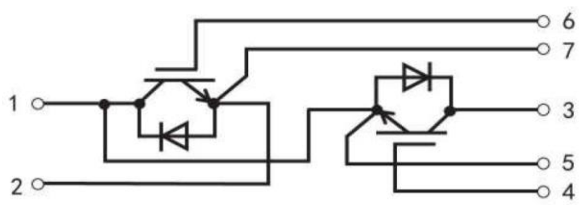
MRI100.12F

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 Min	Value Typ	Value Max	Unit
● 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 = 80 °C, Tvj max = 150°C			100	A
I_{CRM}	Repetitive peak collector current	T_p = 1 ms			200	A
P_C	Collector power dissipation	T_C = 25°C, Tj = 175°C, 1 device			502	W
T_j	Junction temperature		-40		150	°C
T_{stg}	Storage temperature		-40		125	°C
V_{ISO}	Isolation terminal/copper base	Tj = 25°C, AC: 1 minute			2500	V
Screw torque	Mounting (M6)		3.0		5.0	N·m
	Terminals (M5)		2.5		5.0	N·m
L_{SCE}	Stray inductance module			30		nH
I_{CES}	Zero gate voltage collector current	Tj = 25°C, V_{CE} = 1200V, V_{GE} = 0V			1	mA
I_{GES}	Gate-Emitter leakage current	Tj = 25°C, V_{CE} = 0V, V_{GE} = 20V			100	nA
$V_{GE(th)}$	Gate-Emitter threshold voltage	Tj = 25°C, V_{CE} = V_{GE}, I_C = 3.8mA	5.2	5.9	6.6	V
$V_{CE(sat)}$	Collector-Emitter saturation voltage	Tj = 25°C, V_{GE} = 15V, I_C = 100A		1.92		V
		Tj = 125°C, V_{GE} = 15V, I_C = 100A		2.21		V
		Tj = 150°C, V_{GE} = 15V, I_C = 100A		2.28		V
C_{ies}	Input capacitance	Tj = 25°C, V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		9.6		nF
C_{res}	Reverse transfer capacitance	Tj = 25°C, V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		0.01		nF
Q_g	Gate charge	V_{CE} = 600V, I_C = 100A, V_{GE} = 15V		0.48		µC
R_{Gint}	Internal gate resistor	Tj = 25°C		7.5		Ω
$t_{d,on}$	Turn-on time	V_{CE} = 600V, I_C = 100A, V_{GE} = ±15V, R_G = 4.1Ω, inductive load; Tj = 25°C		0.15		µs
		Tj = 125°C		0.17		µs
		Tj = 150°C		0.18		µs
t_r	Rise time	V_{CE} = 600V, I_C = 100A, V_{GE} = ±15V, R_G = 4.1Ω, inductive load; Tj = 25°C		0.03		µs
		Tj = 125°C		0.04		µs
		Tj = 150°C		0.04		µs
$t_{d,off}$	Turn-off time	V_{CE} = 600V, I_C = 100A, V_{GE} = ±15V, R_G = 4.1Ω, inductive load; Tj = 25°C		0.17		µs
		Tj = 125°C		0.19		µs
		Tj = 150°C		0.20		µs
t_f	Fall time	V_{CE} = 600V, I_C = 100A, V_{GE} = ±15V, R_G = 4.1Ω, inductive load; Tj = 25°C		0.20		µs
		Tj = 125°C		0.24		µs
		Tj = 150°C		0.25		µs

