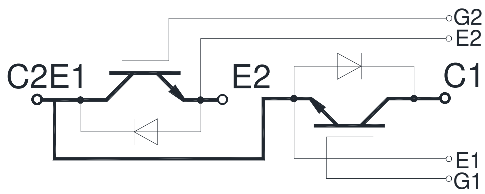
www.scomes.com

MRI100.12F

2 in 1 IGBT Modules

Electrical features

- V_{CES}=1200V
- $I_{C\ nom}$=100A / I_{CRM}=200A
- Low switching losses
- Low inductance
- Fast switching and short tail current
- High power and thermal cycling capability



Typical Applications

- High Frequency Switching Application
- Motor drives
- UPS system

. IGBT, Inverter

Maximum Rated Values

Parameter	Note or test condition	Symbol	Values	Unit
Collector-emitter voltage	T_{vj} = 25°C	V_{CES}	1200	V
Continuous DC collector current	T_C = 80°C, T_{vj} max = 150°C	$I_{C\ nom}$	100	A
Repetitive peak collector current	t_P = 1 ms	I_{CRM}	200	A
Total power dissipation	T_C = 25°C, $T_{vj\ max}$ = 175°C	P_{tot}	502	W
Gate-emitter peak voltage		V_{GES}	+/- 20	V

SCOMES

. IGBT, Inverter

Maximum Rated Values

Parameter	Note or test condition	Symbol	Values	Unit
Collector-emitter voltage	T_{vj} = 25°C	V_{CES}	1200	V
Continuous DC collector current	T_C = 80°C, T_{vj} max = 150°C	$I_{C\ nom}$	100	A
Repetitive peak collector current	t_P = 1 ms	I_{CRM}	200	A
Total power dissipation	T_C = 25°C, $T_{vj\ max}$ = 175°C	P_{tot}	502	W
Gate-emitter peak voltage		V_{GES}	+/- 20	V

Characteristic value

Parameter	Note or test condition		Symbol	Values			Unit
				Min.	Typ.	Max.	
Collector-emitter saturation voltage	I_C = 100 A, V_{GE} = 15 V	T_{vj} = 25°C	$V_{CE,sat}$		1.92		V
		T_{vj} = 125°C			2.21		V
		T_{vj} = 150°C			2.28		V
Gate threshold voltage	I_C = 3.8mA, V_{CE} = V_{GE}, T_{vj} = 25°C		$V_{GE,th}$	5.2	5.9	6.6	V
Internal gate resistor	T_{vj} = 25°C		R_{Gint}		7.5		Ω
Input capacitance	f=1MHz, T_{vj}=25°C, V_{CE}=25V, V_{GE}=0V		C_{ies}		9.6		nF
Reverse transfer capacitance	f=1MHz, T_{vj}=25°C, V_{CE}=25V, V_{GE}=0V		C_{res}		0.01		nF
Collector-emitter cut-off current	V_{CE} = 1200 V, V_{GE} = 0 V, T_{vj} = 25°C		I_{CES}			1	mA
Gate-emitter leakage current	V_{CE} = 0 V, V_{GE} = 20 V, T_{vj} = 25°C		I_{GES}			100	nA
Turn-on delay time, inductive load	I_C = 100A, V_{CE} = 600V	T_{vj} = 25°C	$t_{d,on}$		0.15		us
	V_{GE} = +15/-15V	T_{vj} = 125°C			0.17		us
	$R_{G,on}$ = 4.1Ω	T_{vj} = 150°C			0.18		us
Rise time, inductive load	I_C = 100A, V_{CE} = 600V	T_{vj} = 25°C	t_r		0.03		us
	V_{GE} = +15/-15V	T_{vj} = 125°C			0.04		us
	$R_{G,on}$ = 4.1Ω	T_{vj} = 150°C			0.04		us

(table continues...)

