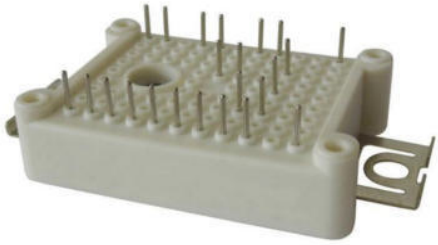
SCOMES

www.scomes.com



MRI15.12-PIM

IGBT POWER MODULE

Features：

- 10us short circuit capability
- Low switching losses
- VCE(sat) with Positive temperature coefficient
- Fast & soft reverse recovery anti-parallel FWD

Typical Applications：

- Inverter for motor drive(VFD)
- AC and DC servo drive amplifier
- Uninterruptible power supply

IGBT,Inverter

SYMBOL	CHARACTERISTIC	TEST CONDITIONS		VALUE			UNIT
				Min	Type	Max	
V_{CES}	Collector-Emitter voltage	T_j=25°C				1200	V
V_{GES}	Gate-Emitter voltage	T_j=25°C				±20	V
I_C	Collector current	Continuous@ T_c=100°C				15	A
I_{CRM}		t_P=1ms				30	A
P_{tot}	Total power dissipation	T_C= 25°C, T_{vjmax}=175°C				130	W
$V_{GE(th)}$	Gate-Emitter threshold voltage	T_j=25°C ,V_{CE}=20V，I_C=1.20mA		5.2	5.8	6.4	V
$V_{CE(sat)}$	Collector-Emitter saturation voltage	T_j=25°C ,V_{GE}=15V，I_C=15A			1.85	2.25	V
		T_j=25°C ,V_{GE}=15V，I_C=15A			2.15		V
		T_j=25°C ,V_{GE}=15V，I_C=15A			2.25		V
Q_g	Gate Charge	V_{GE}=±15V			0.12		μC
R_{Gint}	Integrated gate resistor	T_j=25°C			0		Ω
C_{ies}	Input capacitance	T_j=25°C ,V_{CE}=25V，V_{GE}=0V，f=1MHz			0.89		nF
C_{res}	Reverse transfer capacitance				0.03		nF
I_{CES}	Zero gate voltage collector current	T_j=25°C ,V_{CE}=1200V，V_{GE}=0V				1.0	mA
I_{GES}	Gate-Emitter leakage current	T_j=25°C ,V_{CE}=0V，V_{GE}=±20V		-0.4		0.4	μA
$t_{(d)on}$	Turn-on time	V_{CC}=600V，I_C=15A，V_{GE}=±15V，R_{gon}=39Ω，Inductive load	T_j=25°C		55		ns
			T_j=125°C		55		ns
			T_j=150°C		55		ns
t_r			T_j=25°C		59		ns
			T_j=125°C		65		ns
			T_j=150°C		65		ns
$t_{(d)off}$	Turn-off time	V_{CC}=600V，I_C=15A，V_{GE}=±15V，R_{goff}=39Ω，Inductive load	T_j=25°C		195		ns
			T_j=125°C		275		ns
			T_j=150°C		280		ns
t_f			T_j=25°C		145		ns
			T_j=125°C		190		ns
			T_j=150°C		215		ns
E_{on}		I_C=15 A, V_{CE}=600V, L_S=50nH, V_{GE}=±15 V, di/dt=550A/μs (Tvj = 150°C), R_{Gon}=39 Ω	T_j=25°C		1.30		mJ
			T_j=125°C		1.75		mJ
			T_j=150°C		1.95		mJ
E_{off}		I_C=15 A, V_{CE}=600V, L_S=50nH, V_{GE}=±15 V, di/dt=550A/μs (Tvj = 150°C), R_{Goff}=39 Ω	T_j=25°C		0.83		mJ
			T_j=125°C		1.20		mJ
			T_j=150°C		1.35		mJ

I_{sc}	Short circuit withstand current	V_{GE}=15V, V_{CC}=800V, V_{CEmax}=V_{CES} -L_{sCE} ·di/dt, t_P≤10μs, T_{vj}=150°C		55		A
$R_{th(j-c)}$	Thermal resistance, junction to case	per IGBT		1.05	1.15	℃/W
$R_{th(c-h)}$	Thermal resistance, case to heatsink			1.05		℃/W
T_{Vjop}	Junction temperature	/	-40		150	℃
T_{stg}	Storage temperature		-40		125	℃
F	mountig force per clamp		20		50	N
W_t	Weight			24		g

