

# 2MBI150VH-170-50

IGBT Modules

## IGBT MODULE (V series) 1700V / 150A / 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<sub>c</sub>=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	
Collector current	I <sub>c</sub>	Continuous	T <sub>c</sub> =100°C	150	A
			T <sub>c</sub> =25°C	250	
	I <sub>c pulse</sub>	1ms	300		
	-I <sub>c</sub>		150		
	-I <sub>c pulse</sub>	1ms	300		
Collector power dissipation	P <sub>C</sub>	1 device	1110	W	
Junction temperature	T <sub>j</sub>		175		
Operating junction temperature (under switching conditions)	T <sub>jop</sub>		150	°C	
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 N·m (M5 or M6)

Note \*3: Recommendable Value : 2.5-5.0 N·m (M5)

#### ● Electrical characteristics (at T<sub>j</sub> = 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	-	-	400	nA	
Gate-Emitter threshold voltage	V <sub>GE(th)</sub>	V <sub>CE</sub> = 20V, I <sub>c</sub> = 150mA	6.0	6.5	7.0	V	
Collector-Emitter saturation voltage	V <sub>CE(sat)</sub> (terminal)	V <sub>GE</sub> = 15V I <sub>c</sub> = 150A	T <sub>j</sub> =25°C	-	2.20	2.65	V
			T <sub>j</sub> =125°C	-	2.60	-	
			T <sub>j</sub> =150°C	-	2.65	-	
	V <sub>CE(sat)</sub> (chip)		T <sub>j</sub> =25°C	-	2.00	2.45	
			T <sub>j</sub> =125°C	-	2.40	-	
			T <sub>j</sub> =150°C	-	2.45	-	
Internal gate resistance	R <sub>G(int)</sub>	-	-	5.0	-	Ω	
Input capacitance	C <sub>ies</sub>	V <sub>CE</sub> = 10V, V <sub>GE</sub> = 0V, f = 1MHz	-	16	-	nF	
Turn-on time	t <sub>on</sub>	V <sub>CC</sub> = 900V, I <sub>c</sub> = 150A V <sub>GE</sub> = ±15V, R <sub>g_on</sub> =R <sub>g_off</sub> = 4.8Ω	-	950	-	nsec	
	t <sub>r</sub>		-	350	-		
	t <sub>(l)</sub>		-	60	-		
Turn-off time	t <sub>off</sub>	T <sub>j</sub> =150°C, L <sub>s</sub> = 30nH	-	1050	-	nsec	
	t <sub>r</sub>		-	140	-		
			-	-	-		
Forward on voltage	V <sub>F</sub> (terminal)	V <sub>GE</sub> = 0V I <sub>F</sub> = 150A	T <sub>j</sub> =25°C	-	1.95	2.40	V
			T <sub>j</sub> =125°C	-	2.20	-	
			T <sub>j</sub> =150°C	-	2.20	-	
	V <sub>F</sub> (chip)		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	-	
Reverse recovery time	t <sub>rr</sub>	I <sub>F</sub> = 150A	-	220	-	nsec	

#### ● Thermal resistance characteristics

Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	max.	
Thermal resistance(1device)	R <sub>th(j-c)</sub>	IGBT	-	-	0.135	°C/W
		FWD	-	-	0.200	
Contact thermal resistance (1device) (*4)	R <sub>th(c-f)</sub>	with Thermal Compound	-	0.0250	-	

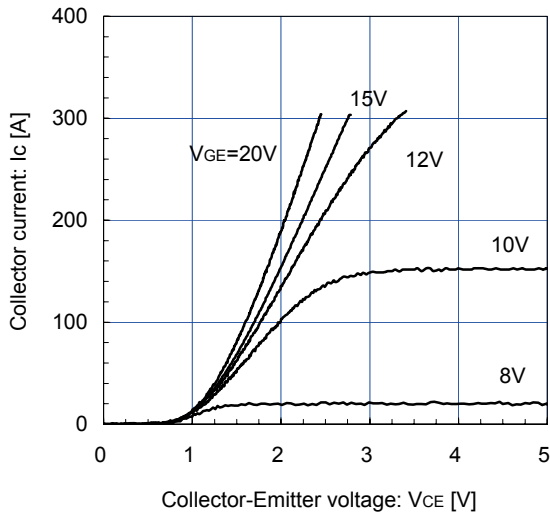
Note \*4: This is the value which is defined mounting on the additional cooling fin with thermal compound.

