

2MBI300VE-170-50

IGBT Modules

IGBT MODULE (V series) 1700V / 300A / 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 Tc=25°C unless otherwise specified)

Items	Symbols	Conditions	Maximum ratings	Units
Collector-Emitter voltage	V _{CES}		1700	V
Gate-Emitter voltage	V _{GES}		±20	V
Inverter	Collector current	Continuous	Tc=100°C	300
			Tc=25°C	440
		1ms		600
				300
				600
Collector power dissipation	P _C	1 device	2830	W
Junction temperature	T _J		175	°C
Operating junction temperature (under switching conditions)	T _{JOP}		150	
Case temperature	T _C		125	
Storage temperature	T _{stg}		-40 ~ +125	
Isolation voltage	between terminal and copper base (*1)		4000	VAC
Screw torque	Mounting (*2)		6.0	N m
	Terminals (*3)		5.0	

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

Note *2: Recommendable Value : 3.0-6.0 Nm (M5 or M6)

Note *3: Recommendable Value : 2.5-5.0 Nm (M6)

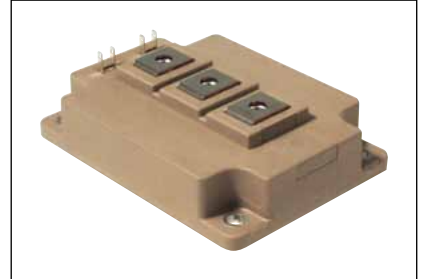
● Electrical characteristics (at Tj= 25°C unless otherwise specified)

Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	max.	
Zero gate voltage collector current	I _{CES}	V _{GE} = 0V, V _{CE} = 1700V	-	-	2.0	mA
Gate-Emitter leakage current	I _{GES}	V _{CE} = 0V, V _{GE} = ±20V	-	-	800	nA
Gate-Emitter threshold voltage	V _{GE(th)}	V _{CE} = 20V, I _C = 300mA	6.0	6.5	7.0	V
Inverter	Collector-Emitter saturation voltage	V _{GE} = 15V I _C = 300A	Tj=25°C	2.15	2.60	V
			Tj=125°C	2.55	-	
			Tj=150°C	2.60	-	
			Tj=25°C	2.00	2.25	
			Tj=125°C	2.40	-	
			Tj=150°C	2.45	-	
Internal gate resistance	R _{g(int)}	-	-	2.5	-	Ω
Input capacitance	C _{ies}	V _{CE} = 10V, V _{GE} = 0V, f = 1MHz	-	33	-	nF
Inverter	Turn-on time	V _{CC} = 900V Tj = 150°C I _C = 300A L _S = 30nH	-	1150	-	nsec
			-	580	-	
			-	60	-	
Inverter	Turn-off time	R _{G-on} = 4.7Ω R _{G-off} = 2.4Ω	-	1050	-	nsec
			-	140	-	
			-	140	-	
Inverter	Forward on voltage	V _{GE} = 0V I _F = 300A	Tj=25°C	1.95	2.25	V
			Tj=125°C	2.15	-	
			Tj=150°C	2.15	-	
			Tj=25°C	1.80	1.95	
			Tj=125°C	2.05	-	
			Tj=150°C	2.05	-	
Reverse recovery time	t _{rr}	I _F = 300A	-	220	-	nsec

● Thermal resistance characteristics

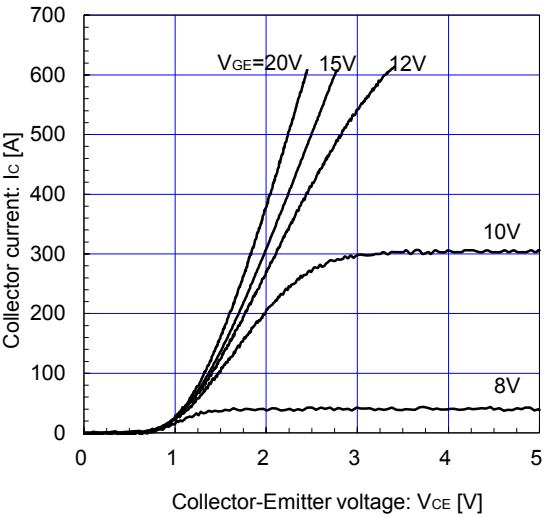
Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	max.	
Thermal resistance (1device)	R _{th(j-c)}	IGBT	-	-	0.045	°C/W
		FWD	-	-	0.094	
Contact thermal resistance (1device) (*4)	R _{th(c-f)}	with Thermal Compound	-	0.0125	-	

Note *4: This is the value which is defined mounting on the additional cooling fin with thermal compound.