Diode, Inverter

SYMBOL	CHARACTERISTIC	TEST CONDITIONS		VALUE			UNIT
				Min	Type	Max	
V_{RRM}	Repetitive peak reverse voltage	T_{vj}=25°C				1200	V
I_F	Continuous DC forward current					15	A
I_{FRM}	Repetitive peak forward current					30	A
I^2t	I^2t - value	V_R=0V, t_P=10ms, T_{vj}=150°C				14	A^2s
V_F	Forward on voltage	I_F=15A	T_j=25°C		2.00	2.65	V
			T_j=125°C		2.10		V
			T_j=150°C		2.10		V
I_{RRM}	Max. reverse recovery current	I_F=15A , - di_F/dt=550A/ μ s, V_R=600V	T_j=25°C		13		A
			T_j=125°C		12		A
			T_j=150°C		12		A
Q_r	Recovered charge	I_F=15A , - di_F/dt=550A/ μ s, V_R=600V	T_j=25°C		1.20		μC
			T_j=125°C		2.05		μC
			T_j=150°C		2.40		μC
E_{rec}	Reverse recovery energy	I_F=15A , - di_F/dt=550A/ μ s, V_R=600V	T_j=25°C		0.37		mJ
			T_j=125°C		0.68		mJ
			T_j=150°C		0.80		mJ
$R_{th(j-c)}$	Thermal resistance, junction to case	per diode			1.75	1.90	℃/W
$R_{th(c-h)}$	Thermal resistance, case to heatsink				1.30		℃/W
T_{Vjop}	Junction temperature	/		-40		150	℃

Diode, Rectifier

SYMBOL	CHARACTERISTIC	TEST CONDITIONS	VALUE			UNIT
			Min	Type	Max	
V_{RRM}	Repetitive peak reverse voltage	T_{vj}=25°C			1600	V
I_{FRMSM}	Maximum RMS forward current per chip	T_C=80°C			30	A
I_{RMSM}	Maximum RMS current at rectifier output	T_C=80°C			30	A
I_{FSM}	Surge forward current	t_p=10ms, T_{vj}=150°C			245	A
I^2t	I^2t - value	V_R=0V, t_P=10ms, T_{vj}=150°C			300	A^2s
V_F	Forward on voltage	I_F=15A, T_j=150°C		0.85		V
I_R	reverse current	V_R=1600V, T_j=150°C		1.0		mA
$R_{th(j-c)}$	Thermal resistance, junction to case	per diode		1.20	1.35	℃/W
$R_{th(c-h)}$	Thermal resistance, case to heatsink			1.15		℃/W
T_{Vjop}	Junction temperature	/	-40		150	℃

IGBT, Brake-Chopper

SYMBOL	CHARACTERISTIC	TEST CONDITIONS		VALUE			UNIT
				Min	Type	Max	
V_{CES}	Collector-Emitter voltage	T_j=25°C				1200	V
V_{GES}	Gate-Emitter voltage	T_j=25°C				±20	V
I_C	Collector current	Continuous@ T_c=100°C				15	A
I_{CRM}		t_P=1ms				30	A
P_{tot}	Total power dissipation	T_C= 25°C, T_{vjmax}=175°C				130	W
$V_{GE(th)}$	Gate-Emitter threshold voltage	T_j=25°C ,V_{CE}=20V，I_C=1.20mA		5.2	5.8	6.4	V
$V_{CE(sat)}$	Collector-Emitter saturation voltage	T_j=25°C ,V_{GE}=15V，I_C=35A			1.85	2.25	V
		T_j=25°C ,V_{GE}=15V，I_C=35A			2.15		V
		T_j=25°C ,V_{GE}=15V，I_C=35A			2.25		V
Q_g	Gate Charge	V_{GE}=±15V			0.12		μC
R_{Gint}	Integrated gate resistor	T_j=25°C			0		Ω
C_{ies}	Input capacitance	T_j=25°C ,V_{CE}=25V，V_{GE}=0V，f=1MHz			0.89		nF
C_{res}	Reverse transfer capacitance				0.03		nF
I_{CES}	Zero gate voltage collector current	T_j=25°C ,V_{CE}=1200V，V_{GE}=0V				1.0	mA
I_{GES}	Gate-Emitter leakage current	T_j=25°C ,V_{CE}=0V，V_{GE}=±20V		-0.4		0.4	μA
$t_{(d)on}$	Turn-on time	V_{CC}=600V，I_C=15A，V_{GE}=±15V，R_{gon}=43Ω，Inductive load	T_j=25°C		65		ns
			T_j=125°C		65		ns
			T_j=150°C		65		ns
t_r			T_j=25°C		60		ns
			T_j=125°C		65		ns
			T_j=150°C		65		ns
$t_{(d)off}$	Turn-off time	V_{CC}=600V，I_C=15A，V_{GE}=±15V，R_{goff}=43Ω，Inductive load	T_j=25°C		210		ns
			T_j=125°C		280		ns
			T_j=150°C		285		ns
t_f			T_j=25°C		170		ns
			T_j=125°C		200		ns
			T_j=150°C		225		ns
E_{on}		I_C=15 A, V_{CE}=600V, L_S=50nH, V_{GE}=±15 V, R_{Gon}=43 Ω	T_j=25°C		1.35		mJ
			T_j=125°C		1.80		mJ
			T_j=150°C		2.00		mJ
E_{off}		I_C=15 A, V_{CE}=600V, L_S=50nH, V_{GE}=±15 V, R_{Goff}=43 Ω	T_j=25°C		0.85		mJ
			T_j=125°C		1.20		mJ
			T_j=150°C		1.35		mJ
I_{sc}	Short circuit withstand current	V_{GE}=15V, V_{CC}=800V, V_{CEmax}=V_{CES} -L_{sCE} ·di/dt, t_P≤10μs, T_{vj} =150°C			55		A
$R_{th(j-c)}$	Thermal resistance, junction to case	per IGBT			1.05	1.15	℃/W
$R_{th(c-h)}$	Thermal resistance, case to heatsink				1.05		℃/W
T_{Vjop}	Junction temperature	/		-40		150	℃

