



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

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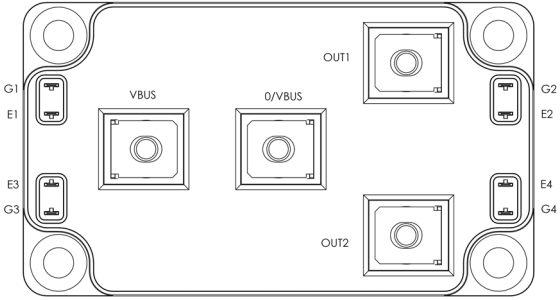
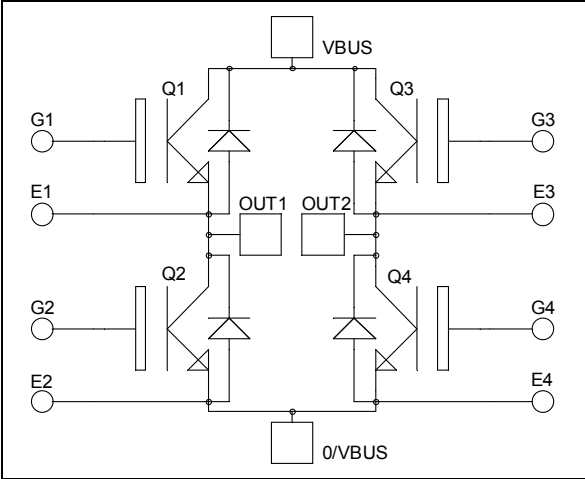
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**Full bridge
High speed Trench + Field Stop IGBT4
Power Module**

**$V_{CES} = 650V$
 $I_C = 200A @ T_c = 60^\circ C$**


Application

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

Features

- **High speed Trench + Field Stop IGBT 4 Technology**
 - Low voltage drop
 - Low leakage current
 - Low switching losses
- Very low stray inductance
- Kelvin emitter for easy drive


Benefits

- Stable temperature behavior
- Very rugged
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Easy paralleling due to positive TC of VCEsat
- Low profile
- RoHS Compliant

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

Absolute maximum ratings (per IGBT)

<i>Symbol</i>	<i>Parameter</i>	<i>Max ratings</i>	<i>Unit</i>
V_{CES}	Collector - Emitter Voltage	650	V
I_C	Continuous Collector Current	$T_C = 25^\circ C$	A
		$T_C = 60^\circ C$	
I_{CM}	Pulsed Collector Current	$T_C = 25^\circ C$	540
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Power Dissipation	680	W

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

Electrical Characteristics (per IGBT)

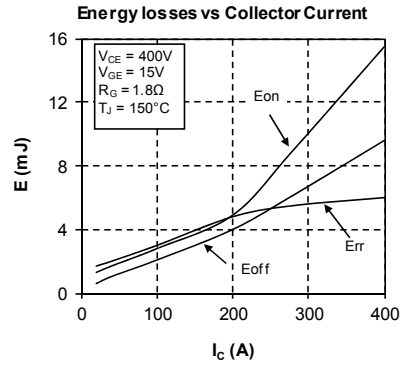
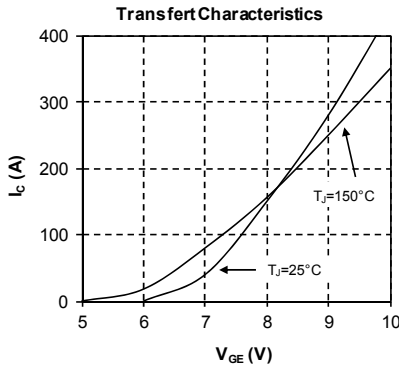
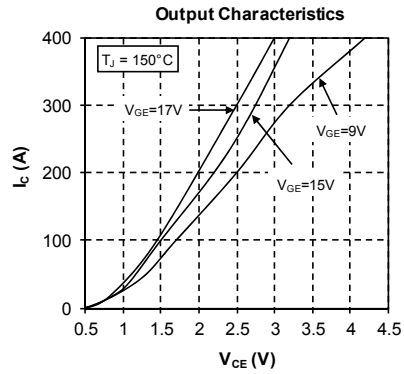
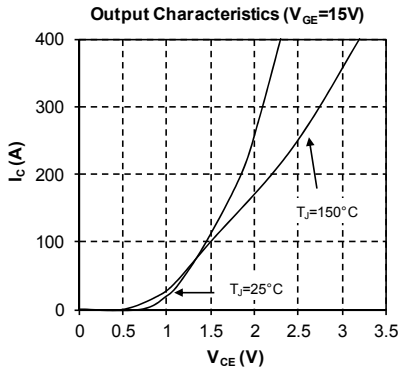
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
I_{CES}	Zero Gate Voltage Collector Current	$V_{GE} = 0V, V_{CE} = 650V$			75	μA
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	$V_{GE} = 15V$ $I_C = 200A$	$T_j = 25^\circ C$ 1.4	1.85	2.3	V
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 3.2 mA$	4.2	5.1	5.6	V
I_{GES}	Gate – Emitter Leakage Current	$V_{GE} = 20V, V_{CE} = 0V$			300	nA

Dynamic Characteristics (per IGBT)