Parameter	Note or test condition		Symbol	Values			Unit
				Min.	Typ.	Max.	
Turn-off delay time, inductive load	I_C = 100A, V_{CE} = 600V	T_{vj} = 25°C	$t_{d,off}$		0.17		us
	V_{GE} = +15/-15V	T_{vj} = 125°C			0.19		us
	$R_{G,on}$ = 4.1Ω	T_{vj} = 150°C			0.20		us
Fall time, inductive load	I_C = 100A, V_{CE} = 600V	T_{vj} = 25°C	t_f		0.20		us
	V_{GE} = +15/-15V	T_{vj} = 125°C			0.24		us
	$R_{G,on}$ = 4.1Ω	T_{vj} = 150°C			0.25		us
Turn-on energy loss per pulse	I_C = 100A, V_{CE} = 600V, L_s=30nH	T_{vj} = 25°C	E_{on}		8.42		mJ
	V_{GE} = +15/-15V, di/dt =1870A/µs	T_{vj} = 125°C			10.5		mJ
	$R_{G,on}$ = 4.1Ω (T_{vj} = 150°C)	T_{vj} = 150°C			11.5		mJ
Turn-off energy loss per pulse	I_C = 100A, V_{CE} = 600V, L_s=30nH	T_{vj} = 25°C	E_{off}		7.89		mJ
	V_{GE} = +15/-15V, dv/dt =7410V/µs	T_{vj} = 125°C			9.59		mJ
	$R_{G,off}$ = 4.1Ω (T_{vj} = 150°C)	T_{vj} = 150°C			10.3		mJ
SC data	V_{GE} ≤15V, V_{CC} =600 V, t_P ≤ 8 µs, T_{vj} = 150°C , C_{GE} = 0.0uF , V_{CEmax} = V_{CES} - L_{sCE} · di/dt		I_{SC}		556		A
Thermal resistance, junction to case	Per IGBT		$R_{th,JC}$			0.298	K/W

Diode, Inverter

Maximum Rated Values

Parameter	Note or test condition	Symbol	Values	Unit
Repetitive peak reverse voltage	T_{vj} = 25°C	V_{RRM}	1200	V
Continuous DC forward current		I_F	100	A
Repetitive peak forward current	t_P = 1 ms	I_{FRM}	200	A

Characteristic value

Parameter	Note or test condition		Symbol	Values			Unit
				Min.	Typ.	Max.	
Forward voltage	I_F = 100 A, V_{GE} = 0 V	T_{vj} = 25°C	V_F		1.69		V
		T_{vj} = 125°C			1.77		V
		T_{vj} = 150°C			1.71		V

(table continues...)

Parameter	Note or test condition		Symbol	Values			Unit
				Min.	Typ.	Max.	
Peak reverse recovery current	I_F = 100A, V_R = 600V	T_{vj} = 25°C	I_{RM}		89.7		A
	V_{GE} = -15V , - di_F/dt = 1300 A/μs	T_{vj} = 125°C			110.7		A
	$R_{G,off}$ = 4.1Ω (T_{vj} = 150°C)	T_{vj} = 150°C			117.8		A
Recovered charge	I_F = 100A, V_R = 600V	T_{vj} = 25°C	Q_r		15.1		μC
	V_{GE} = -15V , - di_F/dt = 1300 A/μs	T_{vj} = 125°C			18.1		μC
	$R_{G,off}$ = 4.1Ω (T_{vj} = 150°C)	T_{vj} = 150°C			19.5		μC
Reverse recovery energy	I_F = 100A, V_R = 600V	T_{vj} = 25°C	E_{rec}		5.13		mJ
	V_{GE} = -15V , - di_F/dt = 1300 A/μs	T_{vj} = 125°C			6.25		mJ
	$R_{G,off}$ = 4.1Ω (T_{vj} = 150°C)	T_{vj} = 150°C			6.95		mJ
Thermal resistance, junction to case	Per diode		$R_{th,JC}$			0.675	K/W