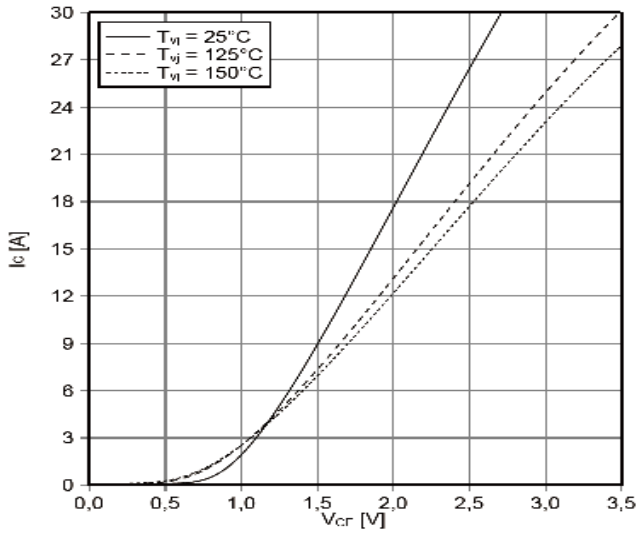
Diode, Brake-Chopper

SYMBOL	CHARACTERISTIC	TEST CONDITIONS		VALUE			UNIT
				Min	Type	Max	
V_{RRM}	Repetitive peak reverse voltage	T_{vj}=25°C				1200	V
I_F	Continuous DC forward current					10	A
I_{FRM}	Repetitive peak forward current					20	A
I^2t	I^2t - value	V_R=0V, t_P=10ms, T_{vj}=125°C				16	A^2s
V_F	Forward on voltage	I_F=10A, V_{GE}=0V	T_j=25°C		1.75	2.25	V
			T_j=125°C		1.75		V
			T_j=150°C		1.75		V
I_{RRM}	Max. reverse recovery current	I_F=10A, -di_F/dt=500A/µs ,(Tvj=150°C), V_R=600 V	T_j=25°C		12		A
			T_j=125°C		10		A
			T_j=150°C		8		A
Q_r	Recovered charge	I_F=10A , - di_F/dt=500A/ µ s, V_R=600V	T_j=25°C		0.90		µC
			T_j=125°C		1.70		µC
			T_j=150°C		1.90		µC
E_{rec}	Reverse recovery energy	I_F=10A , - di_F/dt=500A/ µ s, V_R=600V	T_j=25°C		0.24		mJ
			T_j=125°C		0.52		mJ
			T_j=150°C		0.59		mJ
$R_{th(j-c)}$	Thermal resistance, junction to case	per diode			1.75	1.90	℃/W
$R_{th(c-h)}$	Thermal resistance, case to heatsink				1.30		℃/W
T_{Vjop}	Junction temperature	/		-40		150	℃