MRI100.12F

Symbol	Characteristics	Test Conditions		Value Min	Value Typ	Value Max	Unit
E_{on}	Turn-on energy loss per pulse	V_{CE} = 600V, I_C = 100A, L_s = 30nH, V_{GE} = ±15V, di/dt = 1870A/µs, R_G = 4.1Ω (T_j = 150°C)	Tj = 25°C		8.42		mJ
			Tj = 125°C		10.5		mJ
			Tj = 150°C		11.5		mJ
E_{off}	Turn-off energy loss per pulse	V_{CE} = 600V, I_C = 100A, L_s = 30nH, V_{GE} = ±15V, dv/dt = 7410V/µs, R_G = 4.1Ω (T_j = 150°C)	Tj = 25°C		7.89		mJ
			Tj = 125°C		9.59		mJ
			Tj = 150°C		10.3		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			556		A
$R_{th\ (j-c)}$	Thermal resistance, junction to case	Per IGBT				0.298	°C/W
• Diode, Inverter							
V_{RRM}	Repetitive peak reverse voltage	Tj = 25°C				1200	V
I_F	Forward current	Continuous				100	A
I_{FRM}	Repetitive peak forward current	T_p = 1ms				200	A
V_F	Forward voltage	V_{GE} = 0V, I_F = 100A	Tj = 25°C		1.69		V
			Tj = 125°C		1.77		V
			Tj = 150°C		1.71		V
I_{RM}	Peak reverse recovery current	V_R = 600V, I_F = 100A, V_{GE} = -15V, - di_F/dt = 1300A/µs, $R_{G,off}$ = 4.1Ω (T_j = 150°C)	Tj = 25°C		89.7		A
			Tj = 125°C		110.7		A
			Tj = 150°C		117.8		A
Q_r	Recovery charge	V_R = 600V, I_F = 100A, V_{GE} = -15V, - di_F/dt = 1300A/µs, $R_{G,off}$ = 4.1Ω (T_j = 150°C)	Tj = 25°C		15.1		µC
			Tj = 125°C		18.1		µC
			Tj = 150°C		19.5		µC
E_{rec}	Reverse recovery energy	V_R = 600V, I_F = 100A, V_{GE} = -15V, - di_F/dt = 1300A/µs, $R_{G,off}$ = 4.1Ω (T_j = 150°C)	Tj = 25°C		5.13		mJ
			Tj = 125°C		6.25		mJ
			Tj = 150°C		6.95		mJ
$R_{th\ (j-c)}$	Thermal resistance, junction to case	Per diode				0.675	°C/W
W_t	Weight				160		g

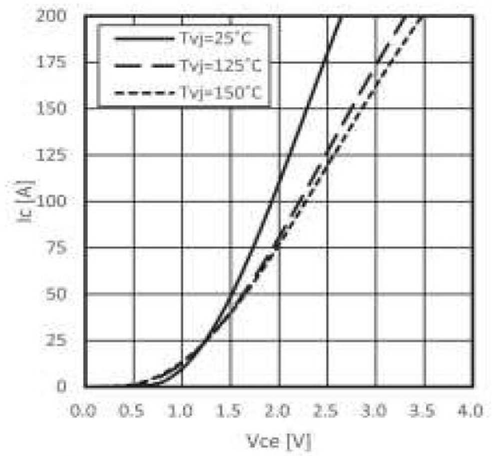


Figure 1 Output characteristic IGBT, Inverter (typical)
$I_C = f(V_{CE})$
$V_{GE} = 15V$

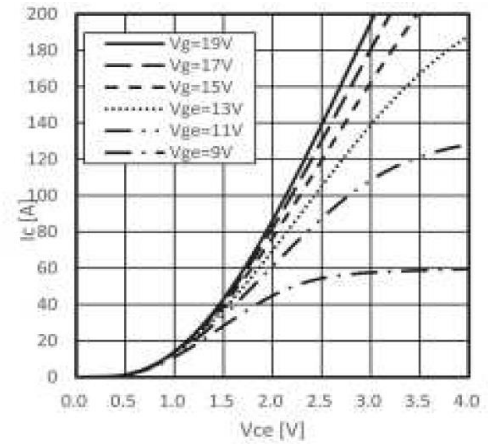


Figure 2 Output characteristic IGBT, Inverter (typical)
$I_C = f(V_{CE})$
$T_{vj} = 150°C$

