Bulletin I27143 Rev.B 07/03

International
IOR Rectifier

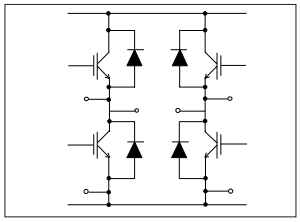
25MT060WF

"FULL-BRIDGE" IGBT MTP

Warp Speed IGBT

Features

- Gen. 4 Warp Speed IGBT Technology
- HEXFRED™ Antiparallel Diodes with UltraSoft Reverse Recovery
- Very Low Conduction and Switching Losses
- Optional SMT Thermistor
- Aluminum Nitride DBC
- Very Low Stray Inductance Design for High Speed Operation

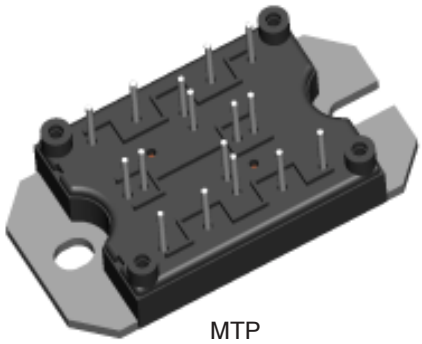


50 A

V_{CES} = 600V

Benefits

- Optimized for Welding, UPS and SMPS Applications
- Operating Frequencies > 20 kHz Hard Switching, >200 kHz Resonant Mode
- Low EMI, requires Less Snubbing
- Direct Mounting to Heatsink
- PCB Solderable Terminals
- Very Low Junction-to-Case Thermal Resistance
- UL Approved E78996



MTP

Absolute Maximum Ratings

	Parameters		Max	Units
V_{CES}	Collector-to-Emitter Voltage		600	V
I_C	Continuos Collector Current	@ T_C = 25°C	50	A
		@ T_C = 100°C	38	
I_{CM}	Pulsed Collector Current		200	
I_{LM}	Peak Switching Current		200	
I_F	Diode Continuous Forward Current	@ T_C = 100°C	25	
I_{FM}	Peak Diode Forward Current		200	
V_{GE}	Gate-to-Emitter Voltage		± 20	V
V_{ISOL}	RMS Isolation Voltage, Any Terminal to Case, t = 1 min		2500	
P_D	Maximum Power Dissipation	@ T_C = 25°C	250	W
	per single IGBT	@ T_C = 100°C	100	

Electrical Characteristics @ T_J = 25°C (unless otherwise specified)

	Parameters	Min	Typ	Max	Units	Test Conditions
$V_{(BR)CES}$	Collector-to-Emitter Breakdown Voltage	600			V	V_{GE} = 0V, I_C = 250µA
$\Delta V_{(BR)CES}/\Delta T_J$	Temperature Coeff. of Breakdown Voltage		+0.6		V/°C	V_{GE} = 0V, I_C = 4mA (25-125°C)
$V_{CE(ON)}$	Collector-to-Emitter Saturation Voltage		2.22	3.14	V	V_{GE} = 15V, I_C = 25A
			2.43	3.25		V_{GE} = 15V, I_C = 50A
			1.65	1.93		V_{GE} = 15V, I_C = 25A T_J = 150°C
			2.08	2.45		V_{GE} = 15V, I_C = 50A T_J = 150°C
$V_{GE(th)}$	Gate Threshold Voltage	3		6		V_{CE} = V_{GE}, I_C = 250µA
$\Delta V_{GE(th)}/\Delta T_J$	Temperature Coeff. of Threshold Voltage		-17		mV/°C	V_{CE} = V_{GE}, I_C = 250µA (25-125°C)
g_{fe}	Transconductance		43		S	V_{CE} = 100V, I_C = 25A, PW = 80µs
I_{CES}	Zero Gate Voltage Collector Current (1)			250	µA	V_{GE} = 0V, V_{CE} = 600V, T_J = 25°C
				10	mA	V_{GE} = 0V, V_{CE} = 600V, T_J = 150°C
I_{GES}	Gate-to-Emitter Leakage Current			±250	nA	V_{GE} = ± 20V
V_{FM}	Diode Forward Voltage Drop		1.36	1.64	V	I_C = 25A
			1.57	1.93		I_C = 50A
			1.19	1.42		I_C = 25A, T_J = 150°C
			1.48	1.80		I_C = 50A, T_J = 150°C

