

# 2MBI300VE-170-50

**IGBT Modules**

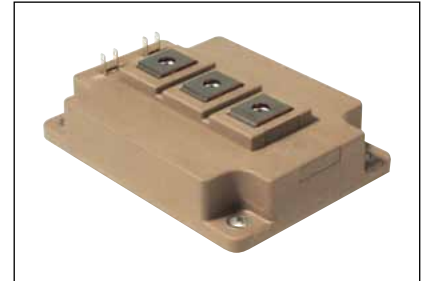
## IGBT MODULE (V series) 1700V / 300A / 2 in one package

### ■ 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 <sub>CEs</sub>		1700	V
Gate-Emitter voltage	V <sub>GES</sub>		±20	V
Inverter Collector current	I <sub>c</sub>	Continuous	T <sub>c</sub> =100°C T <sub>c</sub> =25°C	300 440
		I <sub>c</sub> pulse	1ms	600
	-I <sub>c</sub>		300	
	-I <sub>c</sub> pulse	1ms	600	
	Collector power dissipation	P <sub>c</sub>	1 device	2830
Junction temperature	T <sub>j</sub>		175	°C
Operating junction temperature (under switching conditions)	T <sub>jop</sub>		150	
Case temperature	T <sub>c</sub>		125	
Storage temperature	T <sub>stg</sub>		-40 ~ +125	
Isolation voltage	V <sub>iso</sub>	AC : 1min.	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 <sub>CEs</sub>	V <sub>GE</sub> = 0V, V <sub>CE</sub> = 1700V	-	-	2.0	mA	
Gate-Emitter leakage current	I <sub>GES</sub>	V <sub>CE</sub> = 0V, V <sub>GE</sub> = ±20V	-	-	800	nA	
Gate-Emitter threshold voltage	V <sub>GE(th)</sub>	V <sub>CE</sub> = 20V, I <sub>c</sub> = 300mA	6.0	6.5	7.0	V	
Inverter Collector-Emitter saturation voltage	V <sub>CE(sat)</sub> (terminal)	V <sub>GE</sub> = 15V I <sub>c</sub> = 300A	T <sub>j</sub> =25°C	-	2.15	2.60	V
			T <sub>j</sub> =125°C	-	2.55	-	
	T <sub>j</sub> =150°C		-	2.60	-		
	T <sub>j</sub> =25°C		-	2.00	2.25		
	T <sub>j</sub> =125°C		-	2.40	-		
V <sub>CE(sat)</sub> (chip)	T <sub>j</sub> =150°C	-	2.45	-			
Internal gate resistance	R <sub>g(int)</sub>	-	-	2.5	-	Ω	
Input capacitance	C <sub>ies</sub>	V <sub>CE</sub> = 10V, V <sub>GE</sub> = 0V, f = 1MHz	-	33	-	nF	
Inverter Turn-on time	t <sub>on</sub>	V <sub>CC</sub> = 900V T <sub>j</sub> = 150°C	-	1150	-	nsec	
	t <sub>r</sub>	I <sub>c</sub> = 300A L <sub>s</sub> = 30nH	-	580	-		
Turn-off time	t <sub>r(i)</sub>	V <sub>GE</sub> = ±15V	-	60	-		
	t <sub>off</sub>	R <sub>G,on</sub> = 4.7Ω	-	1050	-		
	t <sub>f</sub>	R <sub>G,off</sub> = 2.4Ω	-	140	-		
Inverter Forward on voltage	V <sub>F</sub> (terminal)	V <sub>GE</sub> = 0V I <sub>F</sub> = 300A	T <sub>j</sub> =25°C	-	1.95	2.25	V
			T <sub>j</sub> =125°C	-	2.15	-	
			T <sub>j</sub> =150°C	-	2.15	-	
	T <sub>j</sub> =25°C		-	1.80	1.95		
	T <sub>j</sub> =125°C		-	2.05	-		
	T <sub>j</sub> =150°C		-	2.05	-		
V <sub>F</sub> (chip)							
Reverse recovery time	t <sub>rr</sub>	I <sub>F</sub> = 300A	-	220	-	nsec	