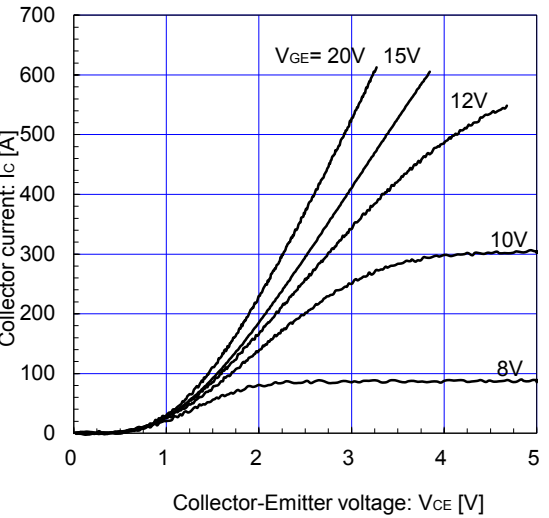


■ Characteristics (Representative)

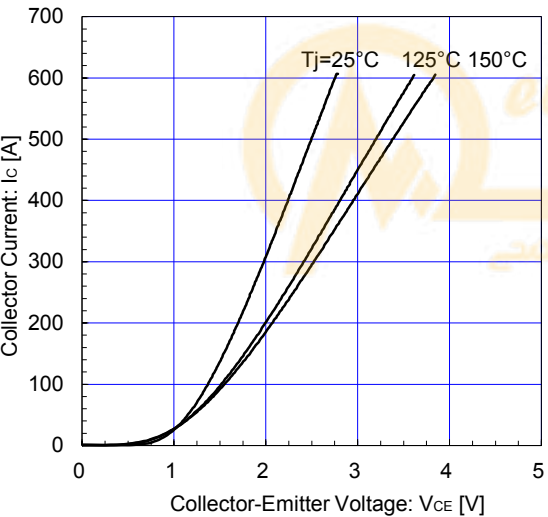
Collector current vs. Collector-Emitter voltage (typ.)
 $T_j = 25^\circ\text{C}$ / chip



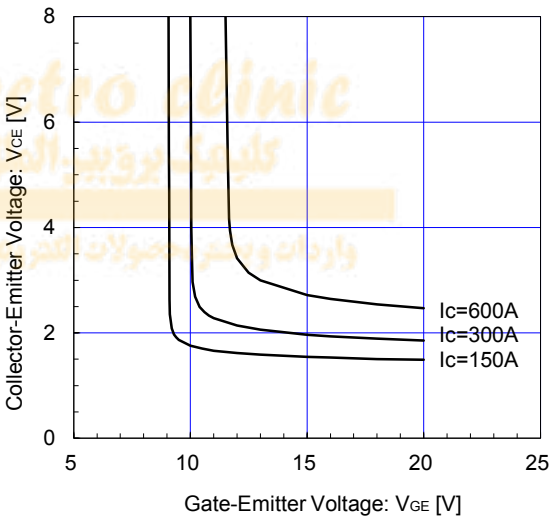
Collector current vs. Collector-Emitter voltage (typ.)
 $T_j = 150^\circ\text{C}$ / chip



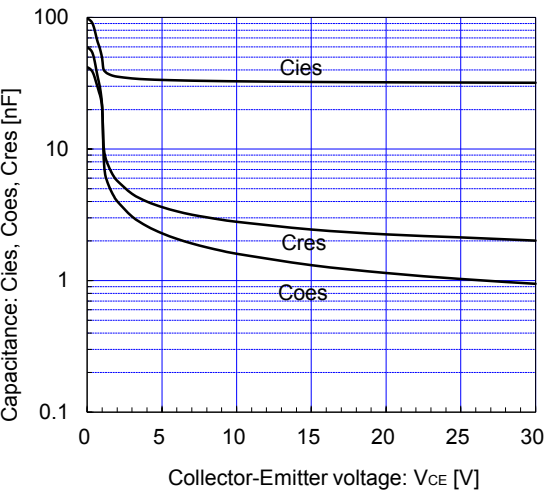
Collector current vs. Collector-Emitter voltage (typ.)
 $V_{GE} = 15\text{V}$ / chip