(1) I_{CES} includes also opposite leg overall leakage

Switching Characteristics @ T_J = 25°C (unless otherwise specified)

	Parameters	Min	Typ	Max	Units	Test Conditions
Q_g	Total Gate Charge (turn-on)		175	263	nC	I_C = 25A
Q_{ge}	Gate-Emitter Charge (turn-on)		27	41		V_{CC} = 480V
Q_{gc}	Gate-Collector Charge (turn-on)		71	107		V_{GE} = 15V
E_{on}	Turn-On Switching Loss		134	201	µJ	R_g= 5Ω , I_C = 25A
E_{off}	Turn-Off Switching Loss		415	623		V_{CC} = 480V
E_{ts}	Total Switching Loss		549	824		V_{GE} = ±15V
E_{on}	Turn-On Switching Loss		391	586	µJ	R_g= 5Ω , I_C = 25A
E_{off}	Turn-Off Switching Loss		492	738		V_{CC} = 480V
E_{ts}	Total Switching Loss		883	1324		V_{GE} = ±15V, T_J = 125°C
C_{ies}	Input Capacitance		3610	5415	pF	V_{GE} = 0V
C_{oes}	Output Capacitance		714	1071		V_{CC} = 30V
C_{res}	Reverse Transfer Capacitance		58	87		f = 1.0 MHz
trr	Diode Reverse Recovery Time		50		ns	V_R = 200V, I_C = 25A
Irr	Diode Peak Reverse Current		4.5		A	di/dt = 200A/µs
Qrr	Diode Recovery Charge		112		nC	
$di_{(rec)}M/_{dt}$	Diode PeakRate of Fall of Recovery During t_b		250		A/µs	

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			0.5	°C/ W
		Diode			0.9	
R_{thCS}	Case-to-Sink	Module		0.06		
	(Heatsink Compound Thermal Conductivity = 1 W/mK)					
	Clearance (2) (external shortest distance in air between two terminals)		5.5			mm
	Creepage (2) (shortest distance along external surface of the insulating material between 2 terminals)		8			mm
	Weight			66		g