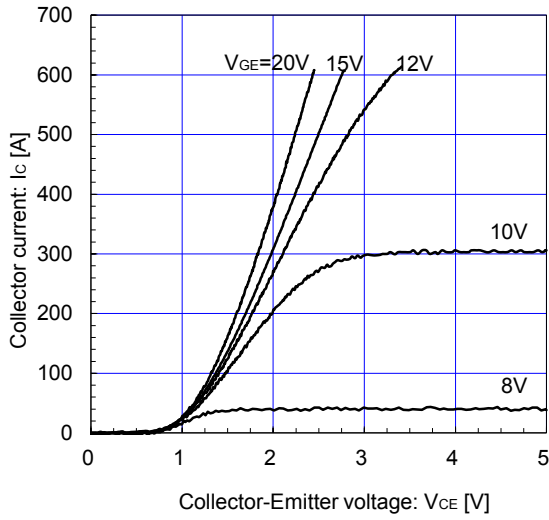
#### ● Thermal resistance characteristics

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

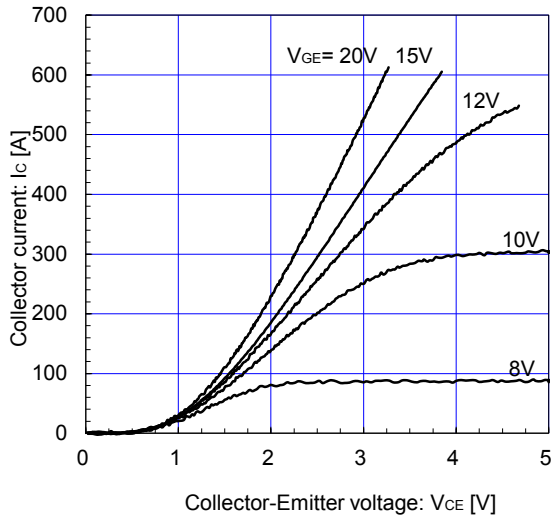
Note \*4: This is the value which is defined mounting on the additional cooling fin with thermal compound.

■ Characteristics (Representative)

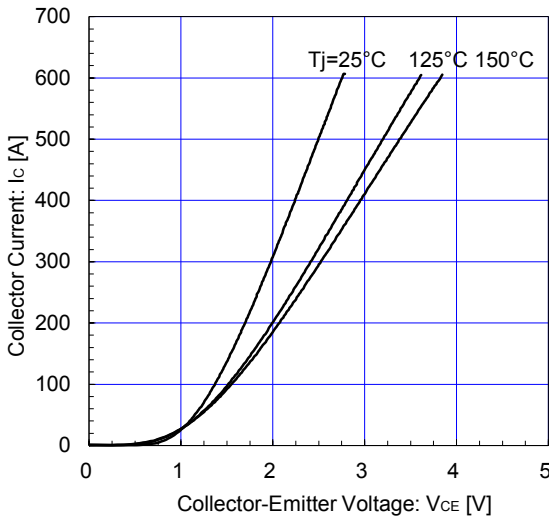
Collector current vs. Collector-Emitter voltage (typ.)  
T<sub>j</sub> = 25°C / chip



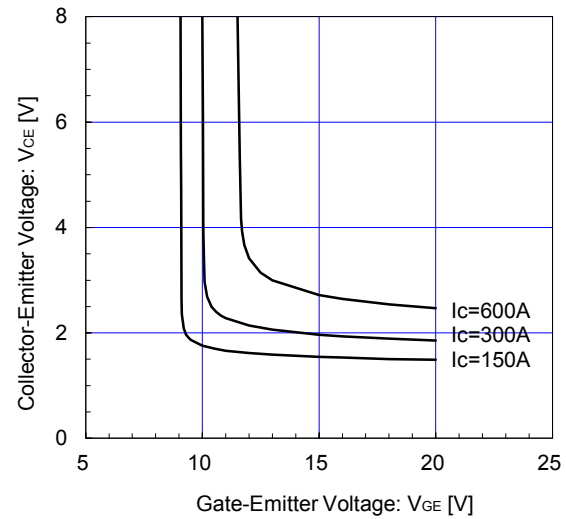
Collector current vs. Collector-Emitter voltage (typ.)  
T<sub>j</sub> = 150°C / chip



