

2MBI900VXA-120E-54

IGBT Modules

IGBT MODULE (V series) 1200V / 900A / 2 in one package

■ Features

- High speed switching
- Voltage drive
- Low Inductance module structure

■ Applications

- Inverter for Motor Drive
- AC and DC Servo Drive Amplifier
- Uninterruptible Power Supply
- Industrial machines, such as Welding machines



■ Maximum Ratings and Characteristics

● Absolute Maximum Ratings (at T_c=25°C unless otherwise specified)

Items	Symbols	Conditions	Maximum ratings	Units	
Inverter	Collector-Emitter voltage	V _{CES}	1200	V	
	Gate-Emitter voltage	V _{GES}	±20	V	
	Collector current	I _c	Continuous	T _c =25°C T _c =100°C	1200 900
		I _{c pulse}	1ms	1800	A
		-I _c		900	
		-I _{c pulse}	1ms	1800	
Collector power dissipation	P _c	1 device	5100	W	
Junction temperature	T _j		175		
Operating junction temperature (under switching conditions)	T _{top}		150	°C	
Case temperature	T _c		150		
Storage temperature	T _{stg}		-40 ~ +150		
Isolation voltage	between terminal and copper base (*1)	V _{iso}	AC : 1min.	4000	VAC
	between thermistor and others (*2)				
Screw torque (*3)	Mounting	-	M5	6.0	N m
	Main Terminals	-	M8	10.0	
	Sense Terminals	-	M4	2.1	

Note *1: All terminals should be connected together during the test.

Note *2: Two thermistor terminals should be connected together, other terminals should be connected together and shorted to base plate during the test.

Note *3: Recommendable Value : Mounting 3.0 ~ 6.0 Nm (M5)
 Recommendable Value : Main Terminals 8.0 ~ 10.0 Nm (M8)
 Recommendable Value : Sense Terminals 1.8 ~ 2.1 Nm (M4)

● Electrical characteristics (at T_j= 25°C unless otherwise specified)

Items	Symbols	Conditions	Characteristics			Units	
			min.	typ.	max.		
Zero gate voltage collector current	I _{CES}	V _{GE} = 0V, V _{CE} = 1200V	-	-	8.0	mA	
Gate-Emitter leakage current	I _{GES}	V _{CE} = 0V, V _{GE} = ±20V	-	-	1600	nA	
Gate-Emitter threshold voltage	V _{GE(th)}	V _{CE} = 20V, I _c = 900mA	6.0	6.5	7.0	V	
Collector-Emitter saturation voltage	V _{CE(sat)} (terminal) (*4)	V _{GE} = 15V I _c = 900A	T _j =25°C	-	1.85	2.30	V
			T _j =125°C	-	2.15	-	
	T _j =150°C		-	2.20	-		
	V _{CE(sat)} (chip)		T _j =25°C	-	1.75	2.20	
			T _j =125°C	-	2.05	-	
			T _j =150°C	-	2.10	-	
Internal gate resistance	R _{G(int)}	-	-	1.19	-	Ω	
Input capacitance	C _{ies}	V _{CE} = 10V, V _{GE} = 0V, f = 1MHz	-	83	-	nF	
Turn-on time	t _{on}	V _{CC} = 600V	-	1000	-	nsec	
	t _r	I _c = 900A	-	400	-		
	t _f	V _{GE} = ±15V	-	150	-		
	t _{off}	R _G = 1.6Ω	-	1200	-		
Turn-off time	t _r	L _s = 70nH	-	150	-	nsec	
	t _f		-	150	-		
Forward on voltage	V _F (terminal) (*4)	V _{GE} = 0V I _F = 900A	T _j =25°C	-	1.90	2.35	V
			T _j =125°C	-	2.05	-	
	T _j =150°C		-	2.00	-		
	V _F (chip)		T _j =25°C	-	1.80	2.25	
			T _j =125°C	-	1.95	-	
			T _j =150°C	-	1.90	-	
Reverse recovery time	t _{rr}	I _F = 900A	-	200	-	nsec	
Resistance	R	T = 25°C	-	5000	-	Ω	
		T = 100°C	465	495	520		
B value	B	T = 25/50°C	3305	3375	3450	K	

Note *4: Fuji defined V_{CE} value of terminal by using Sense C1 and Sense C2E1 for Upper arm and Sense C2E1 and Sense E2 for Lower arm.