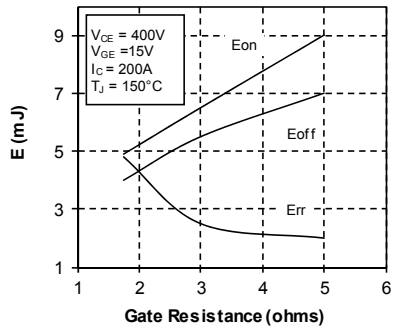
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0V$ $V_{CE} = 25V$ $f = 1MHz$		12.2		nF
C_{oes}	Output Capacitance			0.43		
C_{res}	Reverse Transfer Capacitance			0.36		
Q_G	Gate charge	$V_{GE} = 15V, I_C = 200A$ $V_{CE} = 480V$		1260		nC
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{GE} = \pm 15V$ $V_{Bus} = 400V$ $I_C = 200A$ $R_G = 1.8\Omega$		19		ns
T_r	Rise Time			33		
$T_{d(off)}$	Turn-off Delay Time			197		
T_f	Fall Time			21		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (150°C) $V_{GE} = \pm 15V$ $V_{Bus} = 400V$ $I_C = 200A$ $R_G = 1.8\Omega$		19		ns
T_r	Rise Time			29		
$T_{d(off)}$	Turn-off Delay Time			227		
T_f	Fall Time			22		
E_{on}	Turn on Energy	$V_{GE} = \pm 15V$ $V_{Bus} = 400V$ $I_C = 200A$	$T_j = 150^\circ C$	4.8		mJ
E_{off}	Turn off Energy	$R_G = 1.8\Omega$	$T_j = 150^\circ C$	4		
R_G	Integrated gate resistor			1		Ω
I_{sc}	Short Circuit data	$V_{GE} \leq 15V; V_{Bus} = 400V$ $t_p \leq 5\mu s; T_j = 150^\circ C$		1400		A
R_{thJC}	Junction to Case Thermal Resistance				0.22	$^\circ C/W$

Diode ratings and characteristics (per diode)

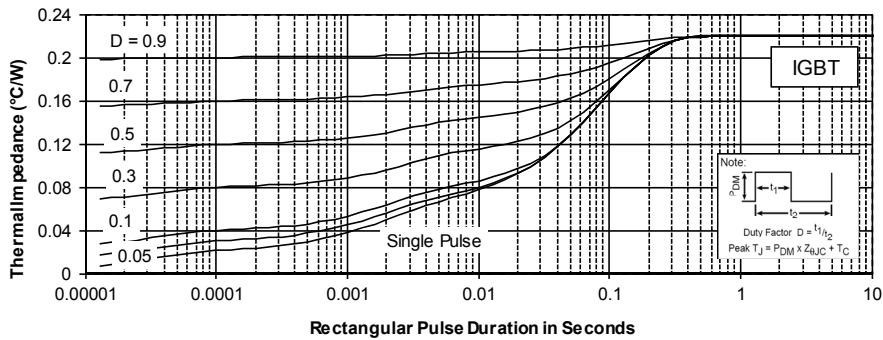
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_{RRM}	Peak Repetitive Reverse Voltage				650	V
I_{RM}	Reverse Leakage Current	$V_R = 650V$			50	μA
I_F	DC Forward Current		$T_c = 25^\circ C$	200		A
V_F	Diode Forward Voltage	$I_F = 200A$ $V_{GE} = 0V$	$T_j = 25^\circ C$ 1.6	2		V
t_{rr}	Reverse Recovery Time	$I_F = 200A$ $V_R = 300V$ $di/dt = 2800A/\mu s$	$T_j = 150^\circ C$	1.5		ns
			$T_j = 25^\circ C$	125		
Q_{rr}	Reverse Recovery Charge		$T_j = 150^\circ C$	220		μC
			$T_j = 25^\circ C$	9.4		
E_{rr}	Reverse Recovery Energy		$T_j = 150^\circ C$	20		mJ
			$T_j = 25^\circ C$	2.2		
R_{thJC}	Junction to Case Thermal Resistance				0.39	$^\circ C/W$

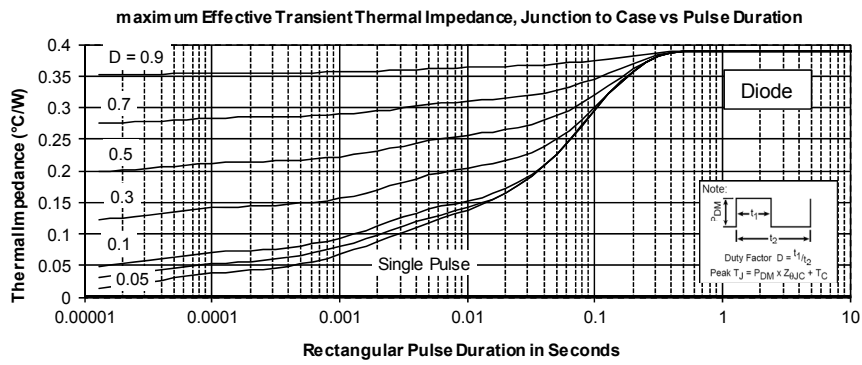
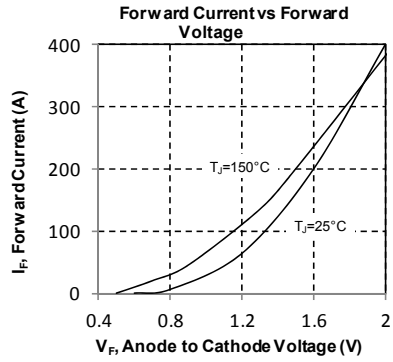
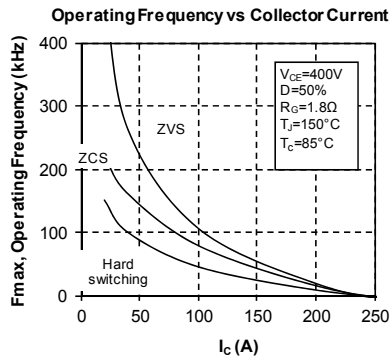
Typical Performance Curve


Switching Energy Losses vs Gate Resistance



maximum Effective Transient Thermal Impedance, Junction to Case vs Pulse Duration





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