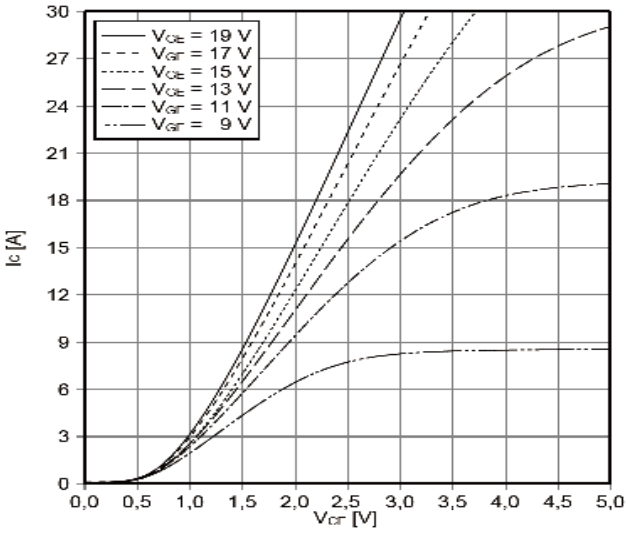
NTC-Thermistor

SYMBOL	CHARACTERISTIC	TEST CONDITIONS	VALUE			UNIT
			Min	Type	Max	
R_{25}	Rated resistance	T_c=25°C		5.00		kΩ
△R/R	Deviation of R100	T_C=100°C, R_{100}=493W	-5		5	%
P_{25}	Power dissipation	T_C=25°C			20.0	mW
$B_{25/50}$	B-value	$R_2=R_{25}$ exp [$B_{25/50}$(1/T_2-1/(298,15K))]		3375		K
$B_{25/80}$		$R_2=R_{25}$ exp [$B_{25/80}$(1/T_2-1/(298,15K))]		3411		K
$B_{25/100}$		$R_2=R_{25}$ exp [$B_{25/100}$(1/T_2-1/(298,15K))]		3433		K

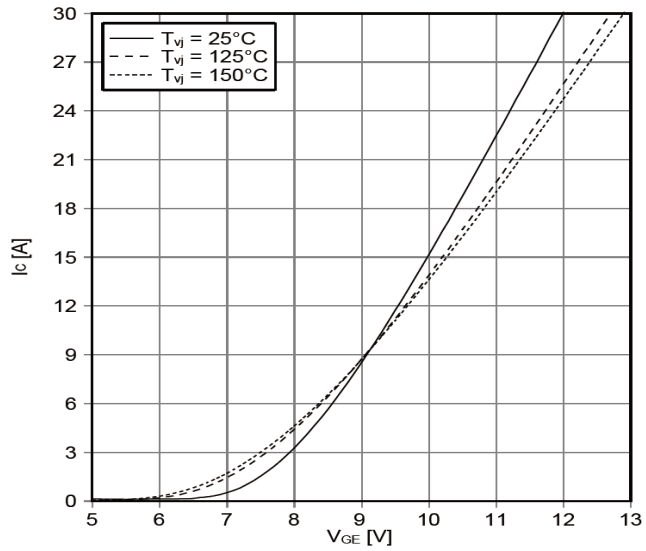
output characteristic IGBT,Inverter (typical)
$I_C = f(V_{CE})$
V_{GE} = 15 V



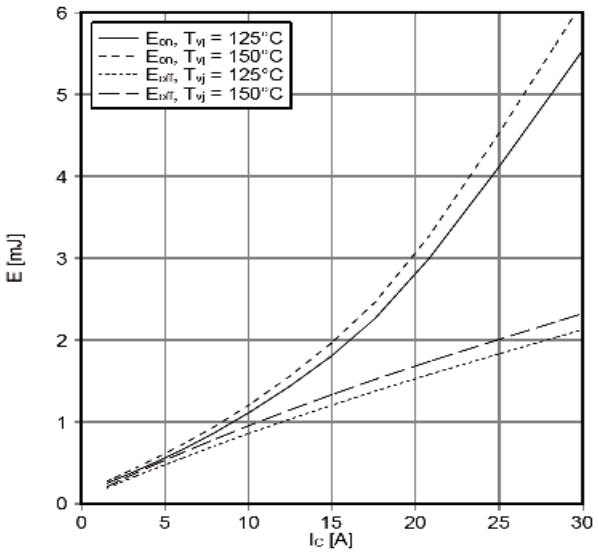
output characteristic IGBT,Inverter (typical)
$I_C = f(V_{CE})$
T_{vj} = 150°C



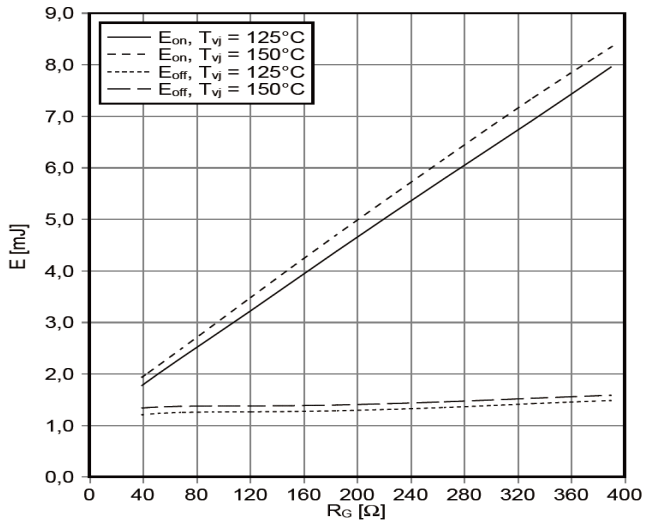
transfer characteristic IGBT,Inverter(typical)
$I_C = f(V_{GE})$
V_{CE} = 20 V