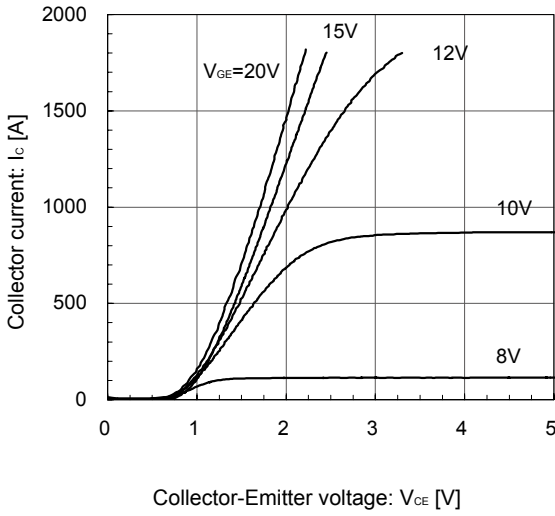
● Thermal resistance characteristics

Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	max.	
Thermal resistance(1device)	$R_{th(j-c)}$	Inverter IGBT	-	-	0.030	°C/W
		Inverter FWD	-	-	0.054	
Contact thermal resistance (1device) (*5)	$R_{th(c-f)}$	with Thermal Compound	-	0.00625	-	

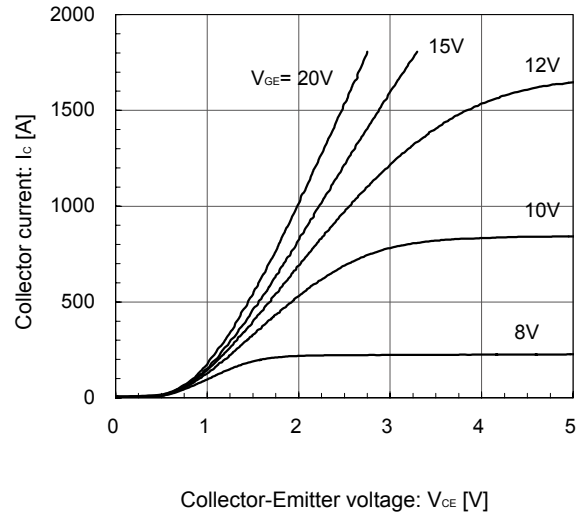
Note *5: This is the value which is defined mounting on the additional cooling fin with thermal compound.

■ Characteristics (Representative)

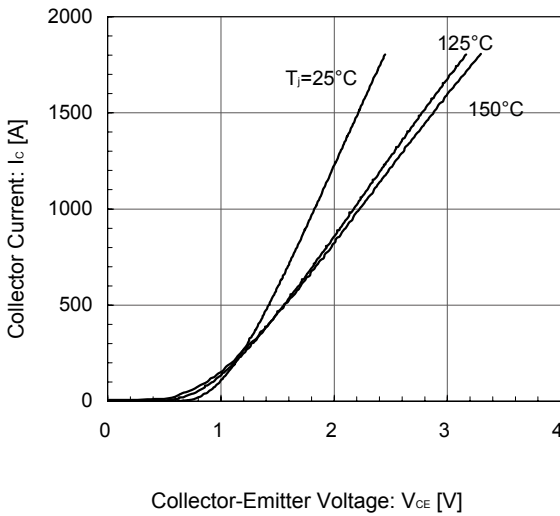
[INVERTER]
Collector current vs. Collector-Emittter voltage (typ.)
 $T_j = 25^\circ\text{C}$ / chip



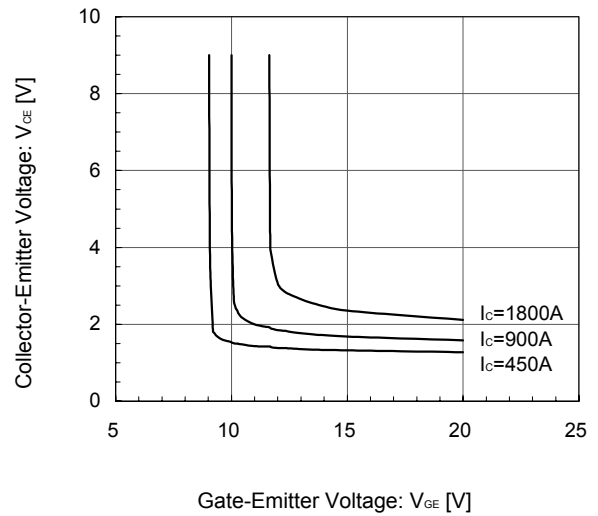
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Collector current vs. Collector-Emittter voltage (typ.)
 $T_j = 150^\circ\text{C}$ / chip



