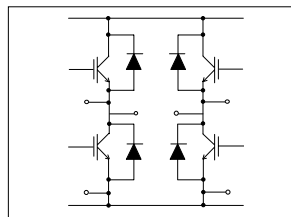


Features

- UltraFast Non Punch Through (NPT) Technology
- Positive $V_{CE(ON)}$ Temperature Coefficient
- 10 μ s Short Circuit Capability
- HEXFRED™ Antiparallel Diodes with UltraSoft Reverse Recovery
- Low Diode V_F
- Square RBSOA
- Aluminum Nitride DBC
- Optional SMT Thermistor Inside
- Very Low Stray Inductance Design for High Speed Operation



$$V_{CES} = 1200V$$

$$V_{CE(on) \text{ typ.}} = 3.05V @$$

$$V_{GE} = 15V, I_C = 20A$$

$$T_C = 25^\circ C$$

Benefits

- Optimized for Welding, UPS and SMPS Applications
- Rugged with UltraFast Performance
- Benchmark Efficiency above 20KHz
- Outstanding ZVS and Hard Switching Operation
- Low EMI, requires Less Snubbing
- Excellent Current Sharing in Parallel Operation
- Direct Mounting to Heatsink
- PCB Solderable Terminals
- Very Low Junction-to-Case Thermal Resistance

Absolute Maximum Ratings

Parameters	Max	Units
V_{CES} Collector-to-Emitter Breakdown Voltage	1200	V
I_C Continuous Collector Current	@ $T_C = 25^\circ C$	A
	@ $T_C = 100^\circ C$	
I_{CM} Pulsed Collector Current	120	
I_{LM} Clamped Inductive Load Current	120	
I_F Diode Continuous Forward Current	@ $T_C = 100^\circ C$	
I_{FM} Diode Maximum Forward Current	120	V
V_{GE} Gate-to-Emitter Voltage	± 20	
V_{ISOL} RMS Isolation Voltage, Any Terminal to Case, $t = 1 \text{ min}$	2500	W
P_D Maximum Power Dissipation	@ $T_C = 25^\circ C$	
	@ $T_C = 100^\circ C$	

Electrical Characteristics @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

Parameters	Min	Typ	Max	Units	Test Conditions
$V_{(BR)CES}$ Collector-to-Emitter Breakdown Voltage	1200			V	$V_{GE} = 0V, I_C = 250\mu A$
$\Delta V_{(BR)CES} / \Delta T_J$ Temperature Coeff. of Breakdown Voltage		+1.2		V/ $^\circ\text{C}$	$V_{GE} = 0V, I_C = 1mA (25-125^\circ\text{C})$
$V_{CE(ON)}$ Collector-to-Emitter Saturation Voltage		3.05		V	$V_{GE} = 15V, I_C = 20A$
		3.37			$V_{GE} = 15V, I_C = 25A$
		4.23			$V_{GE} = 15V, I_C = 40A$
		3.89			$V_{GE} = 15V, I_C = 20A, T_J = 125^\circ\text{C}$
		4.31			$V_{GE} = 15V, I_C = 25A, T_J = 125^\circ\text{C}$
$V_{GE(th)}$ Gate Threshold Voltage	4		6	V	$V_{CE} = V_{GE}, I_C = 250\mu A$
$\Delta V_{GE(th)} / \Delta T_J$ Temperature Coeff. of Threshold Voltage		-1.2		mV/ $^\circ\text{C}$	$V_{CE} = V_{GE}, I_C = 1mA (25-125^\circ\text{C})$
g_{fe} Transconductance		15.7		S	$V_{CE} = 50V, I_C = 20A, PW = 80\mu s$
I_{CES} Zero Gate Voltage Collector Current		420		μA	$V_{GE} = 0V, V_{CE} = 1200V, T_J = 125^\circ\text{C}$
		1482			$V_{GE} = 0V, V_{CE} = 1200V, T_J = 150^\circ\text{C}$
V_{FM} Diode Forward Voltage Drop		1.67		V	$I_C = 20A$
		1.76			$I_C = 25A$
		1.73			$I_C = 20A, T_J = 125^\circ\text{C}$
		1.87			$I_C = 25A, T_J = 125^\circ\text{C}$
I_{GES} Gate-to-Emitter Leakage Current			± 100	nA	$V_{GE} = \pm 20V$