Module

Characteristic value

Parameter	Note or test condition	Symbol	Values			Unit
			Min.	Typ.	Max.	
Isolation Voltage	RMS, f=50HZ,1min	V_{ISOL}			2500	V
Stray inductance module		L_{sCE}		30		nH
Operation Junction Temperature		T_{jop}	-40		150	˚C
Storage Temperature Range		T_{stg}	-40		125	˚C
Mounting Torque	Screw M6	M	3.0		5.0	N.m
Terminal Connection Torque	Screw M5	M	2.5		5.0	N.m
Weight of Module		G		160		g

Characteristics Diagrams

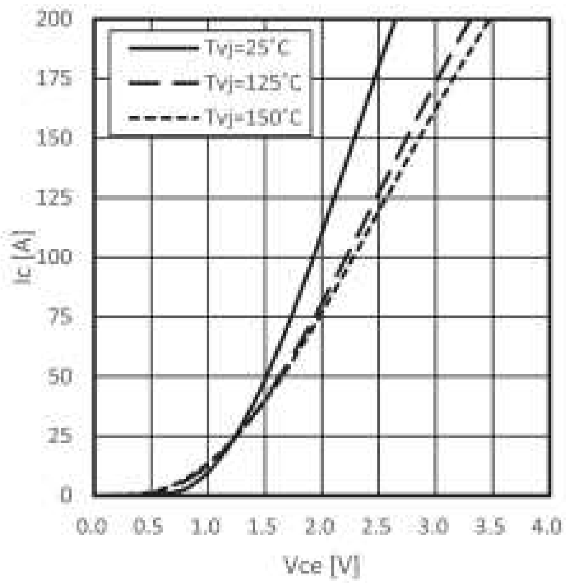


Figure 3 Output characteristic IGBT, Inverter (typical)
$I_C = f(V_{CE})$
$V_{GE} = 15V$

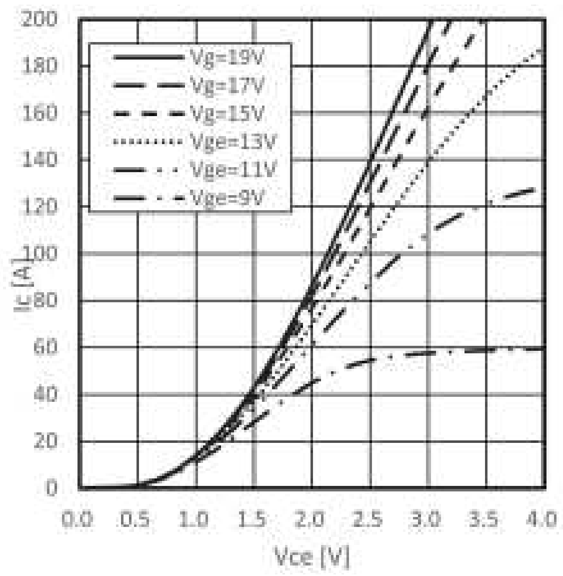


Figure 4 Output characteristic IGBT, Inverter (typical)
$I_C = f(V_{CE})$
$T_{vj} = 150°C$

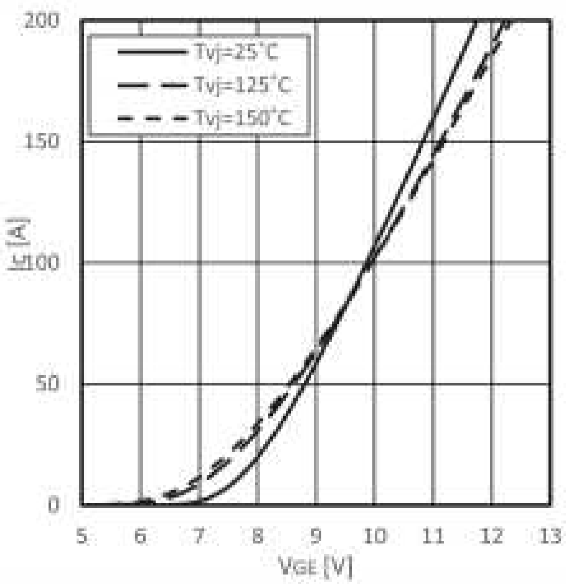


Figure 5 Transfer characteristic IGBT, Inverter (typical)
$I_C = f(V_{GE})$
$V_{CE} = 20V$