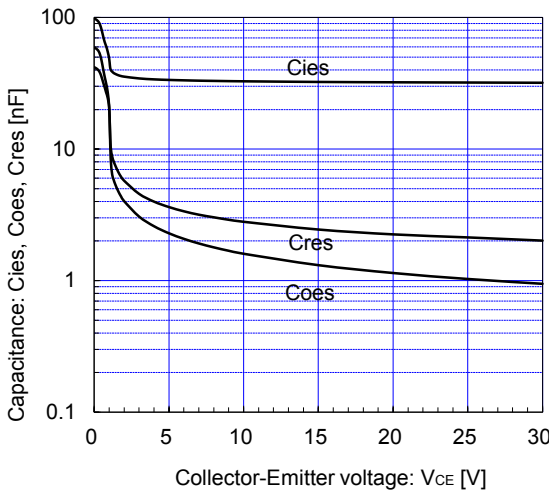
Collector current vs. Collector-Emitter voltage (typ.)  
V<sub>GE</sub> = 15V / chip



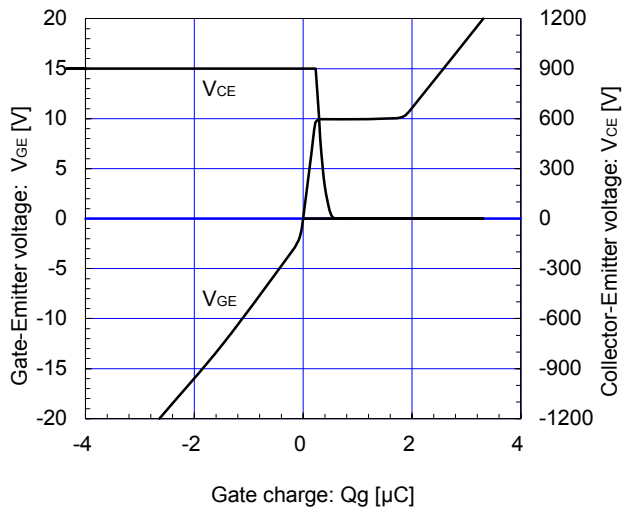
Collector-Emitter voltage vs. Gate-Emitter voltage  
T<sub>j</sub> = 25°C / chip