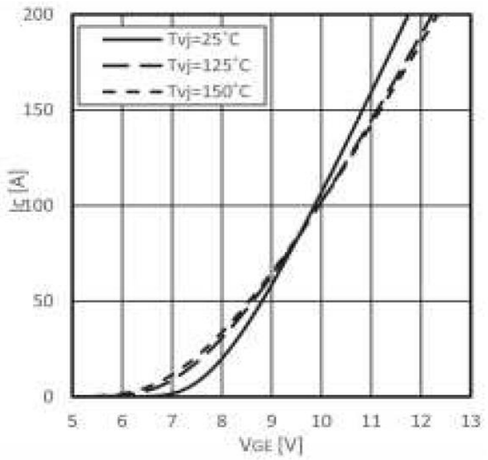


Figure 3 Transfer characteristic IGBT, Inverter (typical)
$I_C = f(V_{GE})$
$V_{CE} = 20V$

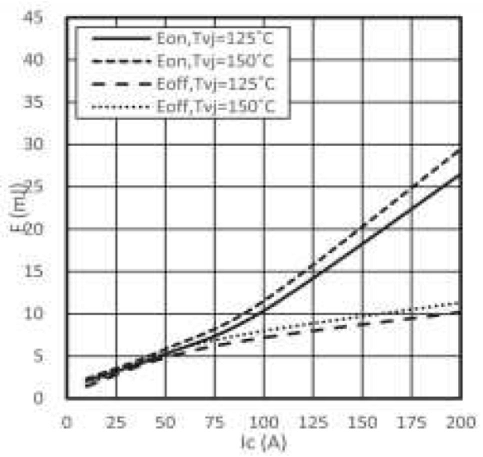


Figure 4 Switching losses IGBT, Inverter (typical)
$E_{on} = f(I_C)$, $E_{off} = f(I_C)$
$R_G = 4.1\ \Omega$, $V_{CE} = 600$ V, $V_{GE} = \pm 15$ V

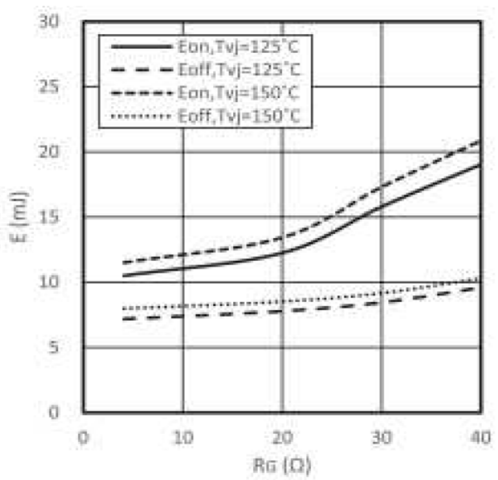


Figure 5 Switching losses IGBT, Inverter (typical)
$E_{on} = f(R_G)$
$I_C = 100$ A, $V_{CE} = 600$ V, $V_{GE} = \pm 15$ V