(2) Standard version only i.e. without optional thermistor

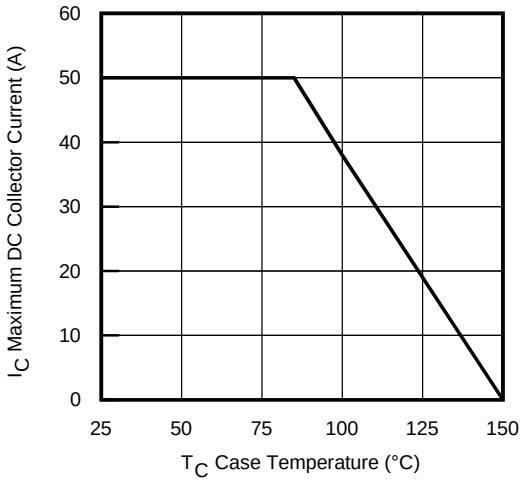


Fig. 4 - Maximum Collector Current vs. Case Temperature

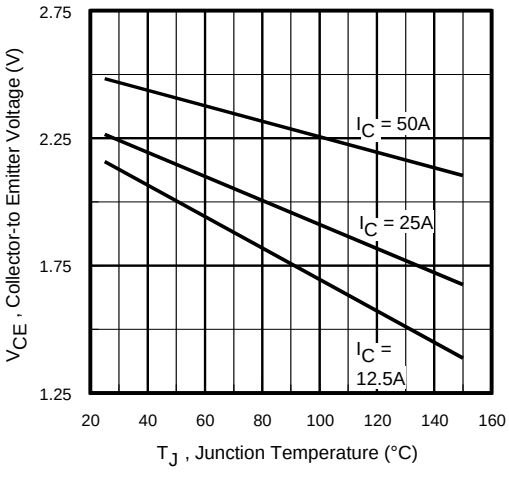


Fig. 5 - Typical Collector-to-Emitter Voltage vs. Junction Temperature

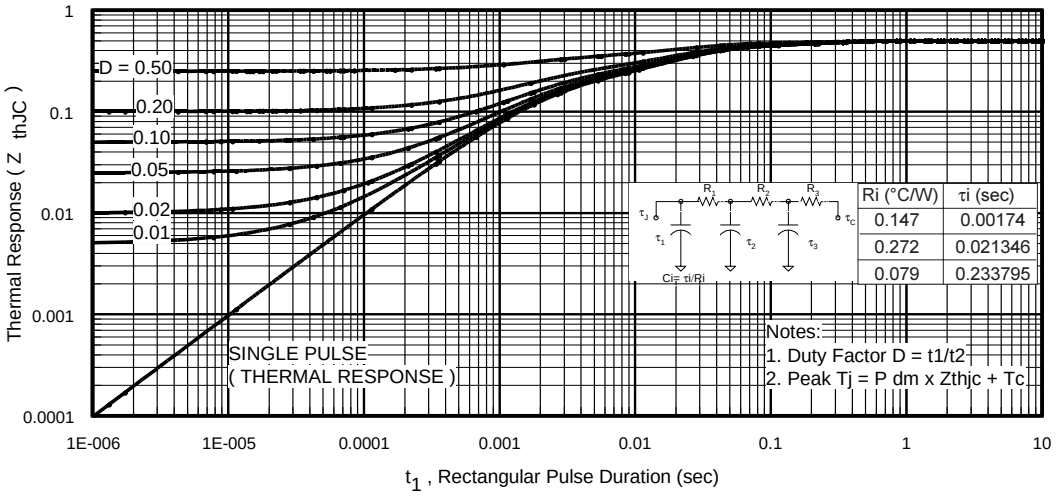


Fig. 6a Maximum Transient Thermal Impedance, Junction-to-Case (IGBT)

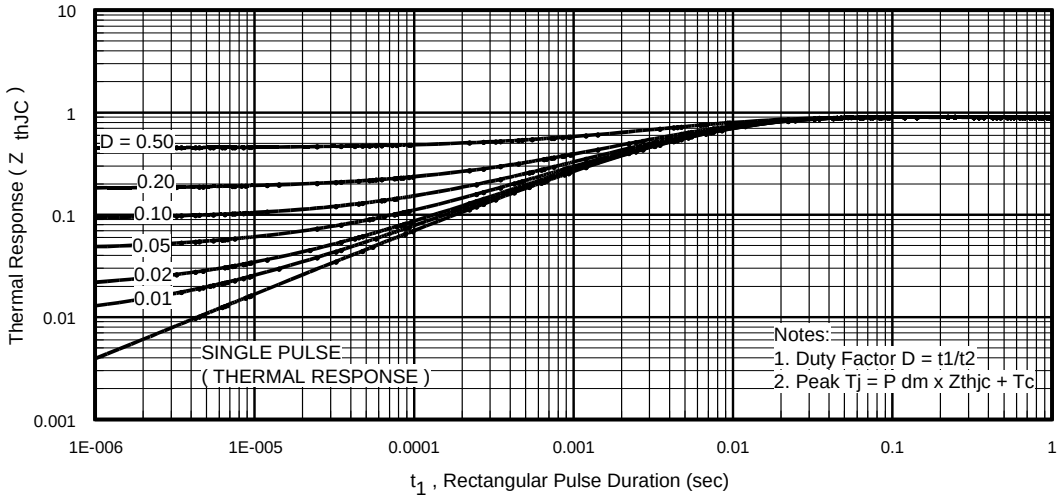


Fig. 6b Maximum Transient Thermal Impedance, Junction-to-Case (DIODE)