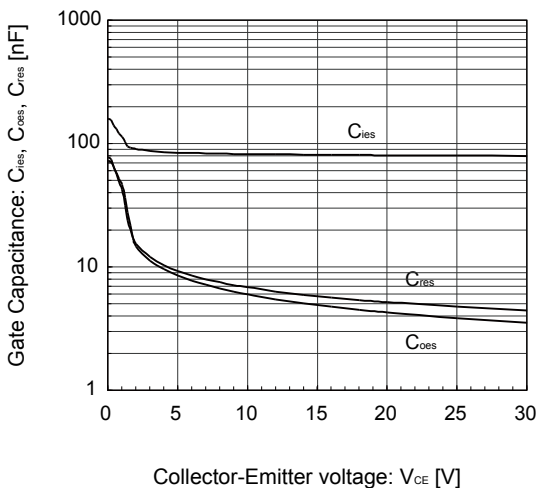
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Collector current vs. Collector-Emittter voltage (typ.)
 $V_{GE} = 15\text{V}$ / chip



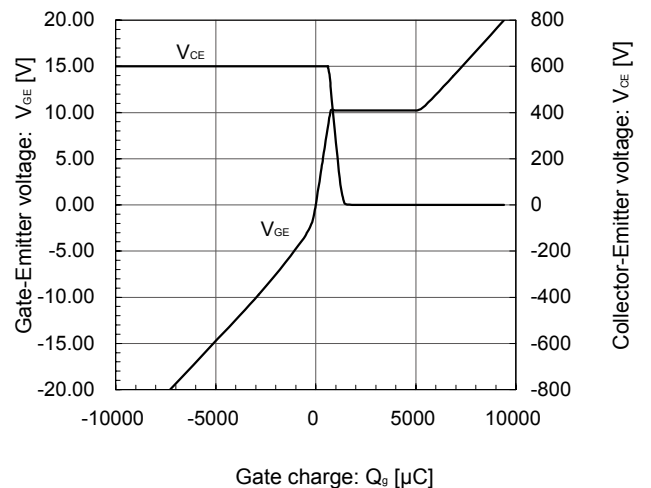
[INVERTER]
Collector-Emittter voltage vs. Gate-Emittter voltage (typ.)
 $T_j = 25^\circ\text{C}$ / chip



[INVERTER]
Gate Capacitance vs. Collector-Emittter Voltage (typ.)
 $V_{GE} = 0\text{V}$, $f = 1\text{MHz}$, $T_j = 25^\circ\text{C}$

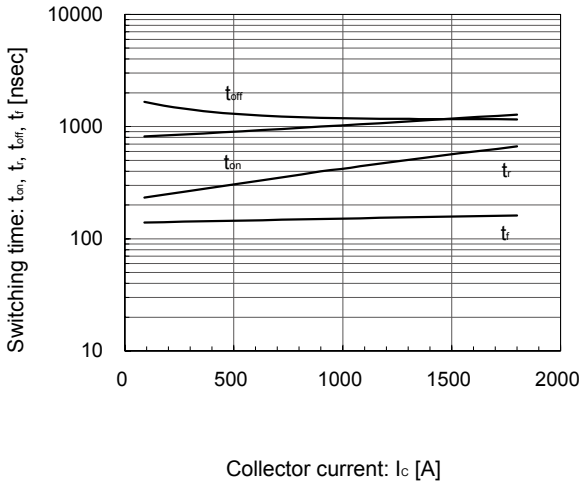


[INVERTER]
Dynamic Gate Charge (typ.)
 $V_{CE} = 600\text{V}$, $I_c = 900\text{A}$, $T_j = 25^\circ\text{C}$