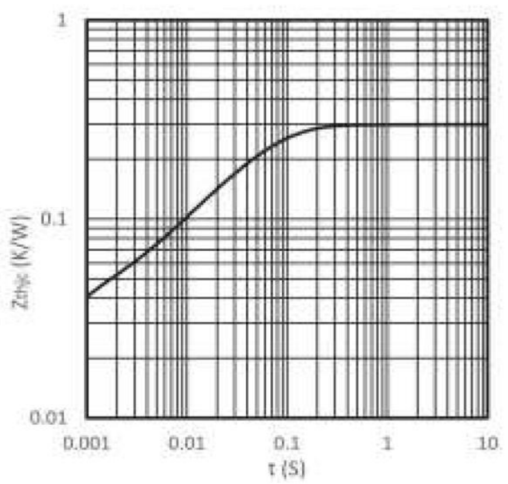


Figure 6 Transient thermal impedance IGBT, Inverter
$Z_{thJC} = f(t)$

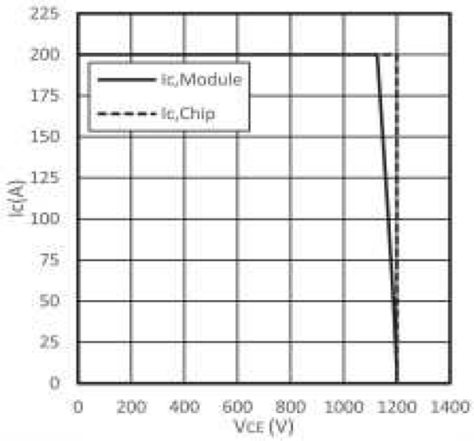


Figure 7 **Reverse bias safe operating area IGBT, Inverter (RBSOA)**

$I_C = f(V_{CE})$
V_{GE} = 15 V, R_{Goff} = 4.1 Ω, T_{vj} = 150°C

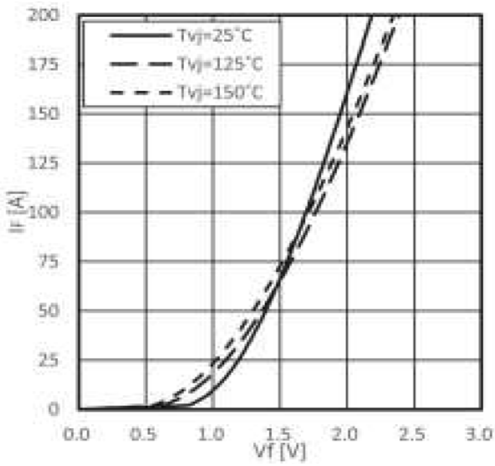


Figure 8 **Forward characteristic of Diode, Inverter (typical)**

$I_F = f(V_F)$

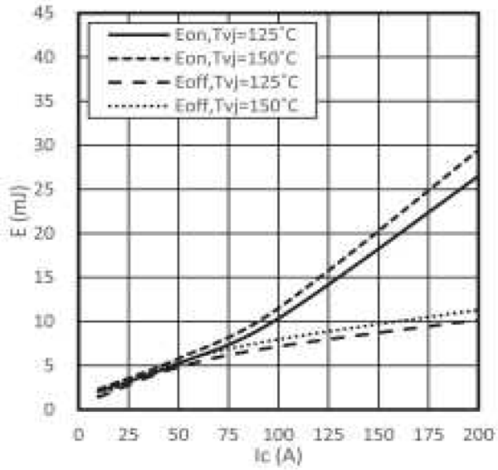


Figure 9 **Switching losses Diode, Inverter (typical)**

$E_{rec} = f(I_F)$
R_{Gon} = 4.1 Ω, V_{CE} = 600 V