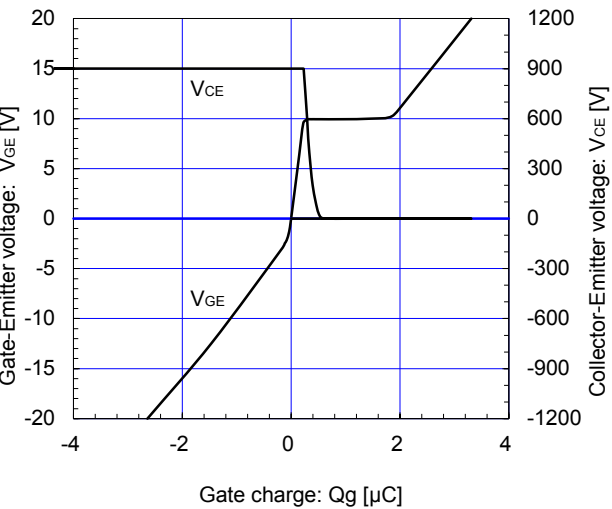
Collector-Emitter voltage vs. Gate-Emitter voltage
 $T_j = 25^\circ\text{C}$ / chip



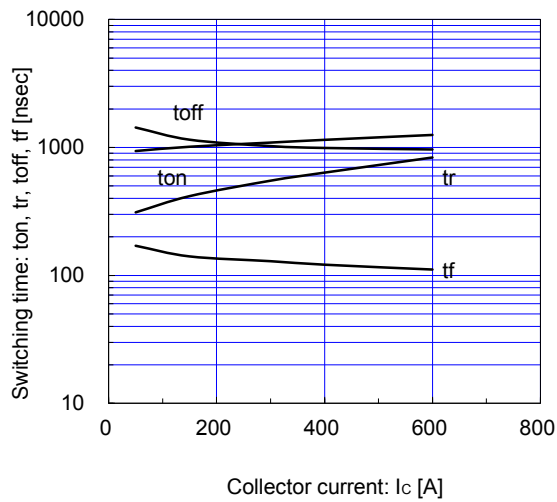
Capacitance vs. Collector-Emitter Voltage (typ.)
 $V_{GE} = 0\text{V}, f = 1\text{MHz}, T_j = 25^\circ\text{C}$



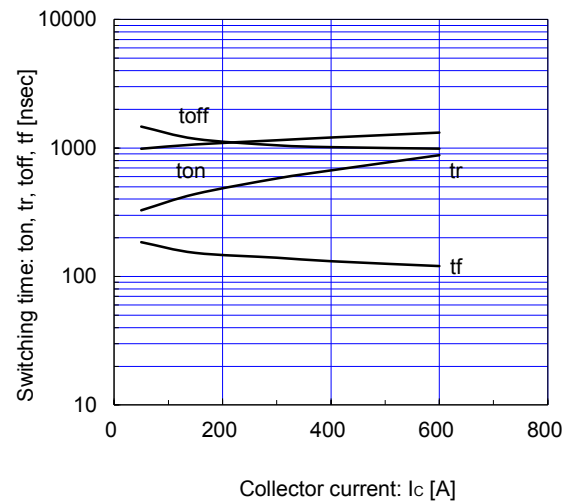
Dynamic Gate Charge (typ.)
 $V_{CC} = 900\text{V}, I_c = 300\text{A}, T_j = 25^\circ\text{C}$



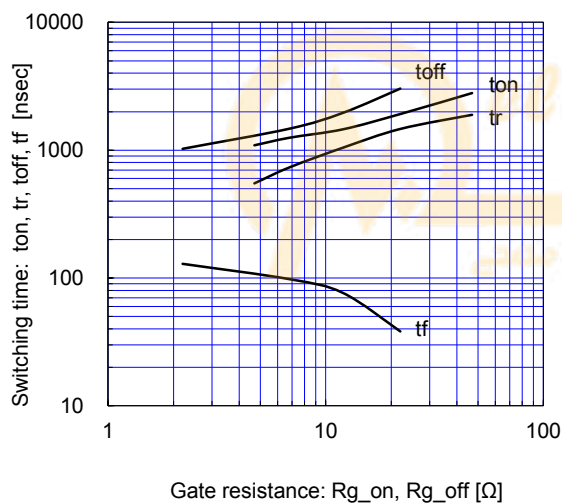
Switching time vs. Collector current (typ.)

