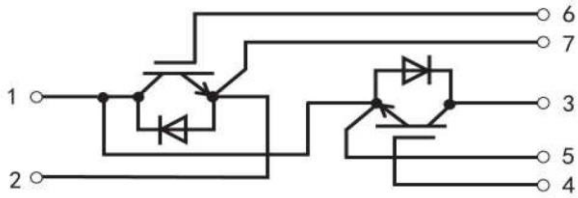
MRI200.12F

2 in 1 Fast IGBT Modules

Features:

- Low switching losses
- Low inductance
- Fast switching and short tail current
- High power and thermal cycling capaility
- Al_2O_3 substrate with low thermal resistance
- Copper base plate



Typical applications:

- High frequency switching application
- Motor drives
- UPS system

Symbol	Characteristcs	Test Conditions		Value			Unit
				Min	Typ	Max	
• IGBT, Inverter							
V_{CES}	Collector-Emitter voltage	Tj = 25°C				1200	V
V_{GES}	Gate-Emitter voltage					±20	V
I_C	Collector current	Continuous @ T_c = 40 °C, Tvj max = 150°C				200	A
I_{CRM}	Repetitive peak collector current	T_p = 1 ms				400	A
P_C	Collector power dissipation	T_C = 25°C, Tj = 175°C				750	W
T_j	Junction temperature			-40		150	°C
T_{stg}	Storage temperature			-40		125	°C
V_{ISO}	Isolation terminal/copper base	AC: 1 minute				2500	V
Screw torque	Mounting (M6)			3		6	N·m
	Terminals (M6)			2.5		5.0	N·m
L_{SCE}	Stray inductance module				20		nH
I_{CES}	Zero gate voltage collector current	Tj = 25°C, V_{CE} = 1200V, V_{GE} = 0V				2	mA
I_{GES}	Gate-Emitter leakage current	Tj = 25°C, V_{CE} = 0V, V_{GE} = 20V				200	nA
$V_{GE(th)}$	Gate-Emitter threshold voltage	Tj = 25°C, V_{CE} = V_{GE}, I_C = 11.4mA		5.0	5.8	6.5	V
$V_{CE(sat)}$	Collector-Emitter saturation voltage	Tj = 25°C, V_{GE} = 15V, I_C = 200A			2.16		V
		Tj = 125°C, V_{GE} = 15V, I_C = 200A			2.63		V
		Tj = 150°C, V_{GE} = 15V, I_C = 200A			2.77		V
C_{ies}	Input capacitance	Tj = 25°C, V_{CE} = 25V, V_{GE} = 0V, f = 1MHz			14		nF
C_{res}	Reverse transfer capacitance	Tj = 25°C, V_{CE} = 25V, V_{GE} = 0V, f = 1MHz			0.5		nF
R_{Gint}	Internal gate resistor	Tj = 25°C			1.05		Ω
$t_{d,on}$	Turn-on time	V_{CE} = 600V, I_C = 200A, V_{GE} = ±15V, R_G = 4.1Ω, inductive load	Tj = 25°C		0.152		µs
			Tj = 125°C		0.166		µs
			Tj = 150°C		0.170		µs
t_r	Rise time	V_{CE} = 600V, I_C = 200A, V_{GE} = ±15V, R_G = 4.1Ω, inductive load	Tj = 25°C		0.066		µs
			Tj = 125°C		0.077		µs
			Tj = 150°C		0.080		µs
$t_{d,off}$	Turn-off time	V_{CE} = 600V, I_C = 200A, V_{GE} = ±15V, R_G = 4.1Ω, inductive load	Tj = 25°C		0.320		µs
			Tj = 125°C		0.343		µs
			Tj = 150°C		0.351		µs
t_f	Fall time	V_{CE} = 600V, I_C = 200A, V_{GE} = ±15V, R_G = 4.1Ω, inductive load	Tj = 25°C		0.060		µs
			Tj = 125°C		0.054		µs
			Tj = 150°C		0.0590		µs