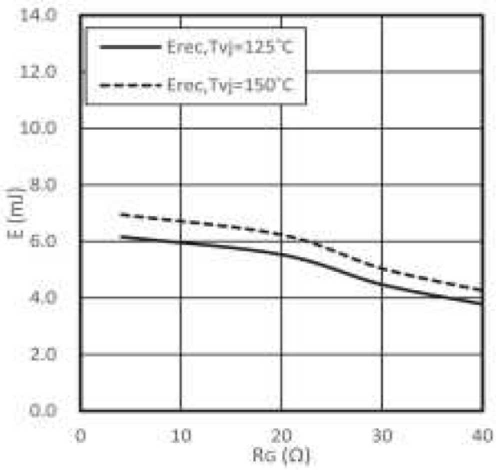


Figure 10 **Switching losses Diode, Inverter (typical)**

$E_{rec} = f(R_{Gon})$
I_F = 100 A, V_{CE} = 600 V

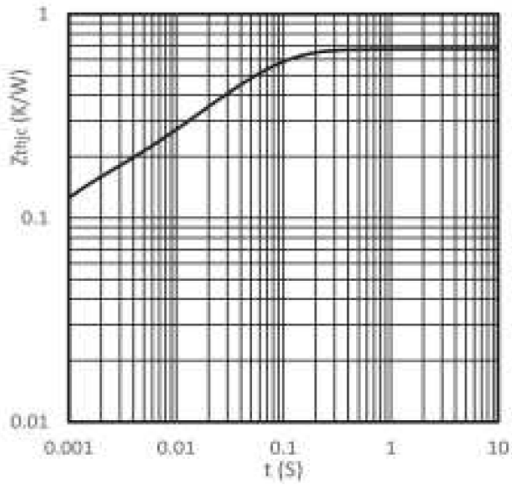


Figure 11 **Transient thermal impedance Diode, Inverter**

$Z_{thJC} = f(t)$

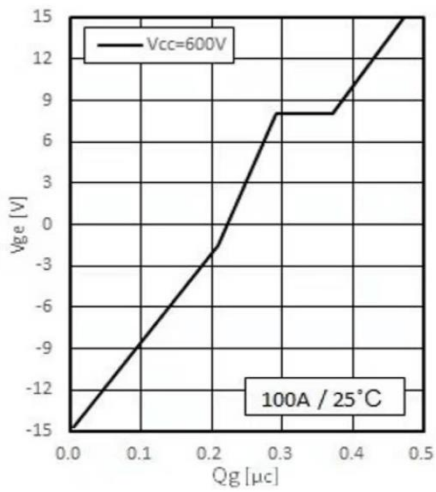
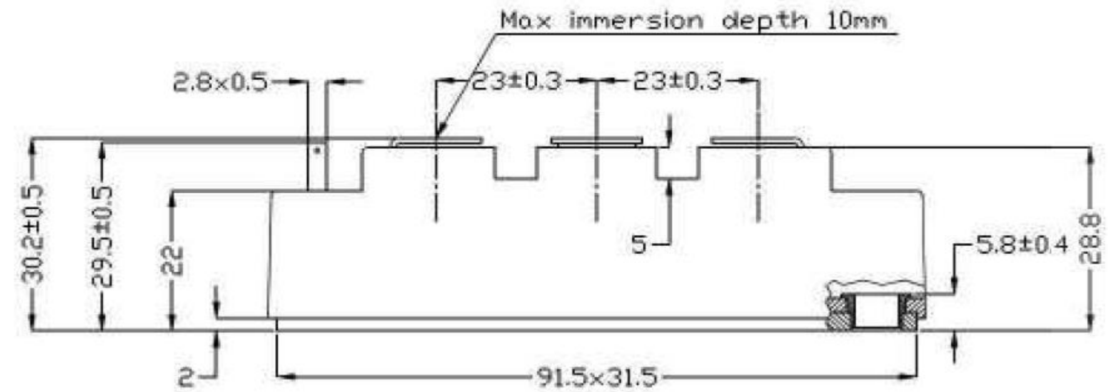
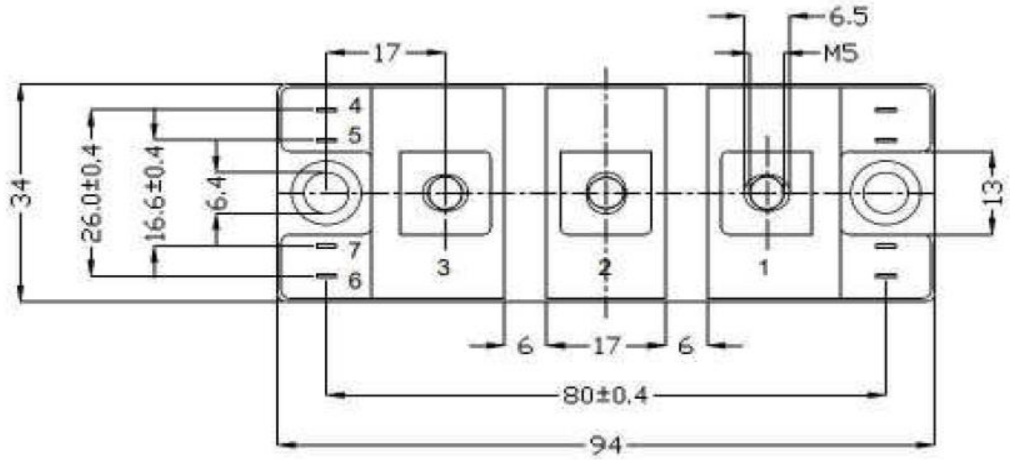


Figure 12 **Qg-Vge Cruve**

Outline:





(dimensions in mm)

S.CO.M.E.S. Srl
Via Enrico Mattei, 6/8 - 26283 - Castiglione d'Adda (LO) - Italy
Phone: +39 0377 901243   Fax: +39 0377 900206