Package No. : M276

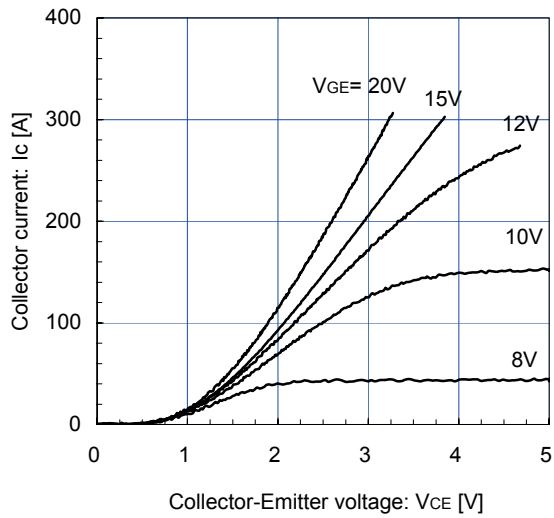


■ Characteristics (Representative)

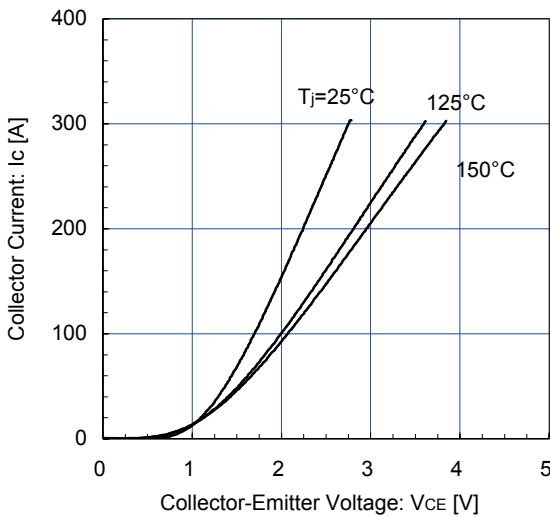
Collector current vs. Collector-Emittor voltage (typ.)  
 $T_j = 25^\circ\text{C}$  / chip



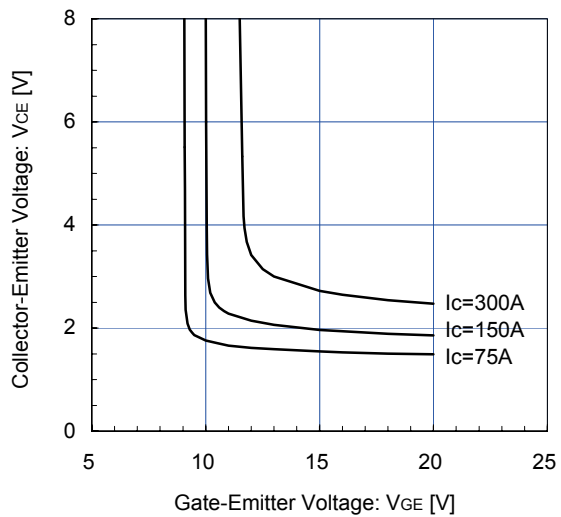
Collector current vs. Collector-Emittor voltage (typ.)  
 $T_j = 150^\circ\text{C}$  / chip



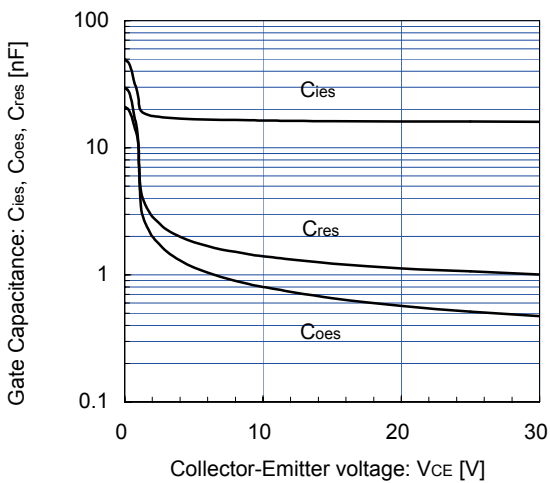
Collector current vs. Collector-Emittor voltage (typ.)  
 $V_{GE} = 15\text{V}$  / chip