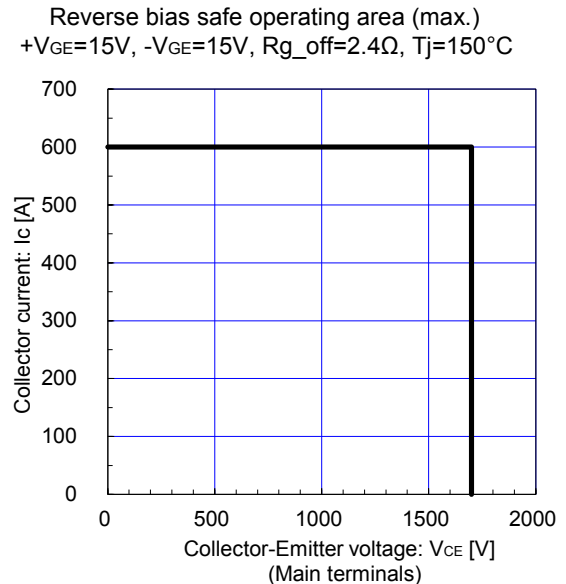
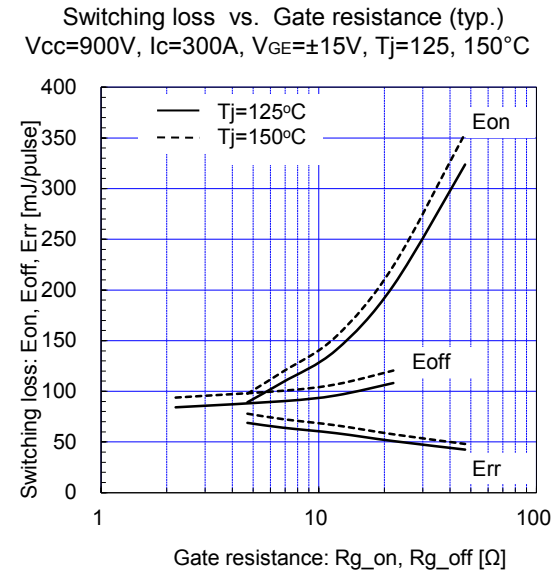
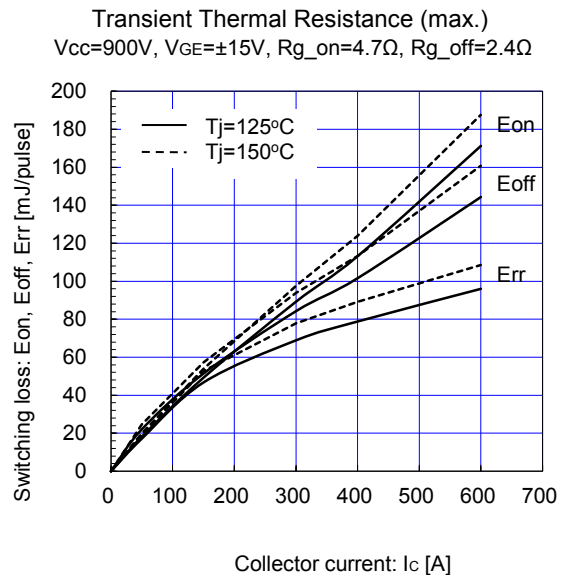
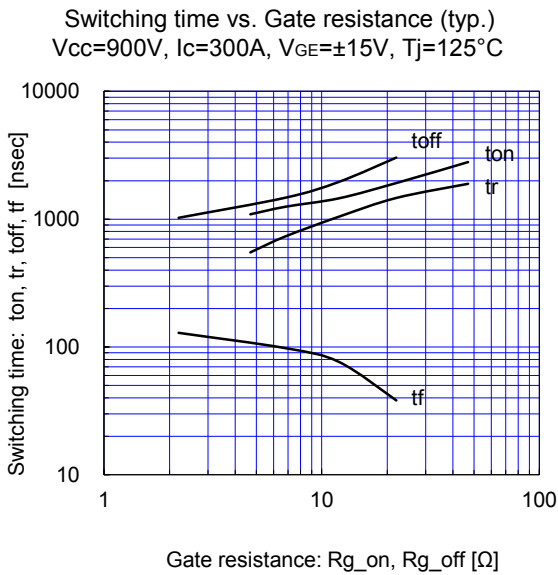
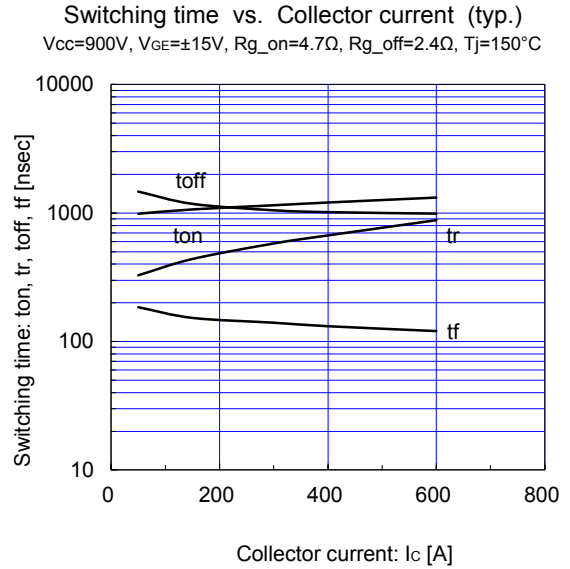
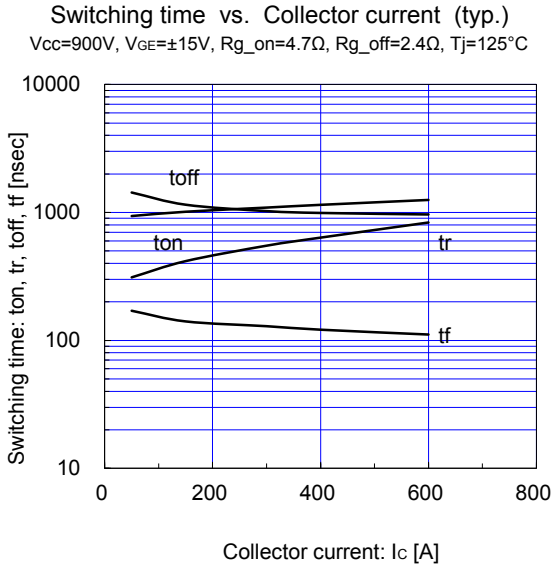


Capacitance vs. Collector-Emitter Voltage (typ.)  
V<sub>GE</sub> = 0V, f = 1MHz, T<sub>j</sub> = 25°C