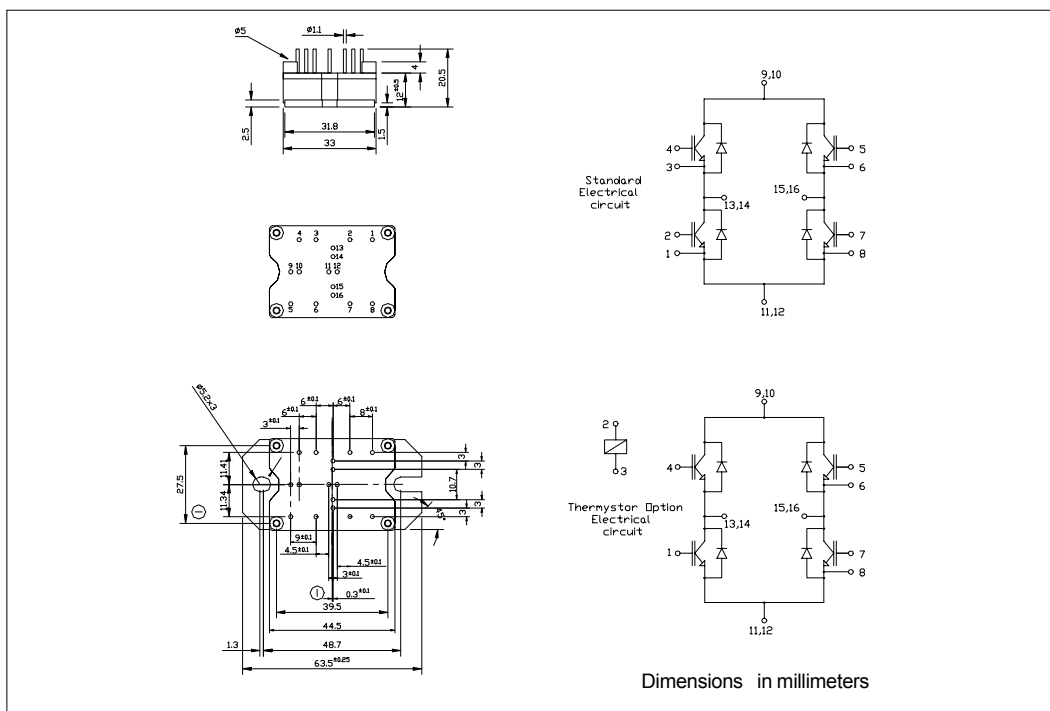
Switching Characteristics @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

Parameters	Min	Typ	Max	Units	Test Conditions
Q_g Total Gate Charge (turn-on)		169		nC	$I_C = 20A$
Q_{ge} Gate-Emitter Charge (turn-on)		24			$V_{CC} = 600V$
Q_{gc} Gate-Collector Charge (turn-on)		82			$V_{GE} = 15V$
E_{on} Turn-On Switching Loss		850		μJ	$V_{CC} = 600V, I_C = 20A$
E_{off} Turn-Off Switching Loss		425			$V_{GE} = 15V, R_g = 5\Omega, L = 200\mu H$
E_{tot} Total Switching Loss		1275			$T_J = 25^\circ\text{C}$, Energy losses include tail and diode reverse recovery
E_{on} Turn-On Switching Loss		1350		μJ	$V_{CC} = 600V, I_C = 20A$
E_{off} Turn-Off Switching Loss		610			$V_{GE} = 15V, R_g = 5\Omega, L = 200\mu H$
E_{tot} Total Switching Loss		1960			$T_J = 125^\circ\text{C}$, Energy losses include tail and diode reverse recovery
C_{ies} Input Capacitance		2200		pF	$V_{GE} = 0V$
C_{oes} Output Capacitance		210			$V_{CC} = 30V$
C_{res} Reverse Transfer Capacitance		85			$f = 1.0\text{ MHz}$
RBSOA Reverse Bias Safe Operating Area		full square			$T_J = 150^\circ\text{C}, I_C = 120A$ $V_{CC} = 1000V, V_p = 1200V$ $R_g = 5\Omega, V_{GE} = +15V \text{ to } 0V$
SCSOA Short Circuit Safe Operating Area	10			μs	$T_J = 150^\circ\text{C}$ $V_{CC} = 900V, V_p = 1200V$ $R_g = 5\Omega, V_{GE} = +15V \text{ to } 0V$
E_{rec} Reverse Recovery Energy of the Diode		1600		μJ	$T_J = 125^\circ\text{C}$
t_{rr} Diode Reverse Recovery Time		300		ns	$V_{CC} = 600V, I_C = 20A$
I_{rr} Peak Reverse Recovery Current		32		A	$V_{GE} = 15V, R_g = 5\Omega, L = 200\mu H$

Thermal- Mechanical Specifications

Parameters		Min	Typ	Max	Units
T _J	Operating Junction Temperature Range	- 40		150	°C
T _{STG}	Storage Temperature Range	- 40		125	
R _{thJC}	Junction-to-Case	IGBT		0.7	°C/ W
		Diode		0.9	
R _{thCS}	Case-to-Sink (Heatsink Compound Thermal Conductivity = 1 W/mK)	Module	0.06		
Wt	Weight		66		g (oz)

Outline Table



Data and specifications subject to change without notice.
This product has been designed for Industrial Level.
Qualification Standards can be found on IR's Web site.

International
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