 $V_{CC}=900V$, $V_{GE}=\pm 15V$, $R_{g_on}=4.7\Omega$, $R_{g_off}=2.4\Omega$, $T_J=125^\circ C$ 

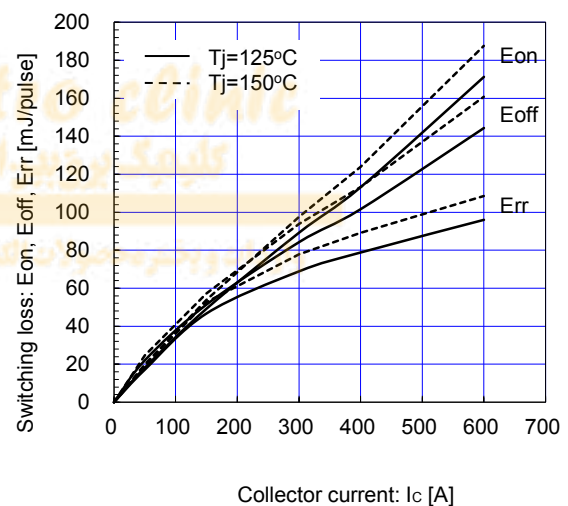
Switching time vs. Collector current (typ.)

 $V_{CC}=900V$, $V_{GE}=\pm 15V$, $R_{g_on}=4.7\Omega$, $R_{g_off}=2.4\Omega$, $T_J=150^\circ C$ 

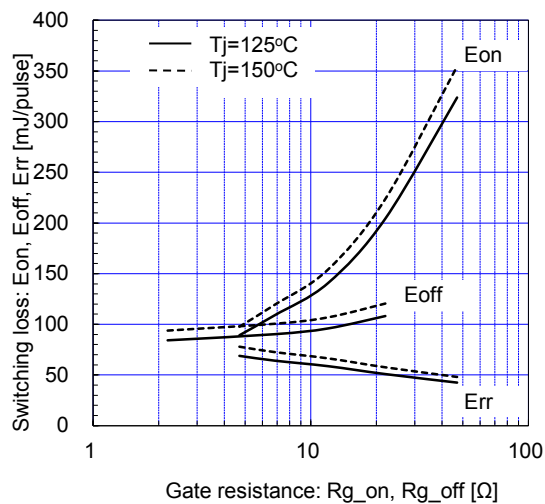
Switching time vs. Gate resistance (typ.)

 $V_{CC}=900V$, $I_C=300A$, $V_{GE}=\pm 15V$, $T_J=125^\circ C$ 

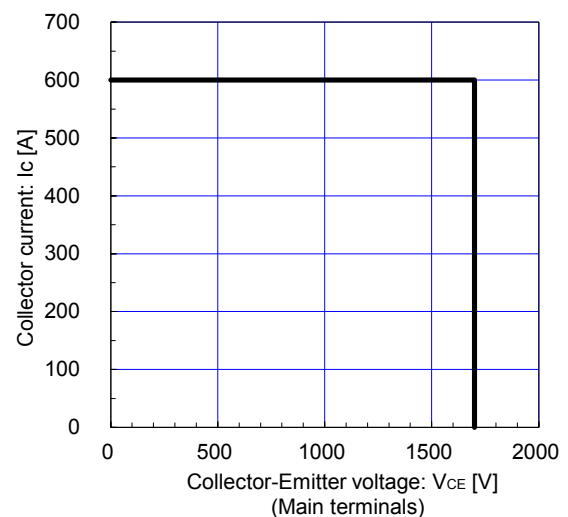
Transient Thermal Resistance (max.)

 $V_{CC}=900V$, $V_{GE}=\pm 15V$, $R_{g_on}=4.7\Omega$, $R_{g_off}=2.4\Omega$ 

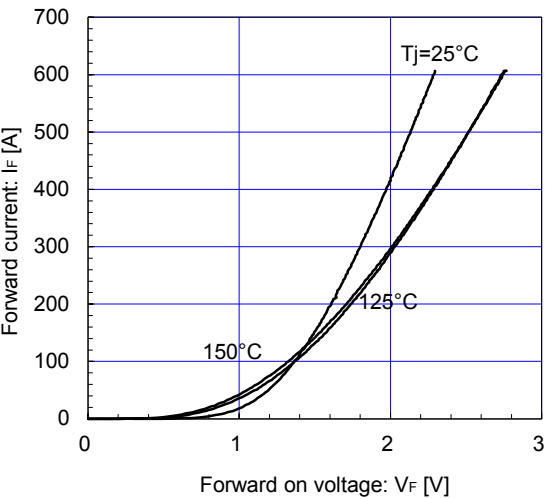
Switching loss vs. Gate resistance (typ.)