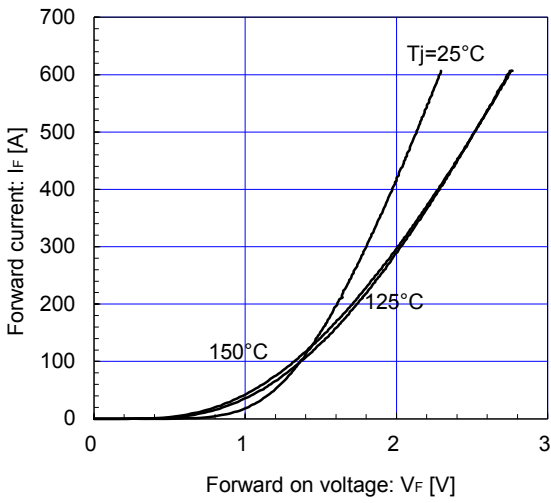


Dynamic Gate Charge (typ.)  
V<sub>CC</sub> = 900V, I<sub>C</sub> = 300A, T<sub>j</sub> = 25°C

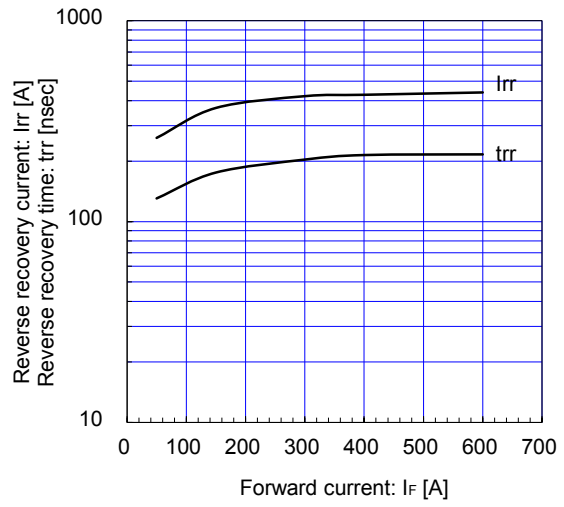




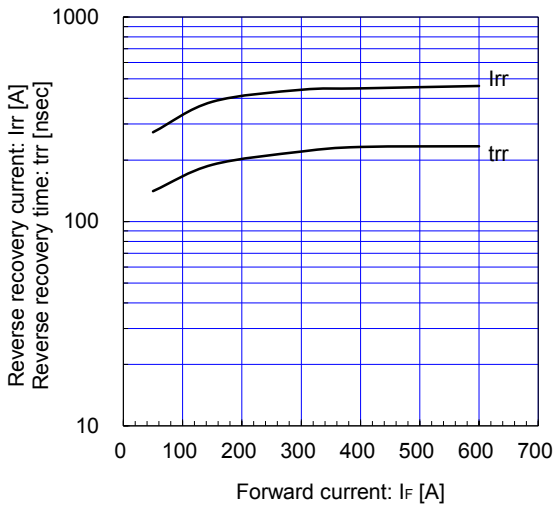
Forward Current vs. Forward Voltage (typ.)  
chip



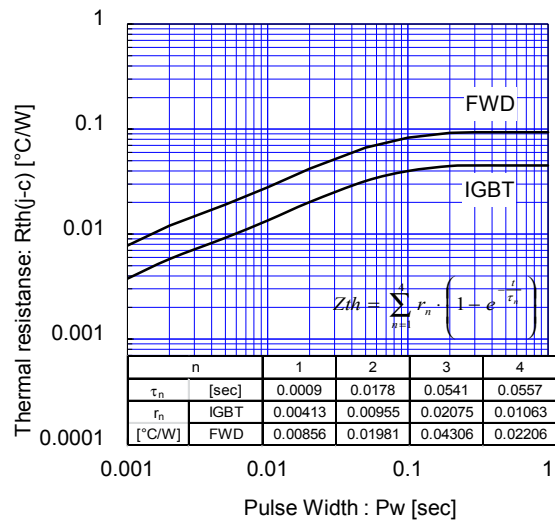
Reverse Recovery Characteristics (typ.)  
V<sub>CC</sub>=900V, V<sub>GE</sub>=±15V, R<sub>g\_on</sub>=4.7Ω, T<sub>J</sub>=125°C