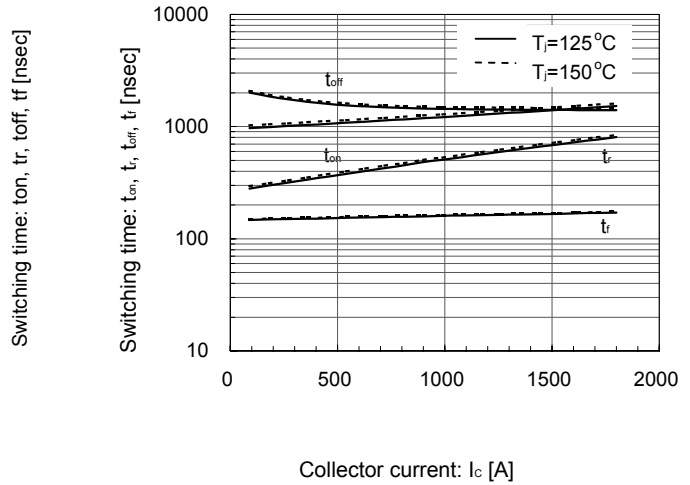
[INVERTER]

Switching time vs. Collector current (typ.)
 $V_{CC}=600V, V_{GE}=\pm 15V, R_G=1.6\Omega, T_J=25^\circ C$



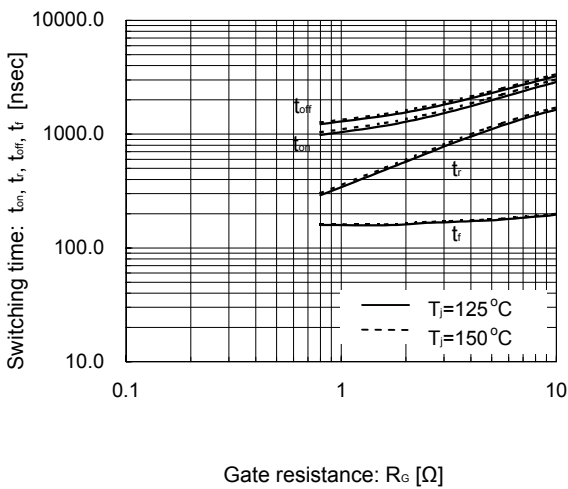
[INVERTER]

Switching time vs. Collector current (typ.)
 $V_{CC}=600V, V_{GE}=\pm 15V, R_G=1.6\Omega, T_J=125^\circ C, 150^\circ C$



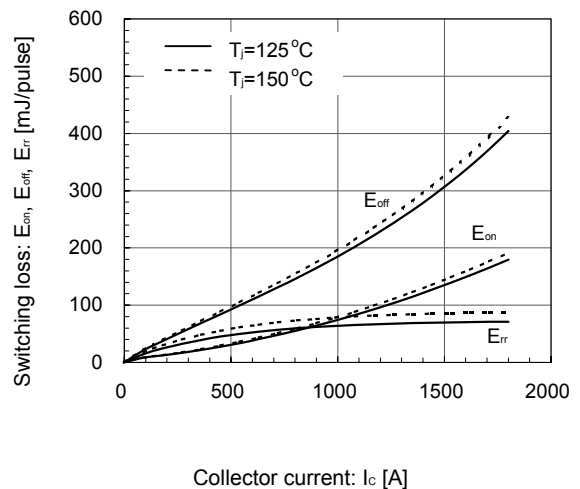
[INVERTER]

Switching time vs. Gate resistance (typ.)
 $V_{CC}=600V, I_c=900A, V_{GE}=\pm 15V, T_J=125^\circ C, 150^\circ C$



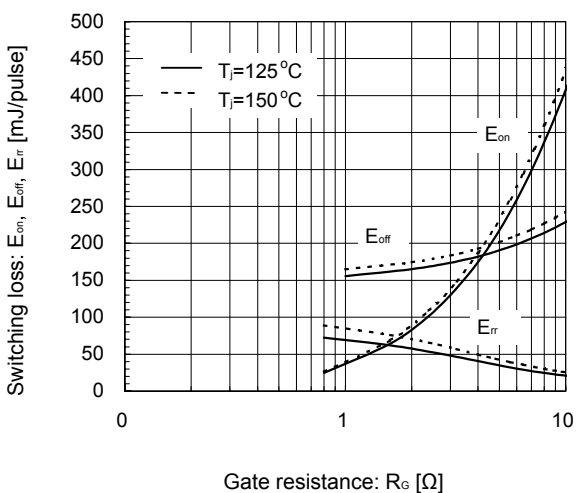
[INVERTER]