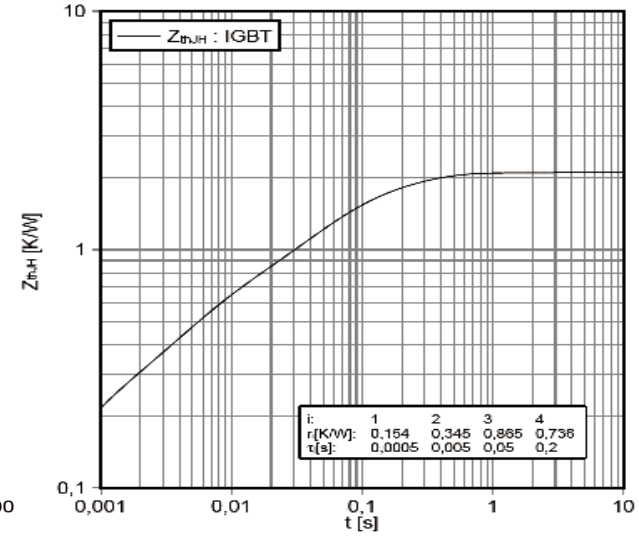
switching losses IGBT,Inverter (typical)
$E_{on} = f(I_C)$, $E_{off} = f(I_C)$
V_{GE} = ±15 V, R_{Gon} = 39 Ω, R_{Goff} = 39 Ω, V_{CE} = 600 V



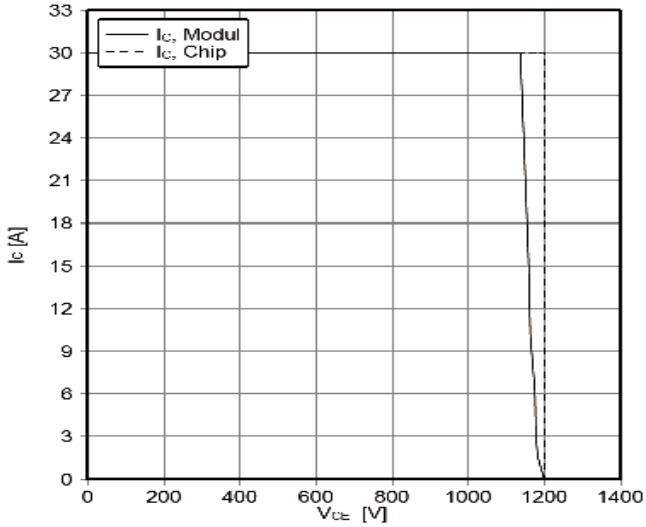
switching losses IGBT,Inverter (typical)
$E_{on} = f(R_G)$, $E_{off} = f(R_G)$
V_{GE} = ±15 V, I_C = 15 A, V_{CE} = 600 V



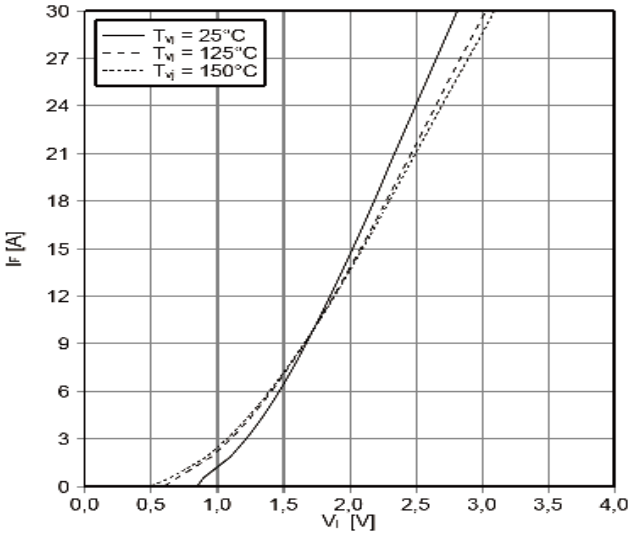
transient thermal impedance IGBT,Inverter
$Z_{thJH} = f(t)$