 $V_{CC}=900V$, $I_C=300A$, $V_{GE}=\pm 15V$, $T_J=125, 150^\circ C$ 

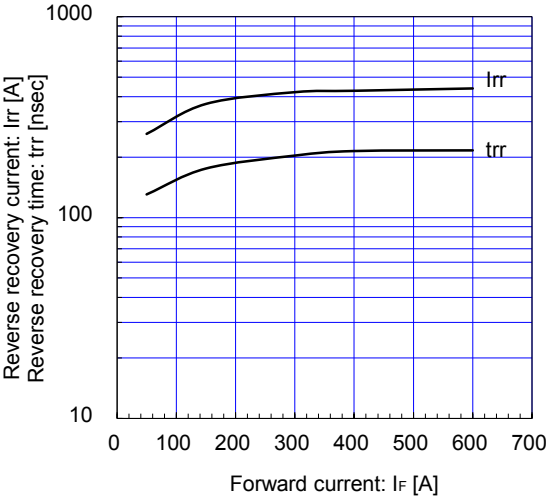
Reverse bias safe operating area (max.)

 $+V_{GE}=15V$, $-V_{GE}=15V$, $R_{g_off}=2.4\Omega$, $T_J=150^\circ C$ 

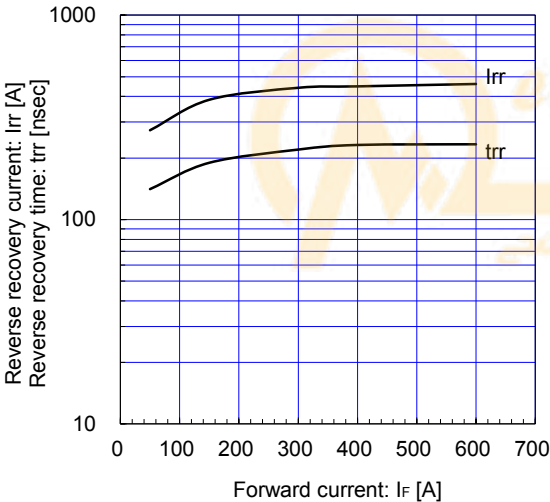
Forward Current vs. Forward Voltage (typ.)
chip



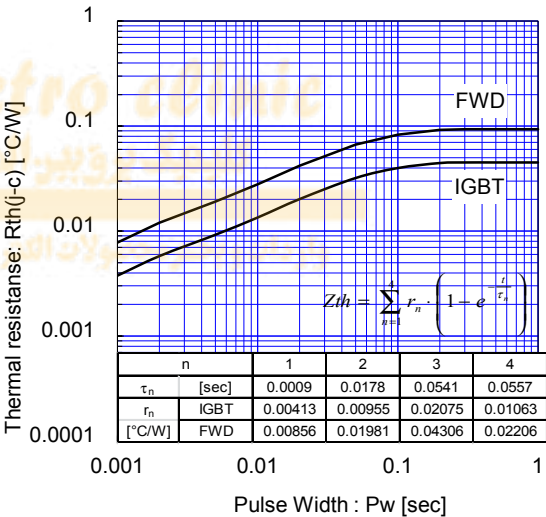
Reverse Recovery Characteristics (typ.)
 $V_{CC}=900\text{V}$, $V_{GE}=\pm 15\text{V}$, $R_{g_on}=4.7\Omega$, $T_j=125^\circ\text{C}$



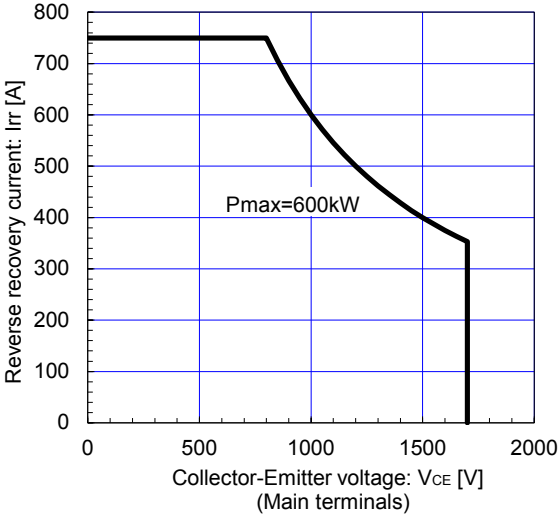
Reverse Recovery Characteristics (typ.)
 $V_{CC}=900\text{V}$, $V_{GE}=\pm 15\text{V}$, $R_{g_on}=4.7\Omega$, $T_j=150^\circ\text{C}$