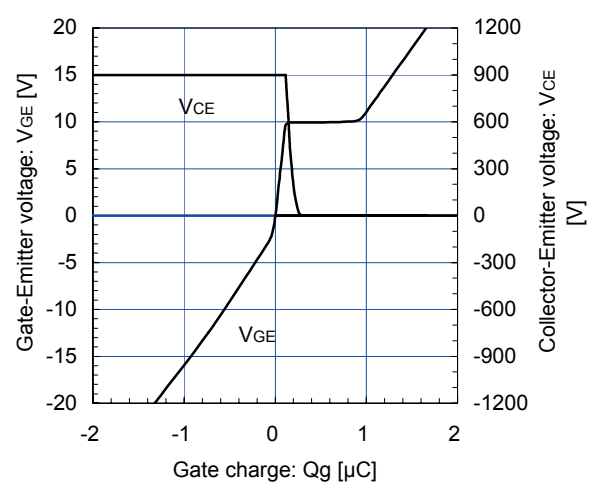
Collector-Emittor voltage vs. Gate-Emittor voltage  
 $T_j = 25^\circ\text{C}$  / chip



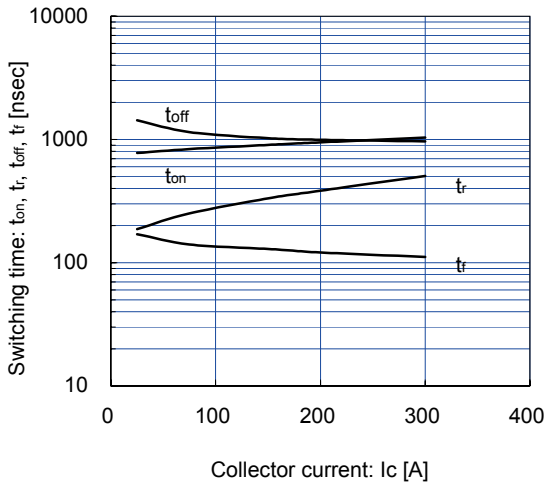
Gate Capacitance vs. Collector-Emittor Voltage  
 $V_{GE} = 0\text{V}$ ,  $f = 1\text{MHz}$ ,  $T_j = 25^\circ\text{C}$



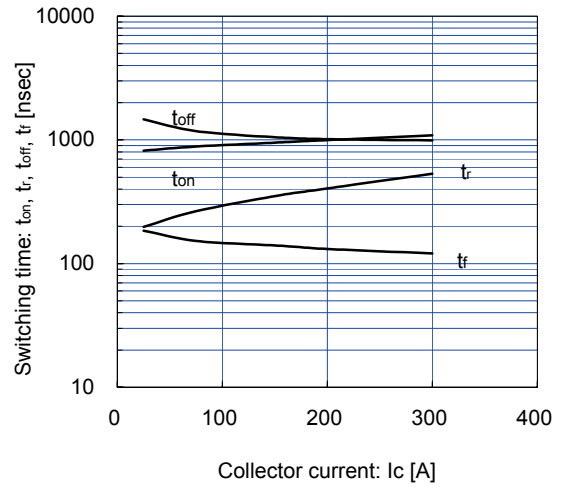
Dynamic Gate Charge (typ.)  
 $V_{CC} = 900\text{V}$ ,  $I_c = 150\text{A}$ ,  $T_j = 25^\circ\text{C}$



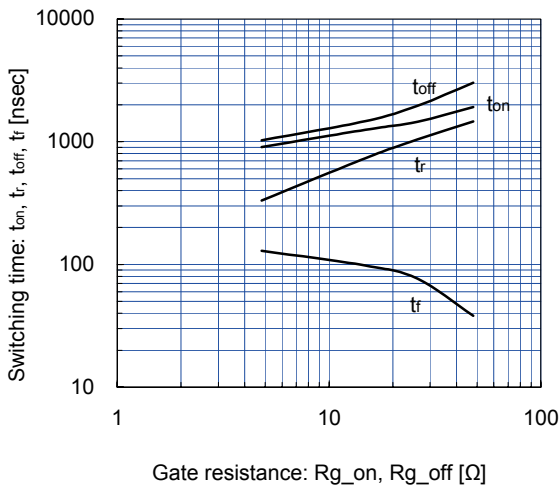
Switching time vs. Collector current (typ.)  
 $V_{CC}=900V, V_{GE}=\pm 15V, R_{g\_on}=R_{g\_off}=4.8\Omega, T_j=125^\circ C$