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Symbol	Characteristcs	Test Conditions		Value			Unit
				Min	Typ	Max	
E_{on}	Turn-on energy loss per pulse	V_{CE} = 600V, I_C = 200A, L_s = 35nH, V_{GE} = ±15V, di/dt = 2000A/µs, R_G = 4.1Ω (T_j = 150°C)	Tj = 25°C		16.9		mJ
			Tj = 125°C		30.4		mJ
			Tj = 150°C		37.1		mJ
E_{off}	Turn-off energy loss per pulse	V_{CE} = 600V, I_C = 200A, L_s = 35nH, V_{GE} = ±15V, dv/dt = 6000V/µs, R_G = 4.1Ω (T_j = 150°C)	Tj = 25°C		10.3		mJ
			Tj = 125°C		9.9		mJ
			Tj = 150°C		10.2		mJ
I_{SC}	SC data	V_{GE} ≤ 15V, V_{CC} = 600V, tp ≤ 8µs, Tj = 150°C, C_{GE} = 0.0µF, V_{CEmax} = V_{CES} - L_{sCE} • di/dt			1190		A
$R_{th\ (j-c)}$	Thermal resistance, junction to case	Per IGBT				0.20	°C/W
• Diode, Inverter							
V_{RRM}	Repetitive peak reverse voltage	Tj = 25°C				1200	V
I_F	Forward current	Continuous				200	A
I_{FRM}	Repetitive peak forward current	T_p = 1ms				400	A
V_F	Forward voltage	V_{GE} = 0V, I_F = 200A	Tj = 25°C		1.50		V
			Tj = 125°C		1.26		V
			Tj = 150°C		1.21		V
I_{RM}	Peak reverse recovery current	V_R = 600V, I_F = 200A, V_{GE} = -15V, - di_F/dt = 1950A/µs, $R_{G,off}$ = 4.1Ω (T_j = 150°C)	Tj = 25°C		215		A
			Tj = 125°C		286		A
			Tj = 150°C		297		A
Q_r	Recovery charge	V_R = 600V, I_F = 200A, V_{GE} = -15V, - di_F/dt = 1950A/µs, $R_{G,off}$ = 4.1Ω (T_j = 150°C)	Tj = 25°C		19		µC
			Tj = 125°C		49		µC
			Tj = 150°C		55		µC
E_{rec}	Reverse recovery energy	V_R = 600V, I_F = 200A, V_{GE} = -15V, - di_F/dt = 1950A/µs, $R_{G,off}$ = 4.1Ω (T_j = 150°C)	Tj = 25°C		4.0		mJ
			Tj = 125°C		13.5		mJ
			Tj = 150°C		15.8		mJ
$R_{th\ (j-c)}$	Thermal resistance, junction to case	Per diode				0.25	°C/W
W_t	Weight				340		g

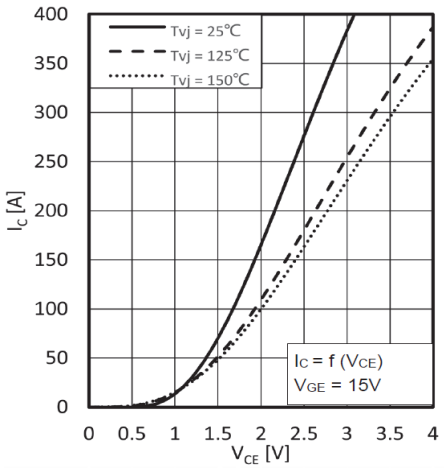

Figure 1 Output characteristic IGBT, Inverter (typical)

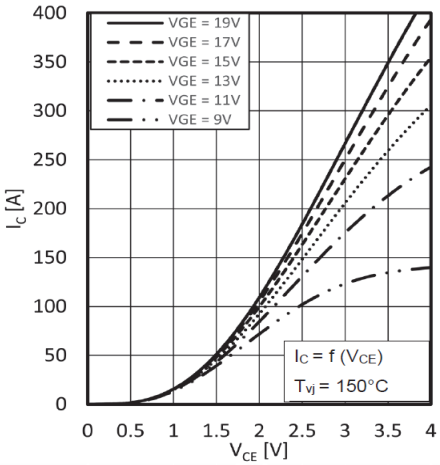

Figure 2 Output characteristic IGBT, Inverter (typical)

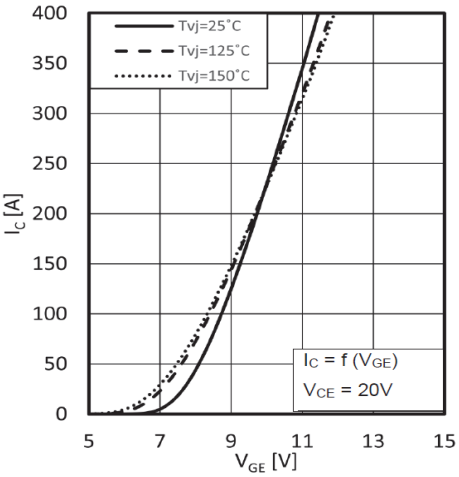

Figure 3 Transfer characteristic IGBT, Inverter (typical)

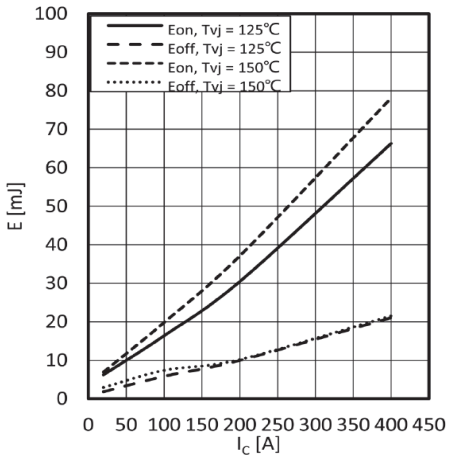

Figure 4 Switching losses IGBT, Inverter (typical)
Eon=f (IC), Eoff = f (IC) , VGE = ±15V, RGon = 4.1 Ω
RGoff = 4.1 Ω, VCE = 600V