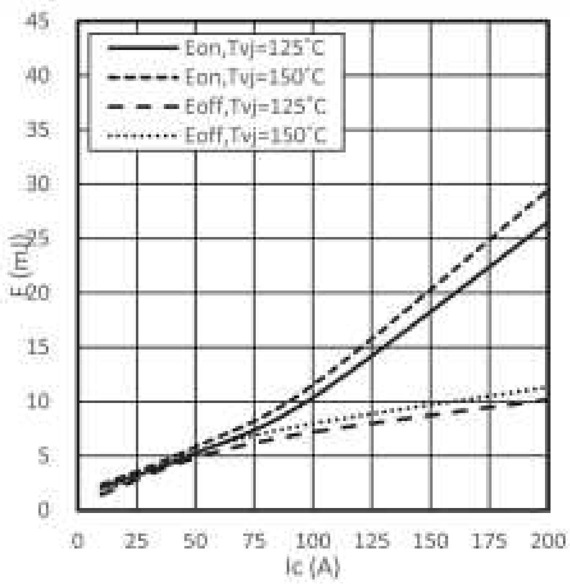


Figure 6 Switching losses IGBT, Inverter (typical)
$E_{on} = f(I_C)$, $E_{off} = f(I_C)$
$R_G = 4.1\ \Omega$, $V_{CE} = 600\ V$, $V_{GE} = \pm 15\ V$

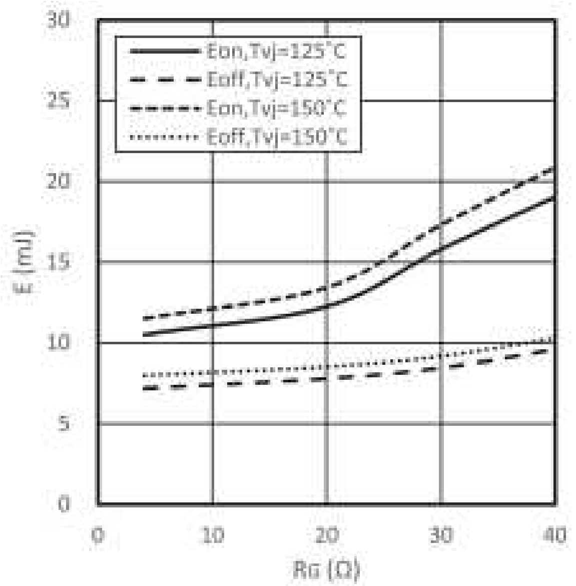


Figure 7 Switching losses IGBT, Inverter (typical)
$E_{on} = f(R_G)$
I_C = 100 A, V_{CE} = 600 V, V_{GE} = ± 15 V