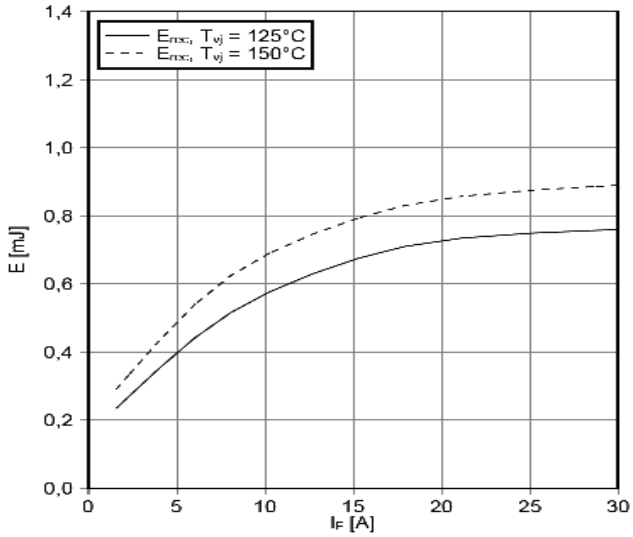
reverse bias safe operating area IGBT,Inverter (RBSOA)
$I_C = f(V_{CE})$
$V_{GE} = \pm 15$ V, $R_{Goff} = 39\ \Omega$, $T_{vj} = 150$°C



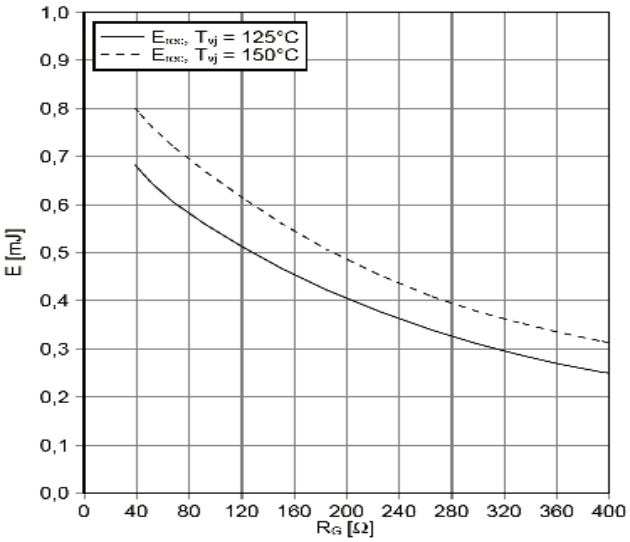
forward characteristic of Diode, Inverter (typical)
$I_F = f(V_F)$



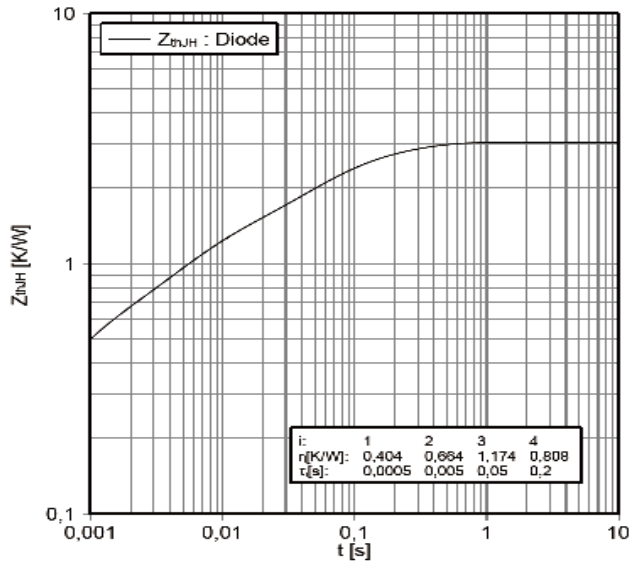
switching losses Diode, Inverter (typical)
$E_{rec} = f(I_F)$
$R_{Gon} = 39\ \Omega$, $V_{CC} = 600$ V



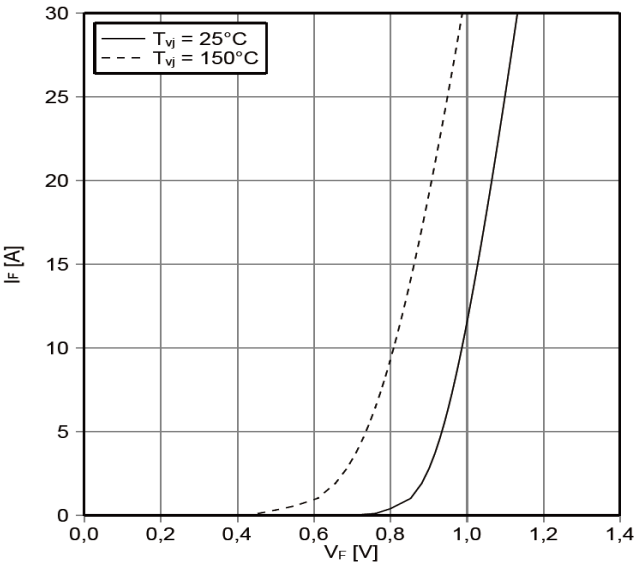
switching losses Diode, Inverter (typical)
$E_{rec} = f(R_G)$
$I_F = 15$ A, $V_{CC} = 600$ V