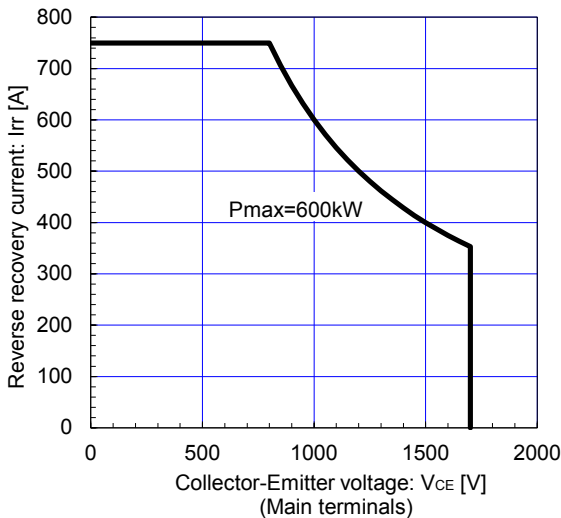
Reverse Recovery Characteristics (typ.)  
V<sub>CC</sub>=900V, V<sub>GE</sub>=±15V, R<sub>g\_on</sub>=4.7Ω, T<sub>J</sub>=150°C



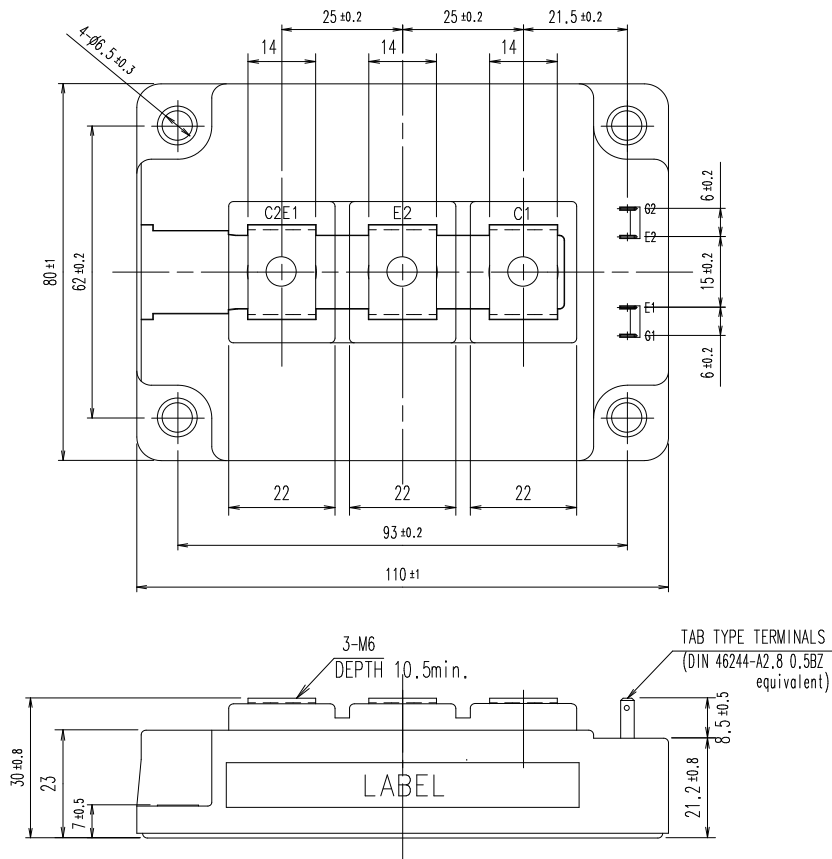
Transient Thermal Resistance (max.)



FWD safe operating area (max.)  
T<sub>J</sub>=150°C

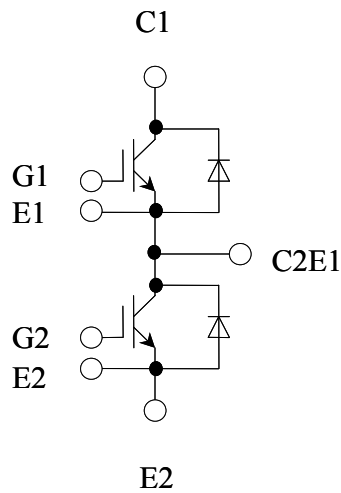


■ Outline Drawings (Unit: mm)



Weight: 470g (typ.)

■ Equivalent Circuit



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