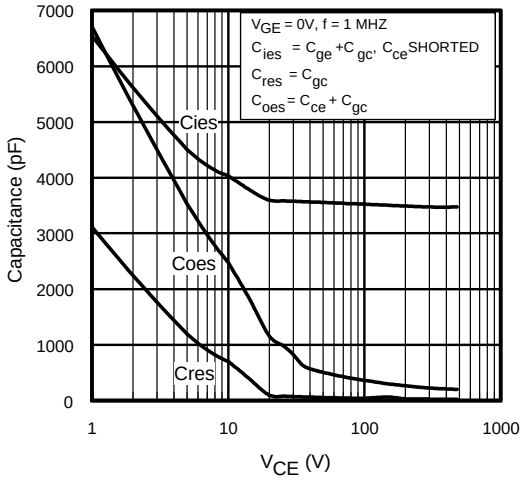


Fig. 7 - Typical Capacitance vs. Collector-to-Emitter Voltage

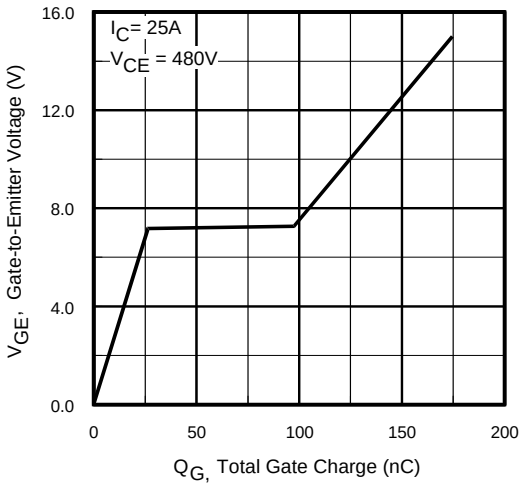


Fig. 8 - Typical Gate Charge vs. Gate-to-Emitter Voltage

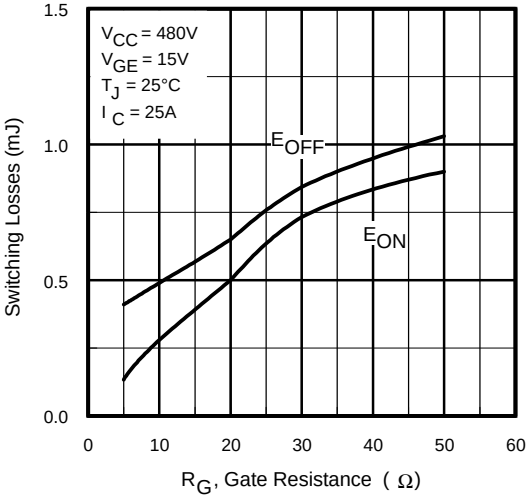


Fig. 9 - Typical Switching Losses vs. Gate Resistance

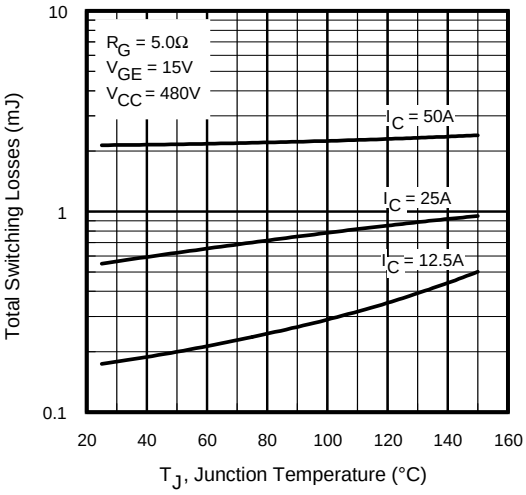


Fig. 10 - Typical Switching Losses vs. Junction Temperature

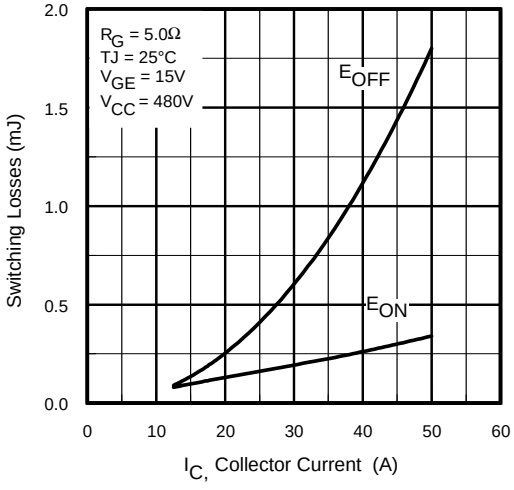


Fig. 11 - Typical Switching Losses vs. Collector-to-Emitter Current