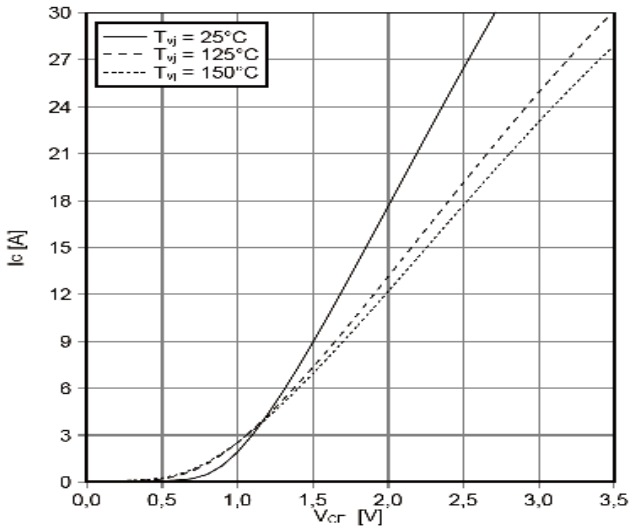
transient thermal impedance Diode, Inverter
$Z_{thJH} = f(t)$



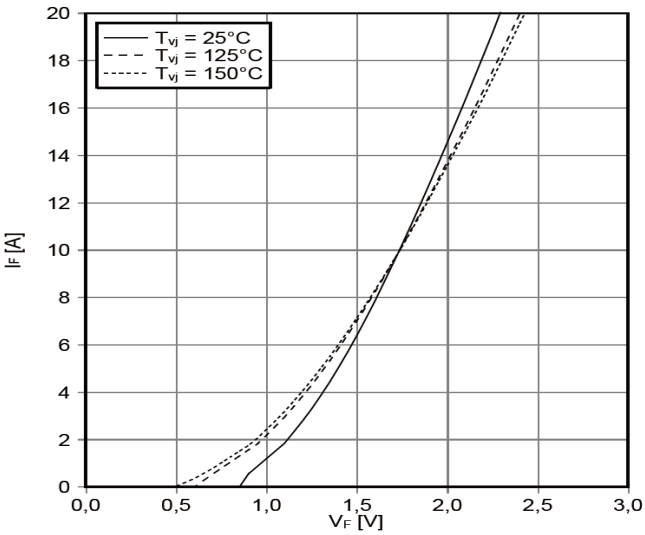
forward characteristic of Diode, Rectifier (typical)
$I_F = f(V_F)$



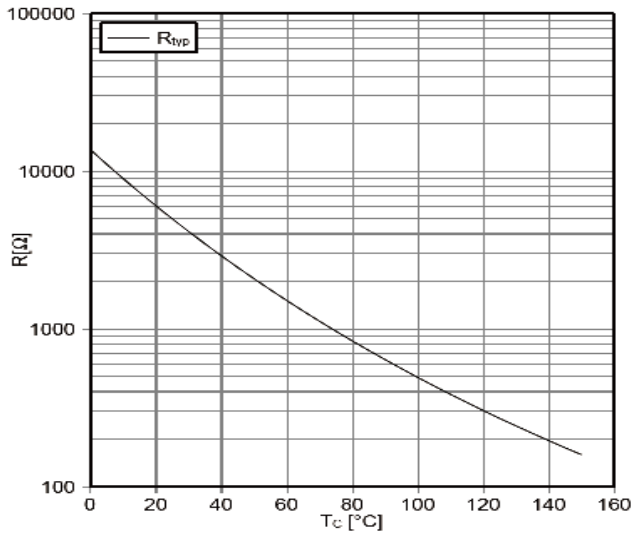
output characteristic IGBT, Brake-Chopper (typical)
$I_C = f(V_{CE})$
$V_{GE} = 15$ V



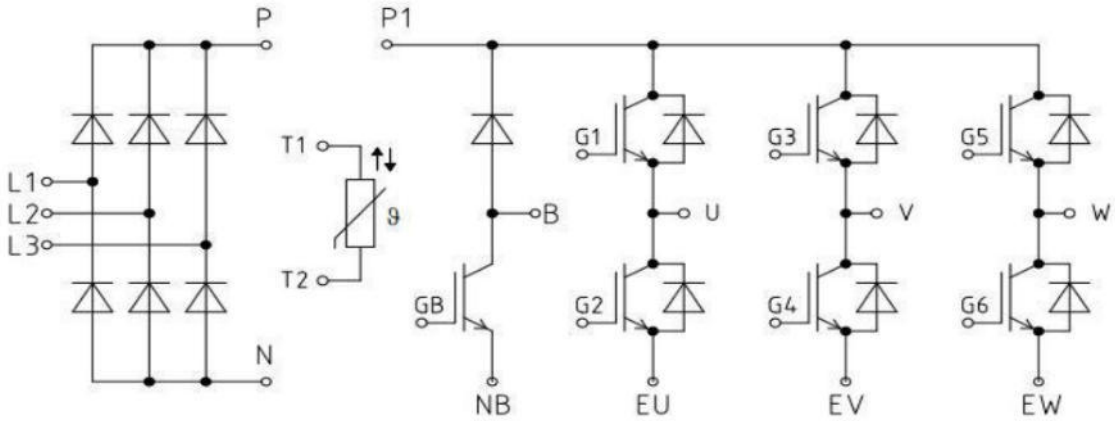
forward characteristic of Diode, Brake-Chopper (typical)
$I_F = f(V_F)$