Switching loss vs. Collector current (typ.)
 $V_{CC}=600V, V_{GE}=\pm 15V, R_G=1.6\Omega, T_J=125^\circ C, 150^\circ C$



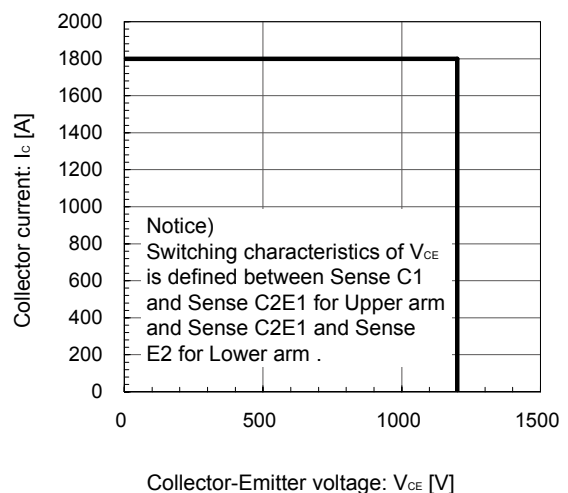
[INVERTER]

Switching loss vs. Gate resistance (typ.)
 $V_{CC}=600V, I_c=900A, V_{GE}=\pm 15V, T_J=125^\circ C, 150^\circ C$



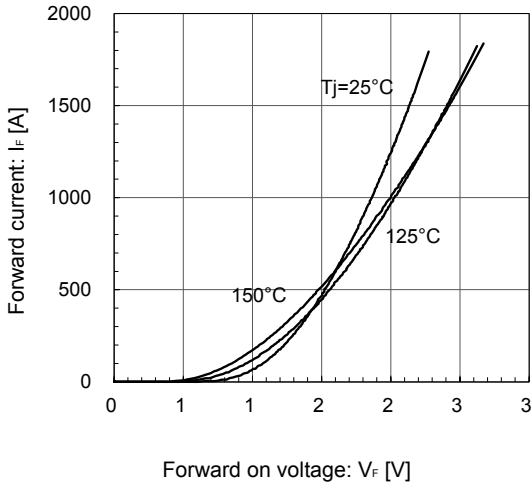
[INVERTER]

Reverse bias safe operating area (max.)
 $+V_{GE}=15V, -V_{GE}=15V, R_G=1.6\Omega, T_J=150^\circ C$



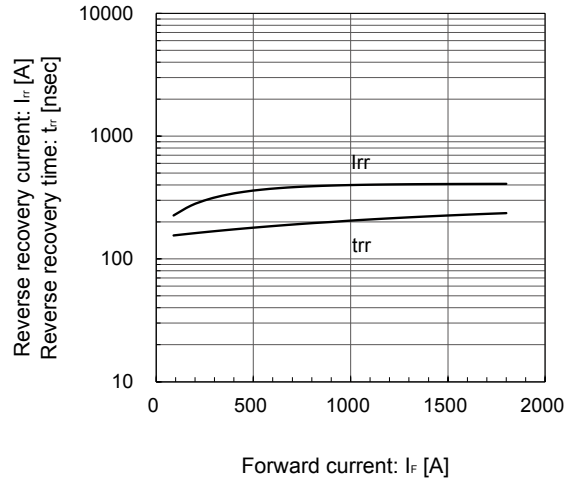
[INVERTER]

Forward Current vs. Forward Voltage (typ.)
chip



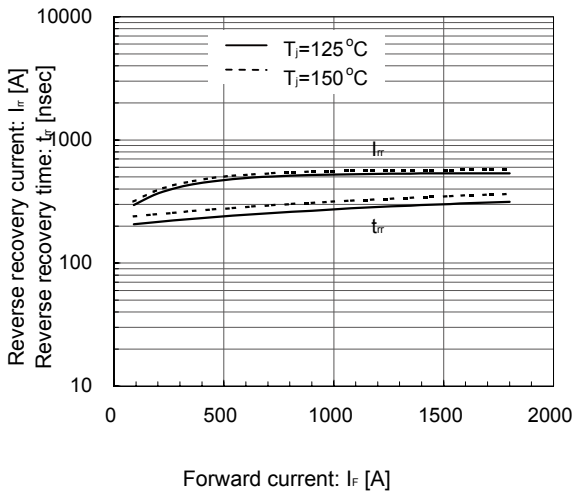
[INVERTER]