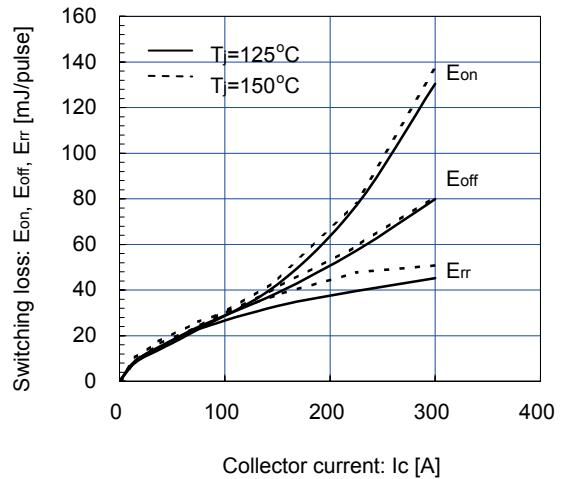
Switching time vs. Collector current (typ.)  
 $V_{CC}=900V, V_{GE}=\pm 15V, R_{g\_on}=R_{g\_off}=4.8\Omega, T_j=150^\circ C$



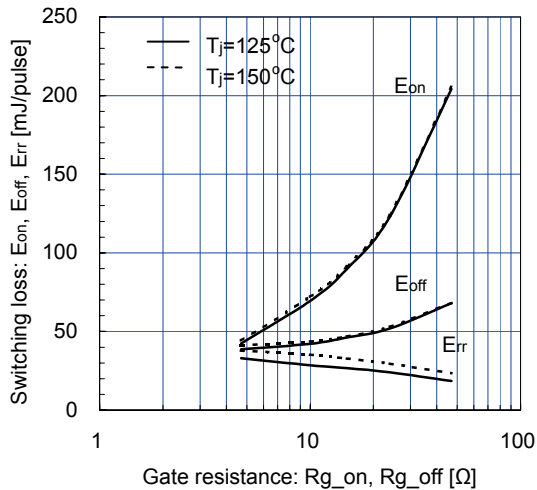
Switching time vs. Gate resistance (typ.)  
 $V_{CC}=900V, I_c=150A, V_{GE}=\pm 15V, T_j=125^\circ C$



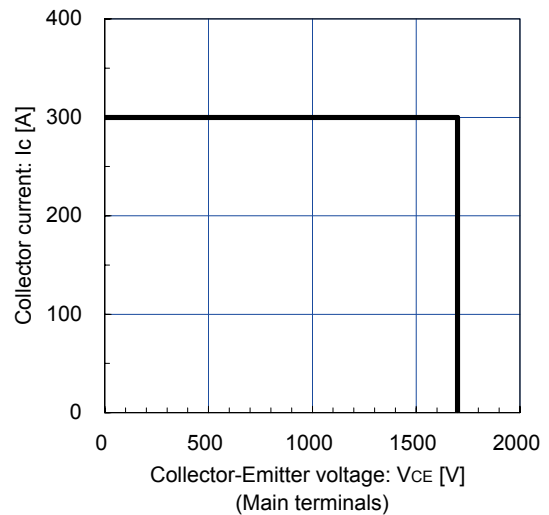
Switching loss vs. Collector current (typ.)  
 $V_{CC}=900V, V_{GE}=\pm 15V, R_{g\_on}=R_{g\_off}=4.8\Omega, T_j=125, 150^\circ C$



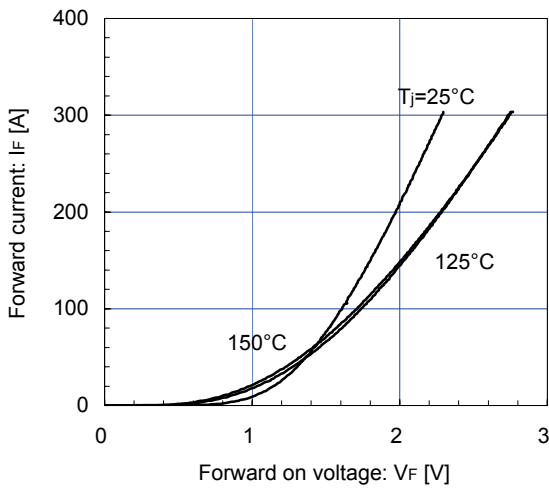
Switching loss vs. Gate resistance (typ.)  
 $V_{CC}=900V, I_c=150A, V_{GE}=\pm 15V, T_j=125, 150^\circ C$