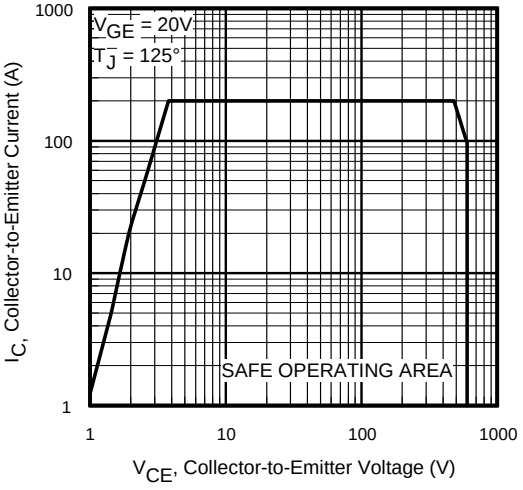


Fig. 12 - Turn-Off SOA

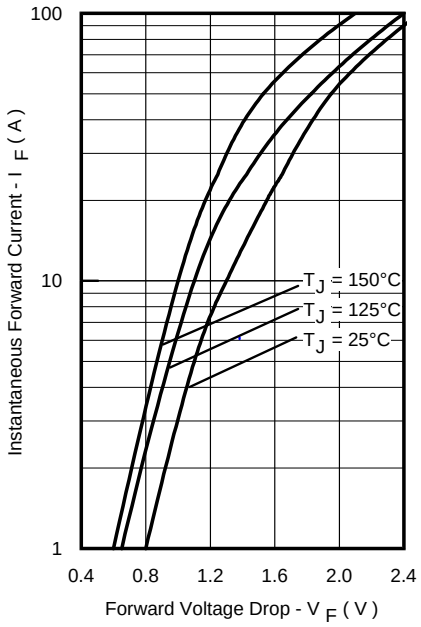


Fig. 13 - Maximum Forward Voltage Drop vs. Instantaneous Forward Current

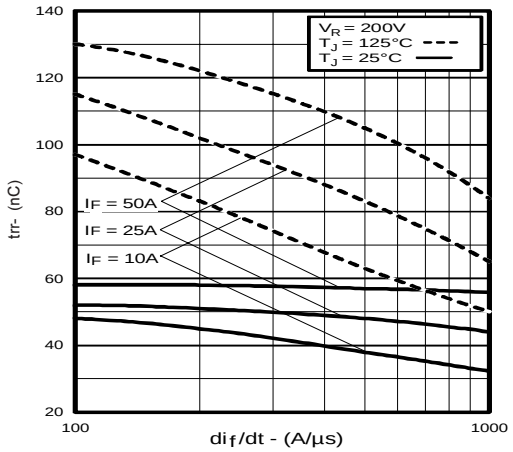


Fig. 14 - Typical Reverse Recovery vs. di_f/dt

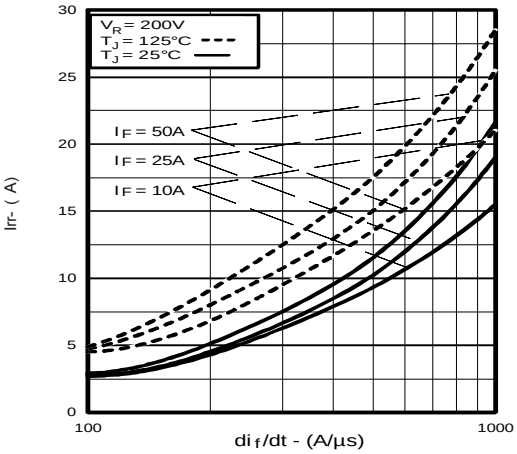


Fig. 15 - Typical Recovery Current vs. di_f/dt

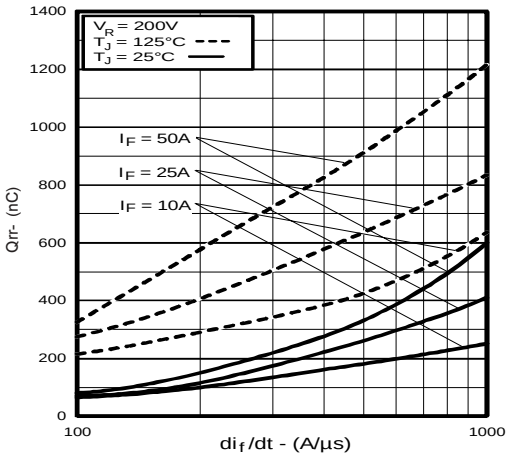


Fig. 16 - Typical Stored Charge vs. di_f/dt

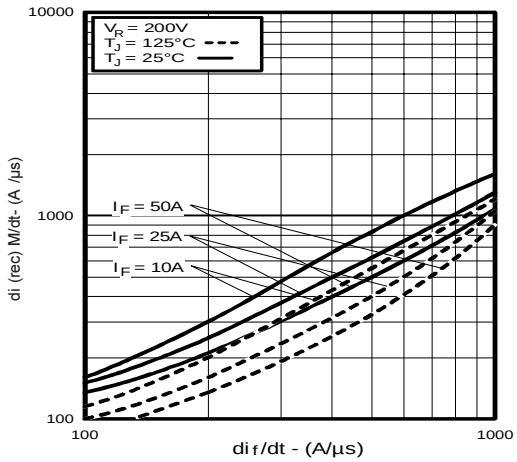