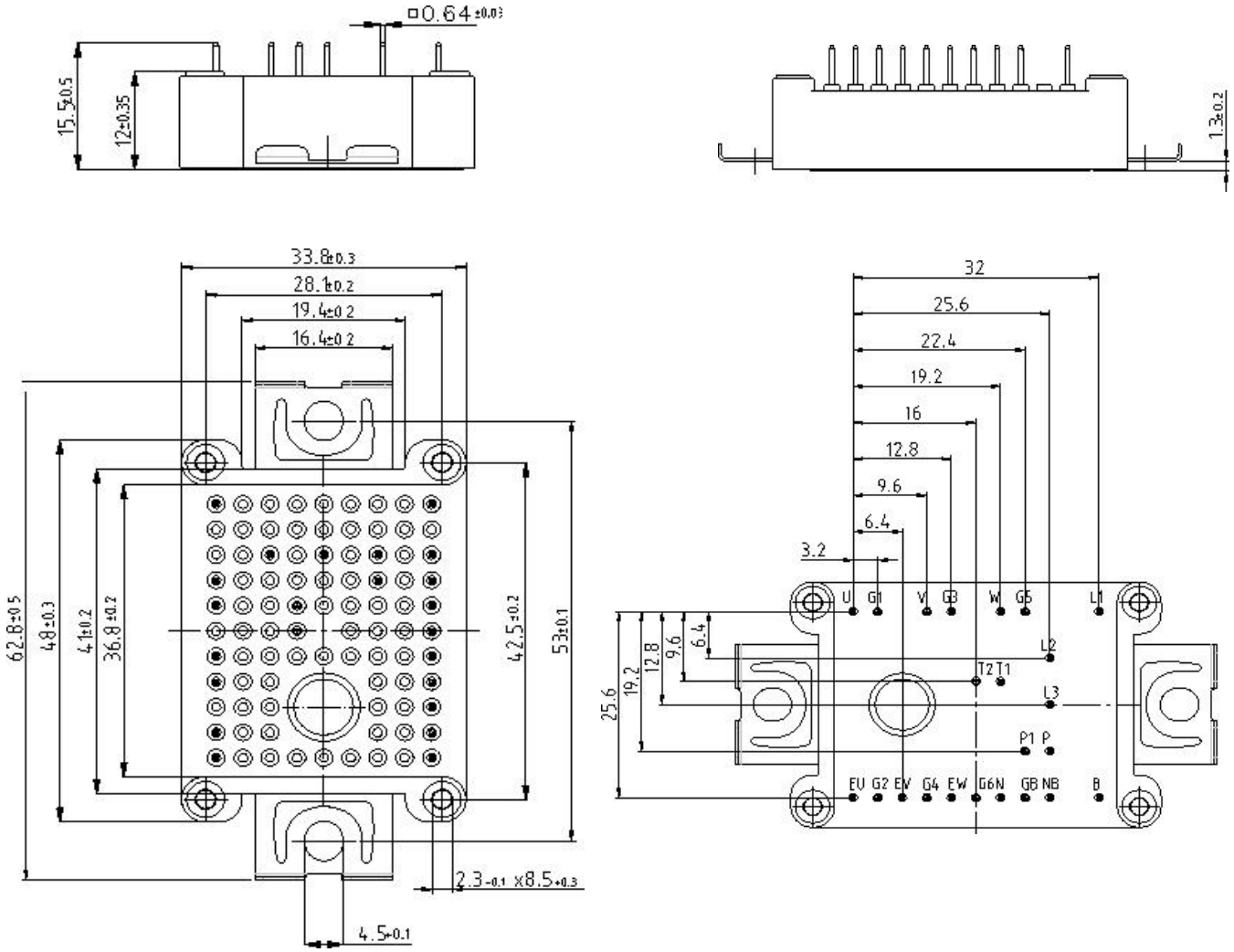


NTC-Thermistor-temperature characteristic (typical)
$R = f(T)$



Outline:





Outline:258H5P

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