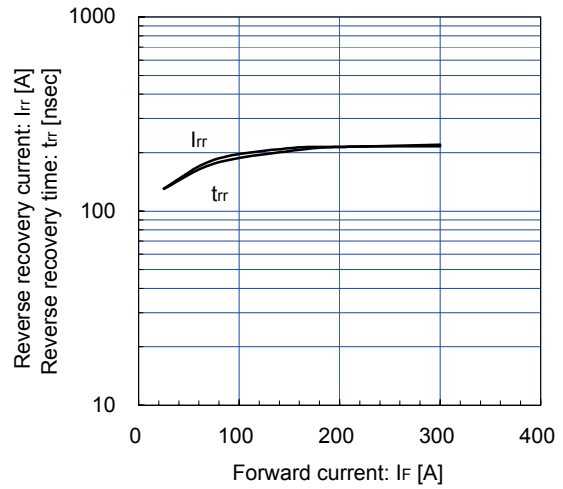
Reverse bias safe operating area (max.)  
 $+V_{GE}=15V, -V_{GE}=15V, R_{g\_off}=4.8\Omega, T_j=150^\circ C$



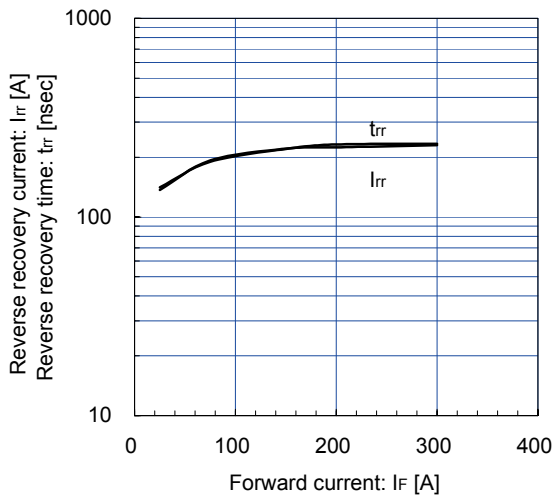
Forward Current vs. Forward Voltage (typ.)  
chip



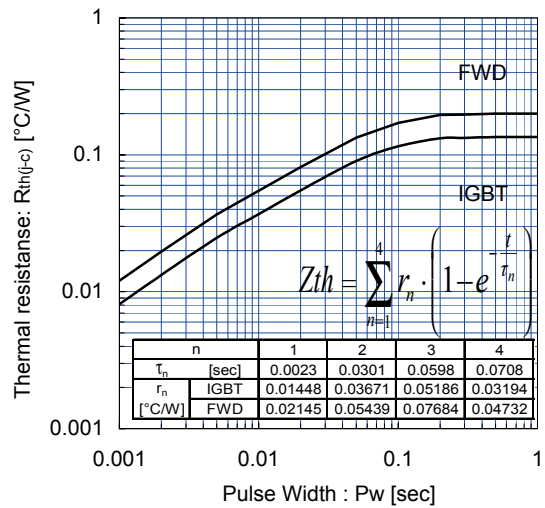
Reverse Recovery Characteristics (typ.)  
VCC=900V, VGE=±15V, Rg\_on=4.8Ω, Tj=125°C



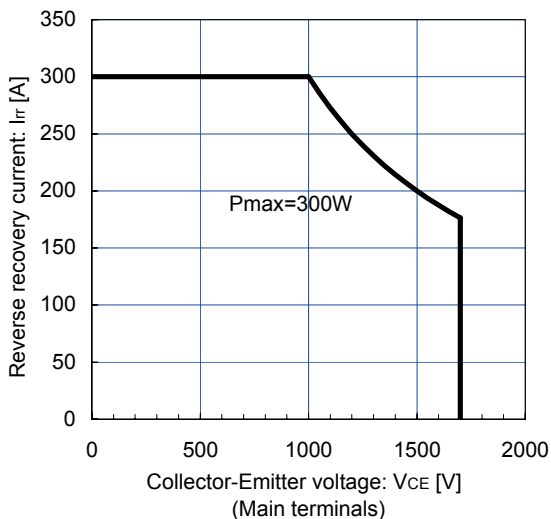
Reverse Recovery Characteristics (typ.)  
VCC=900V, VGE=±15V, Rg\_on=4.8Ω, Tj=150°C