Reverse Recovery Characteristics (typ.)
V_{CC}=600V, V_{GE}=±15V, R_G=1.6Ω, T_J=25°C

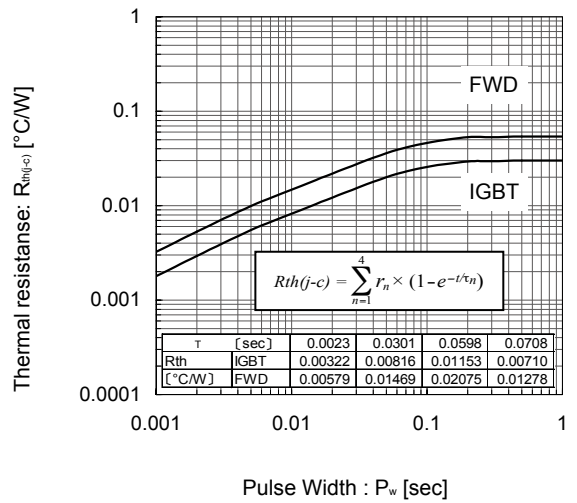


[INVERTER]

Reverse Recovery Characteristics (typ.)
V_{CC}=600V, V_{GE}=±15V, R_G=1.6Ω, T_J=125°C, 150°C

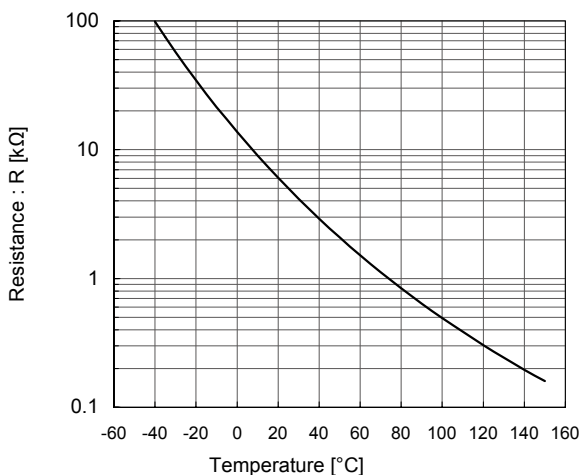


Transient Thermal Resistance (max.)

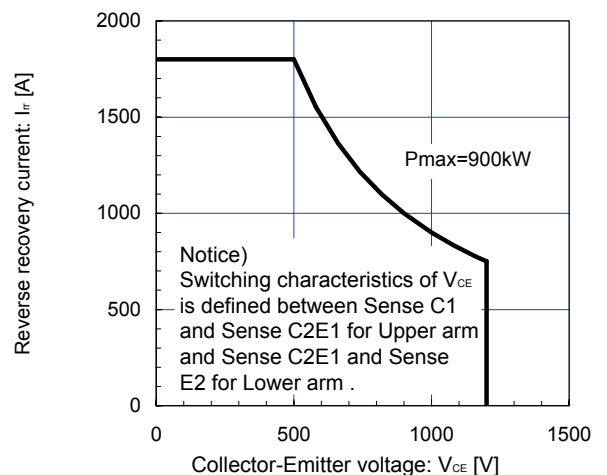


[THERMISTOR]