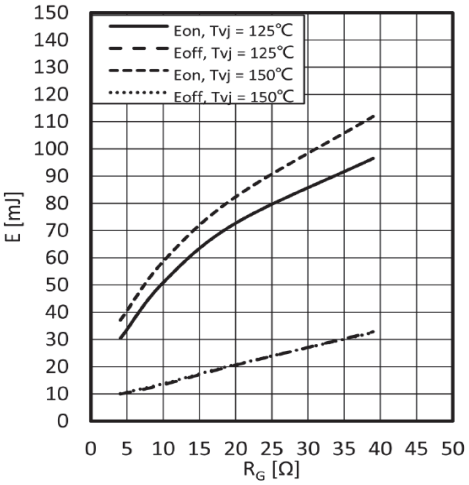

Figure 5 Switching losses IGBT, Inverter (typical)
Eon = f (RG), Eoff = f (RG), VGE = ±15V, IC = 300A,VCE = 600V

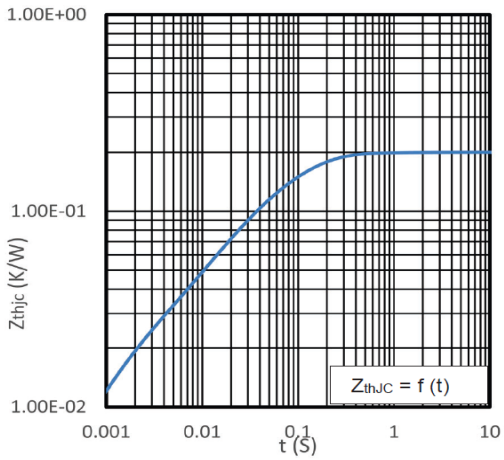

Figure 6 Transient thermal impedance IGBT, Inverter

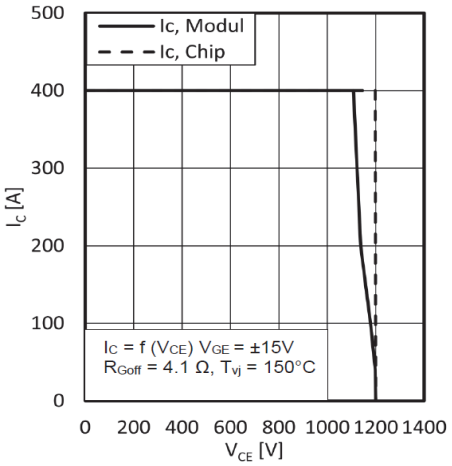

Figure 7 Reverse bias safe operating area IGBT, Inverter (RBSOA)

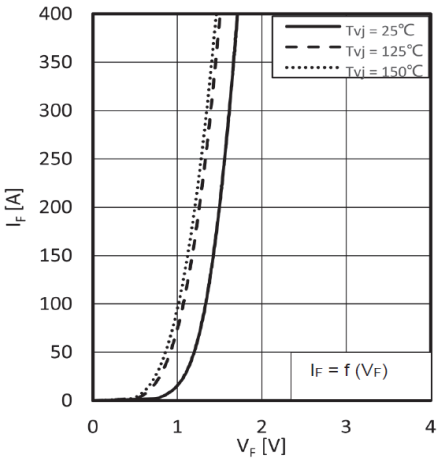

Figure 8 Forward characteristic of Diode, Inverter (typical)

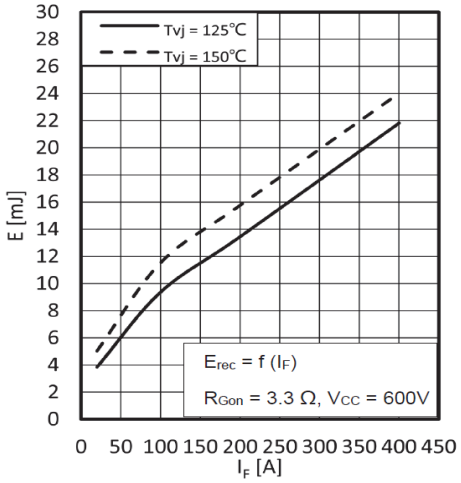

Figure 9 Switching losses Diode, Inverter (typical)