Fig. 17 - Typical $di_{(rec)M}/dt$ vs. di_f/dt

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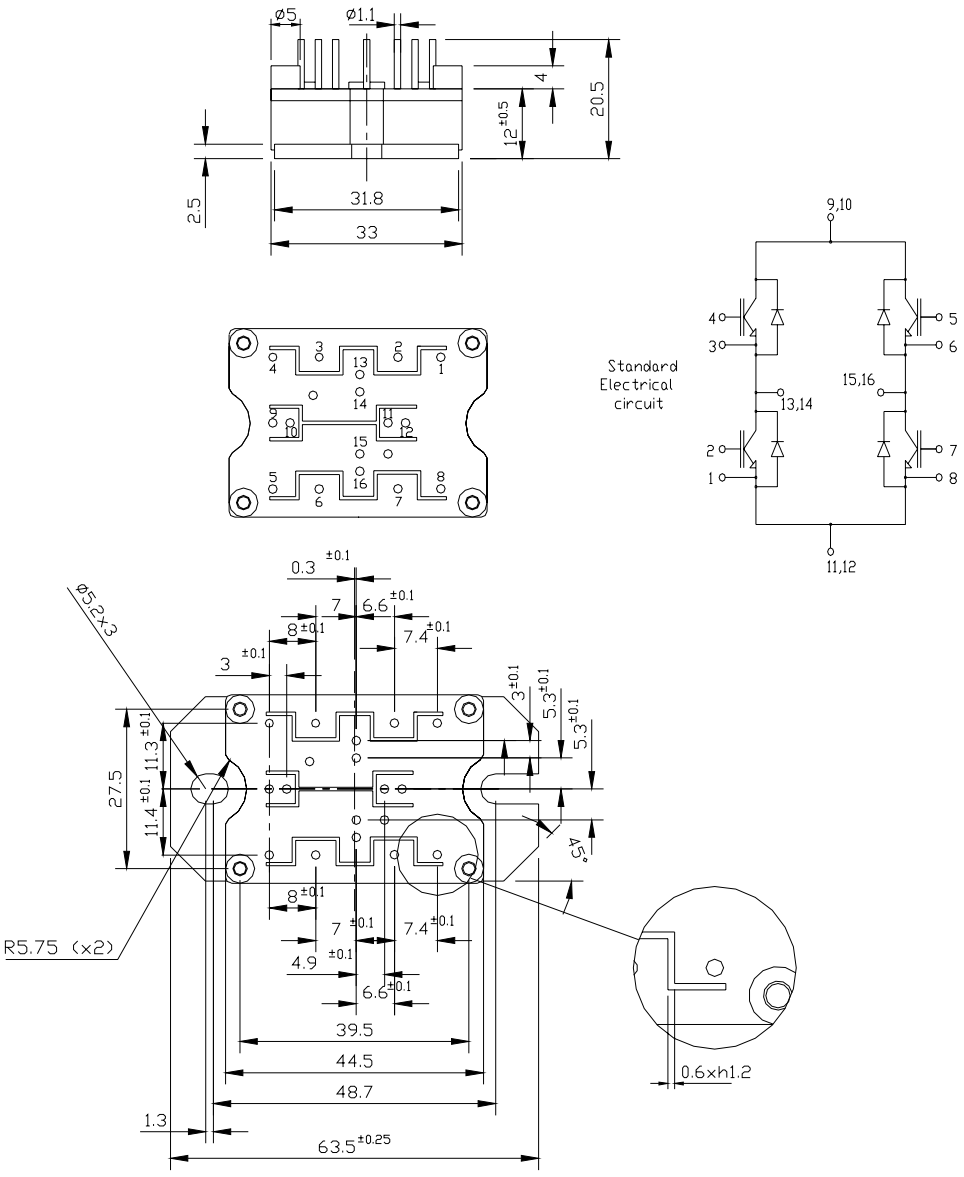
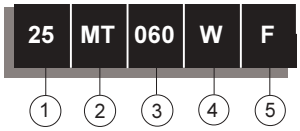
Outline Table



Dimensions in millimeters

Ordering Information Table

Device Code



1	-	Current rating	(25 = 25A)
2	-	Essential Part Number	
3	-	Voltage code	(060 = 600V)
4	-	Speed/ Type	(W = Warp® IGBT)
5	-	Circuit Configuration	(F = Full Bridge)

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