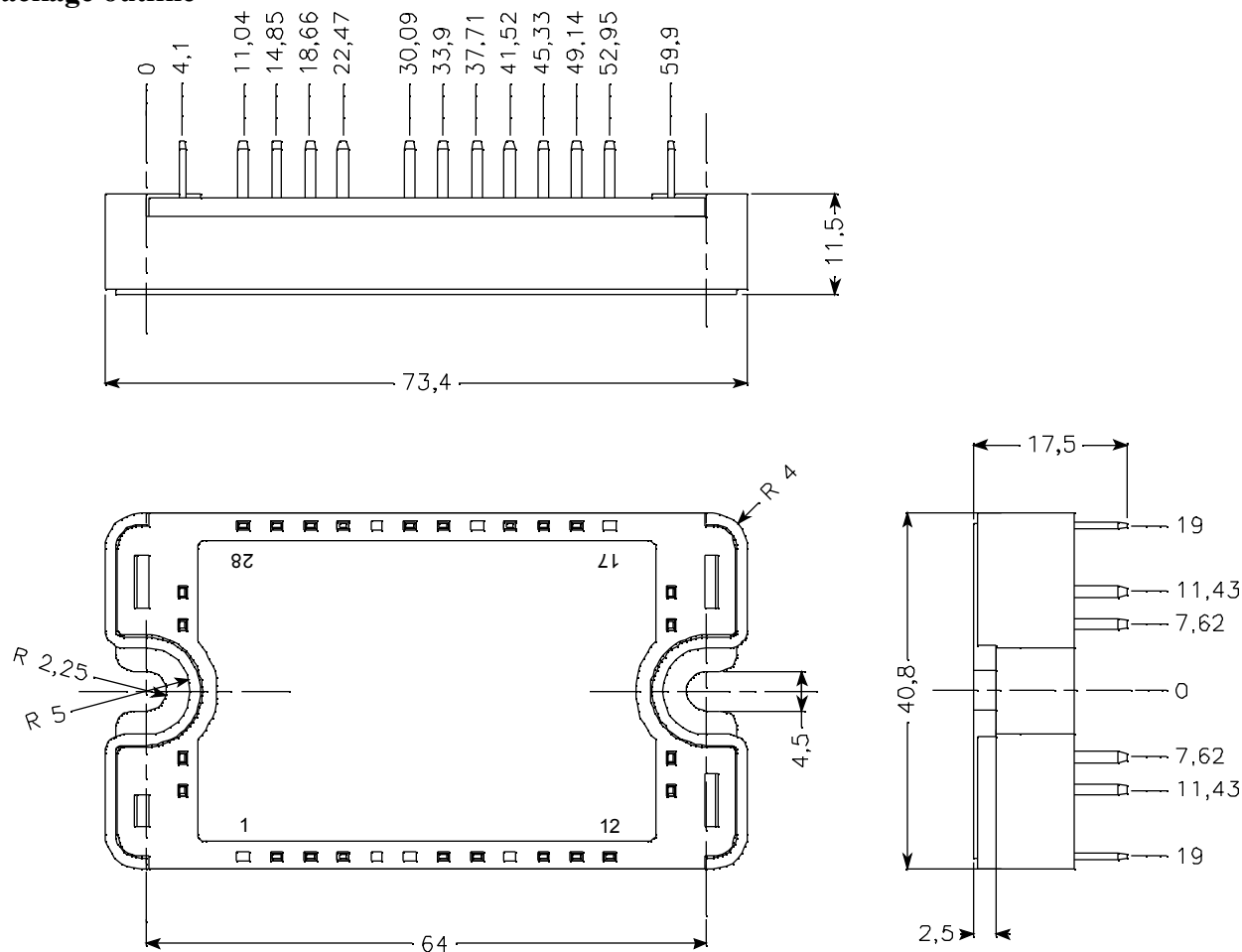
Thermal and package characteristics

Symbol Characteristic

Min Typ Max Unit

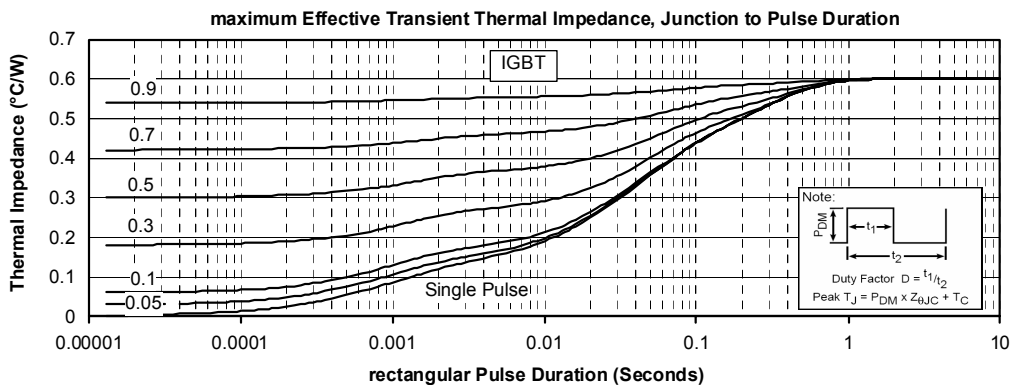
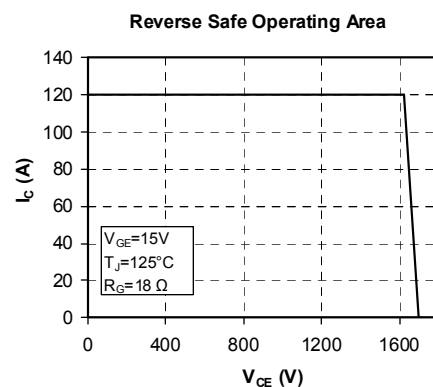
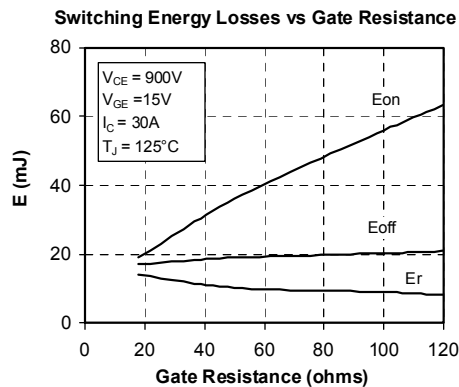
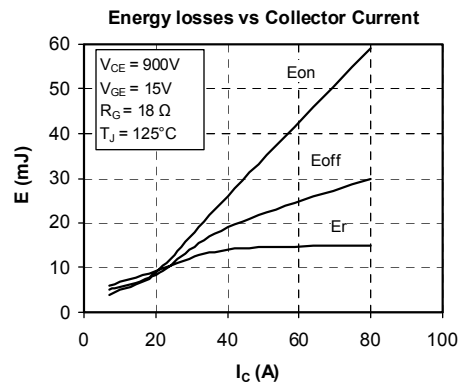
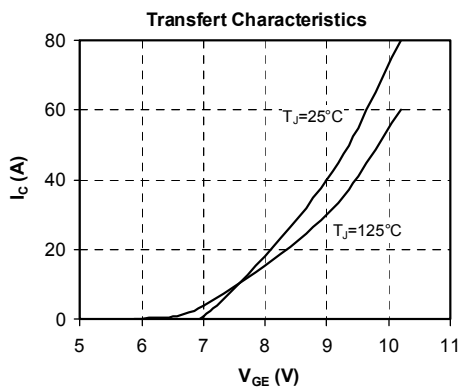
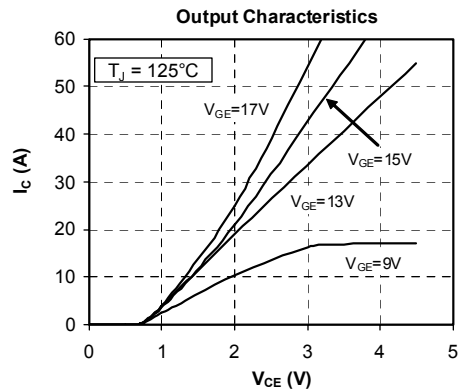
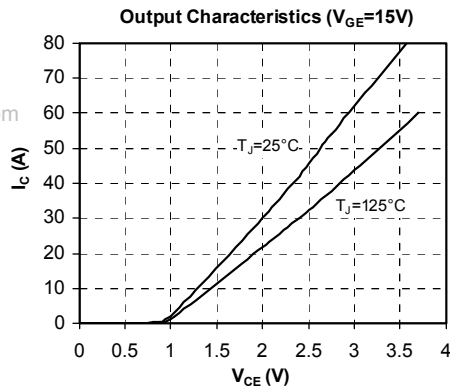
R _{thJC}	Junction to Case	IGBT			0.6	°C/W
		Diode			0.9	
V _{ISOL}	RMS Isolation Voltage, any terminal to case t = 1 min, I _{isol} < 1mA, 50/60Hz		3500			V
T _J	Operating junction temperature range		-40		150	°C
T _{STG}	Storage Temperature Range		-40		125	
T _C	Operating Case Temperature		-40		100	
Torque	Mounting torque	To heatsink	M4		4.7	N.m
Wt	Package Weight				110	g