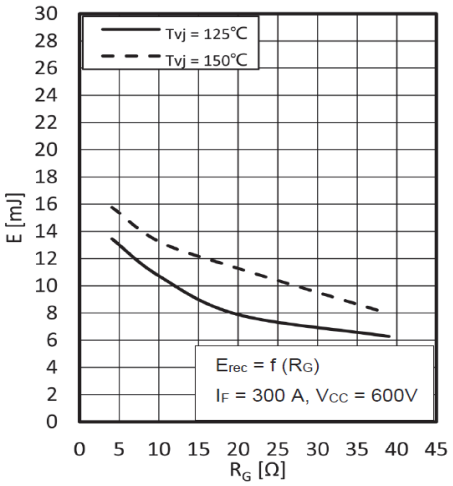

Figure 10 Switching losses Diode, Inverter (typical)

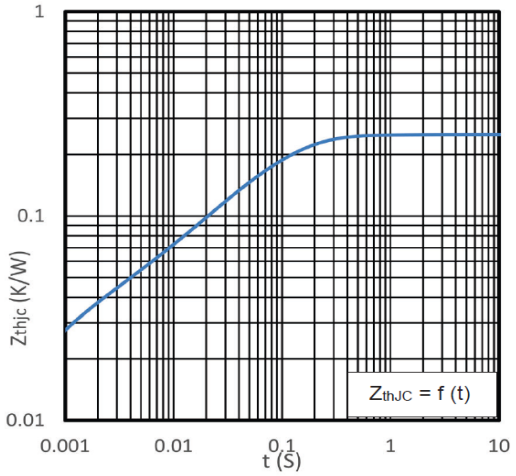

Figure 11 Transient thermal impedance Diode Inverter

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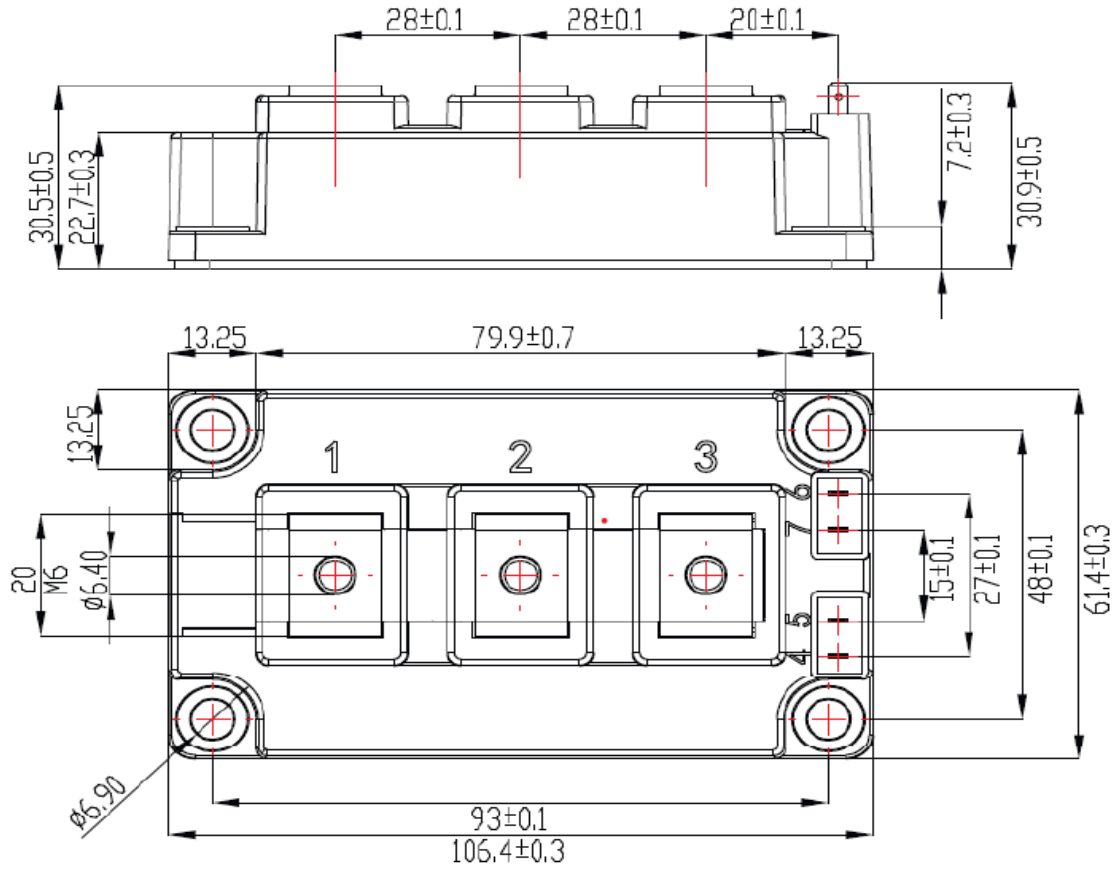
Outline:



(dimensions in mm)

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