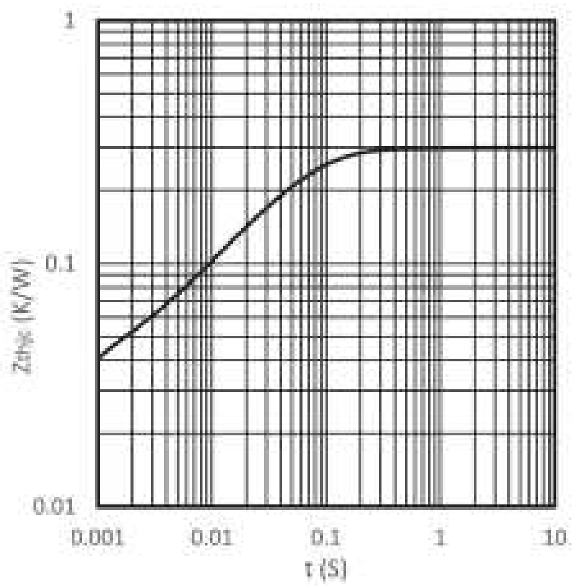
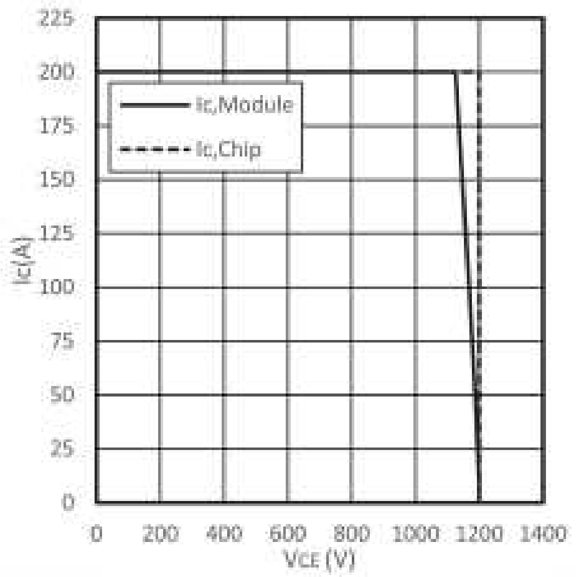
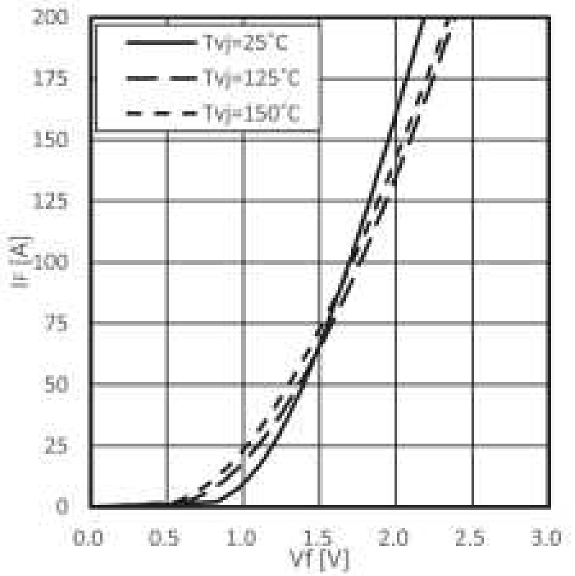


Figure 8 Transient thermal impedance IGBT, Inverter
$Z_{thJC} = f(t)$



F9 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



F10 Forward characteristic of Diode, Inverter (typical)
$I_F = f(V_F)$

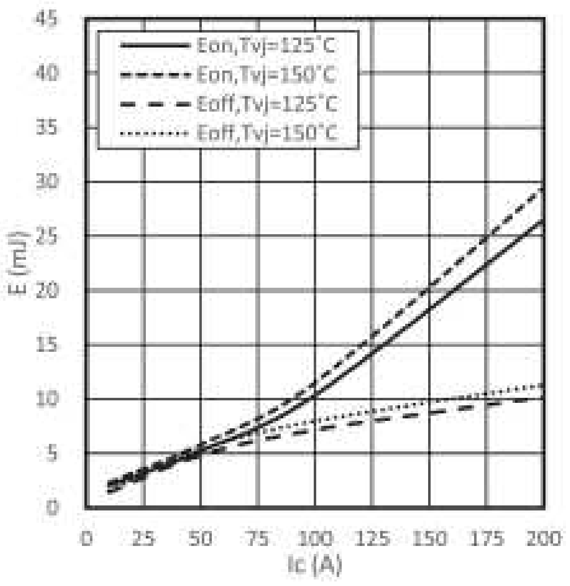


Figure 11 **Switching losses Diode, Inverter (typical)**
$E_{rec} = f(I_F)$
$R_{Gon} = 4.1\ \Omega$, $V_{CE} = 600$ V