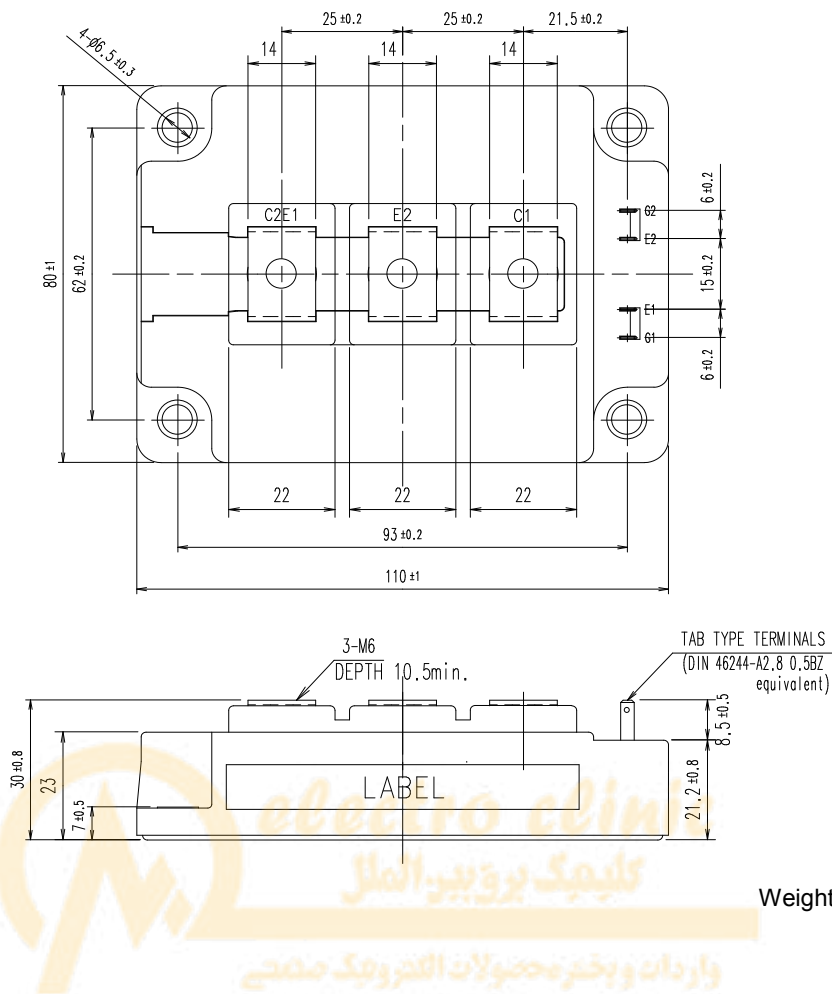
Transient Thermal Resistance (max.)



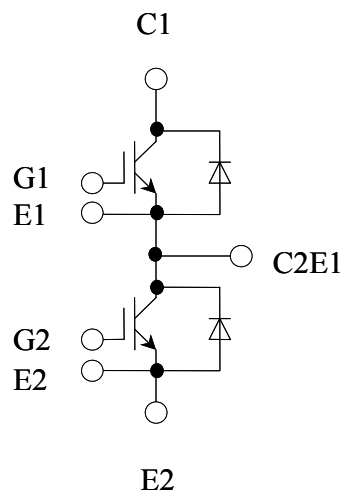
FWD safe operating area (max.)
 $T_j=150^\circ\text{C}$



■ Outline Drawings (Unit: mm)



■ Equivalent Circuit



WARNING

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• Machine tools	• Audiovisual equipment	• Electrical home appliances	• Personal equipment
			• Industrial robots etc.
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• Traffic-signal control equipment	• Gas leakage detectors with an auto-shut-off feature
• Emergency equipment for responding to disasters and anti-burglary devices	• Safety devices
• Medical equipment	
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• Submarine repeater equipment		
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