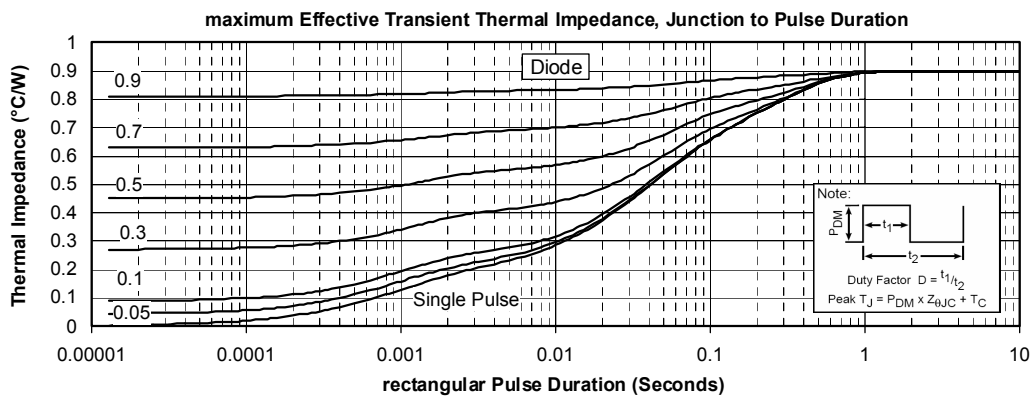
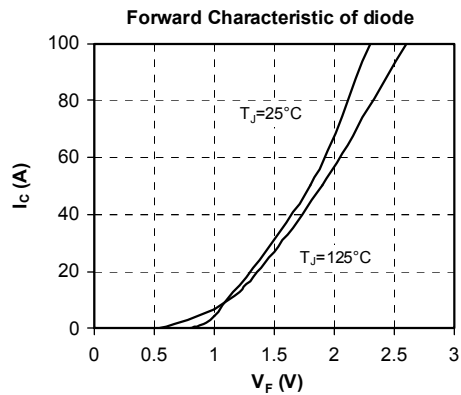
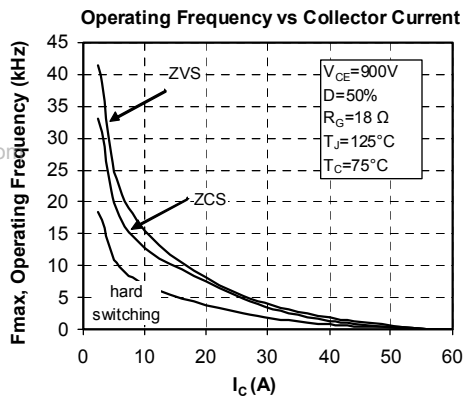
Package outline



Typical Performance Curve

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