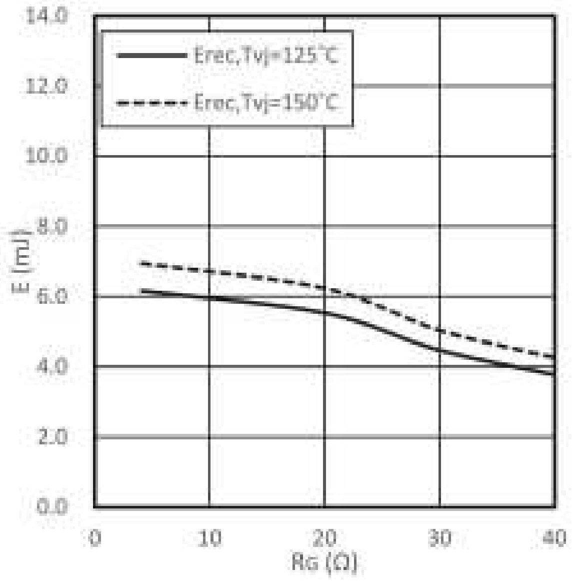


Figure 12 **Switching losses Diode, Inverter (typical)**
$E_{rec} = f(R_{Gon})$
$I_F = 100$ A, $V_{CE} = 600$ V

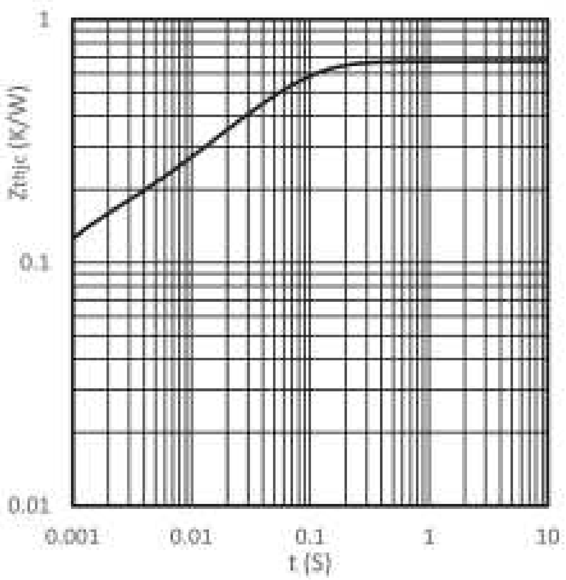
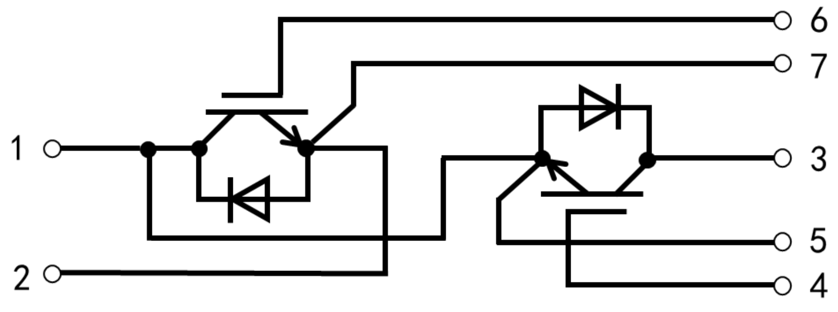