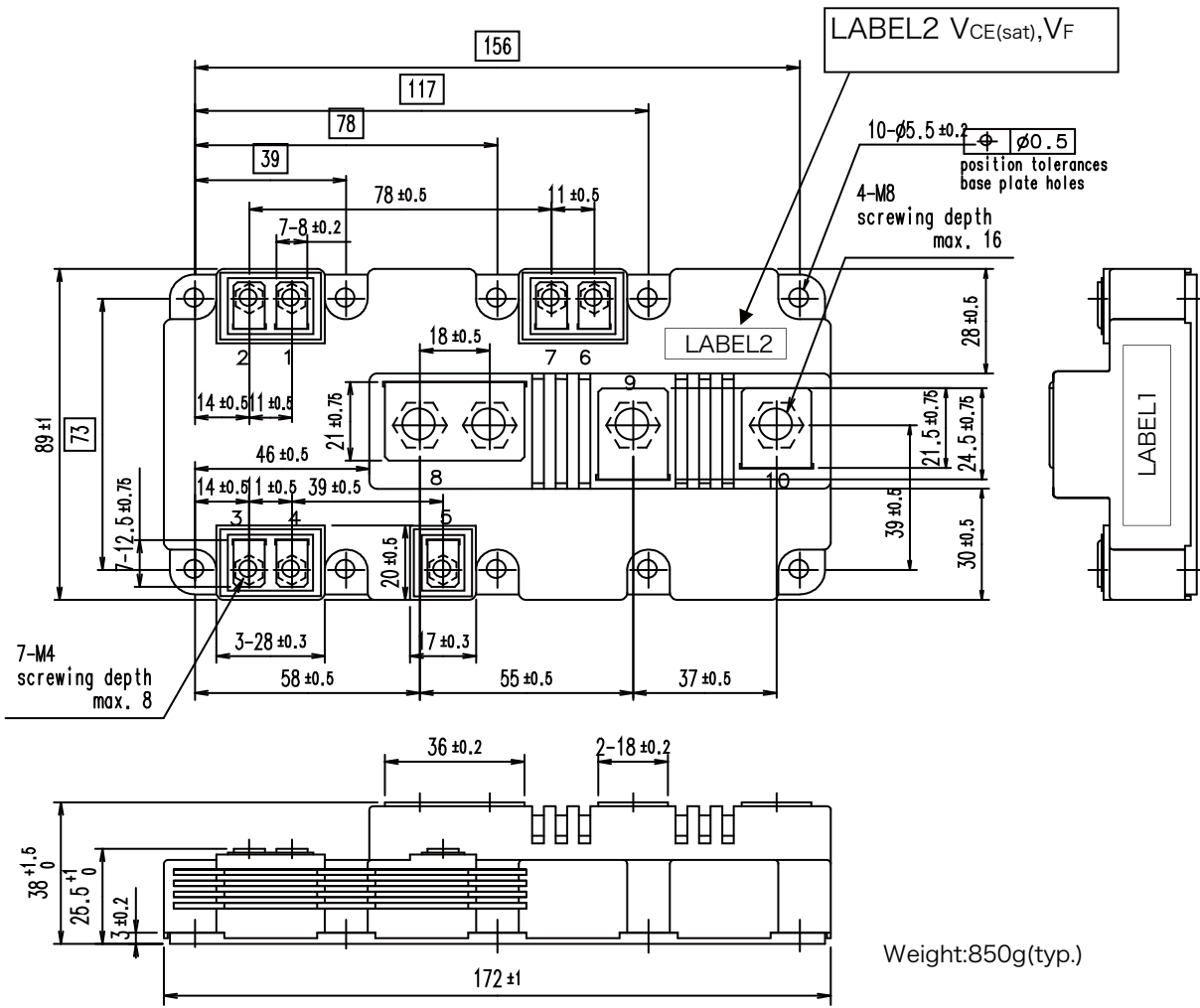
Temperature characteristic (typ.)



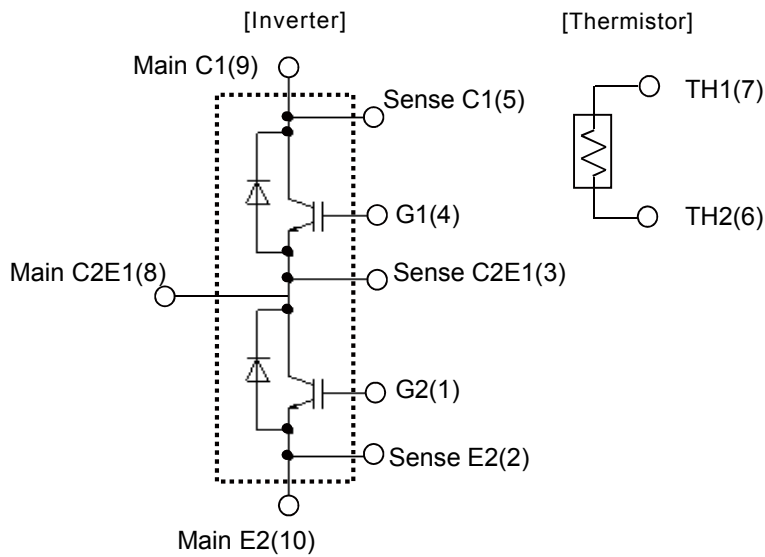
FWD safe operating area (max.)
T_J=150°C



■ Outline Drawings, mm



■ Equivalent Circuit Schematic



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