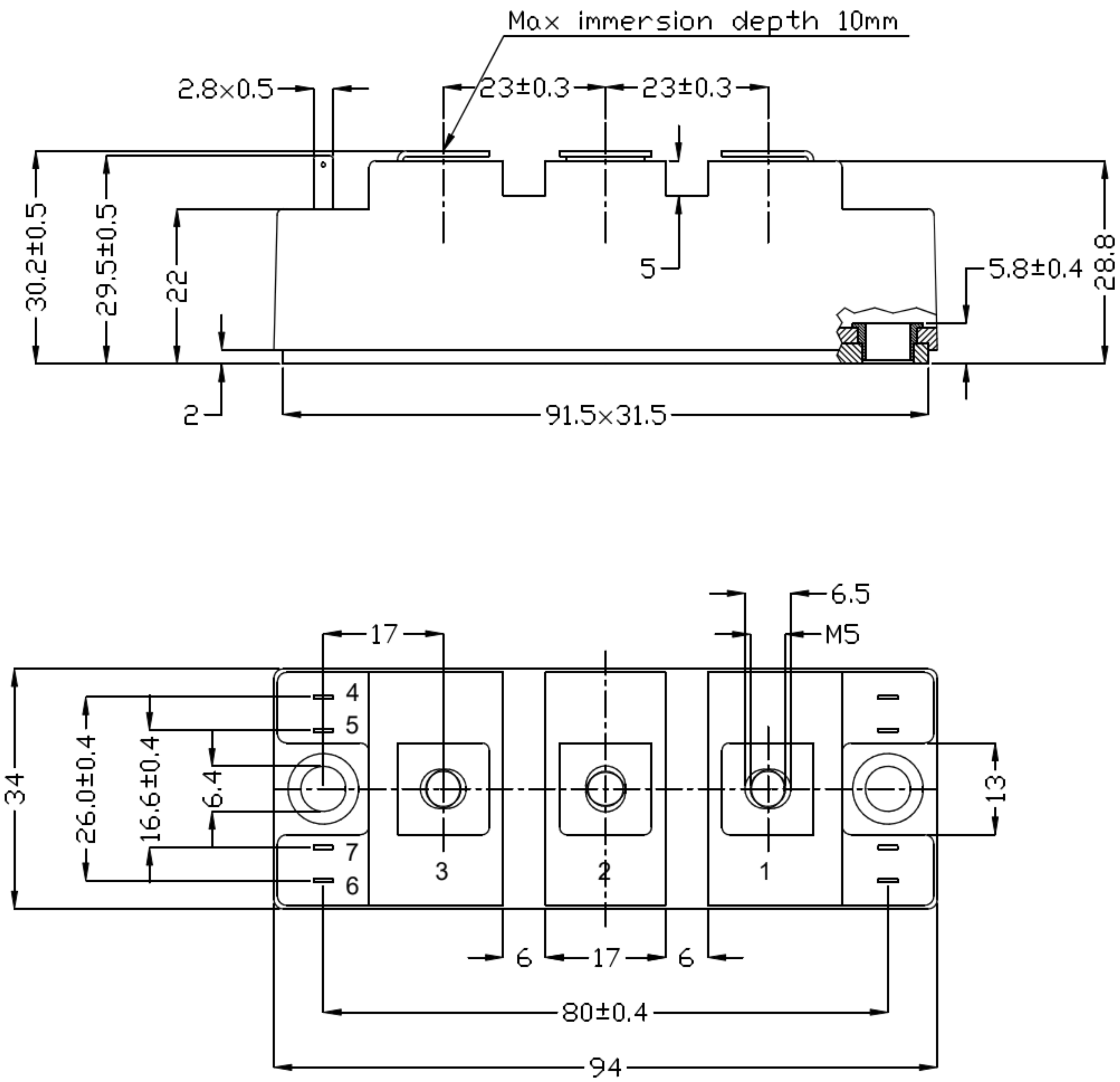
Figure 13 **Transient thermal impedance Diode, Inverter**
$Z_{thJC} = f(t)$

Outline:

Circuit Diagram



Package Outlines



S.CO.M.E.S. srl Via Enrico Mattei,6/8 26823 Castiglione d'Adda(LO)-IT
Phone:+39 0377 901243 Fax:+39 0377 900206