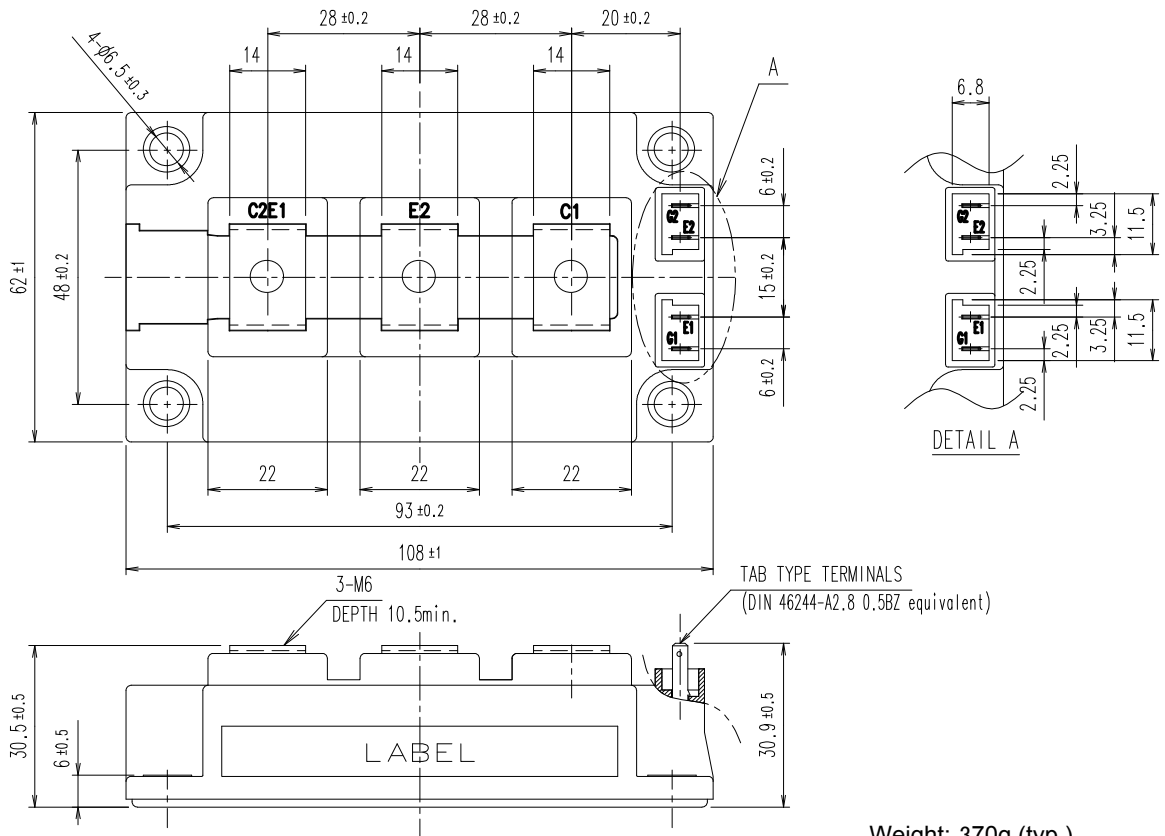
Transient Thermal Resistance (max.)



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

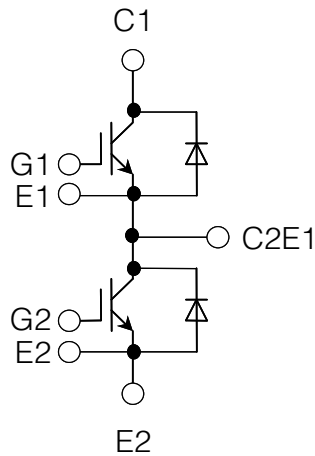


■ Outline Drawings, mm



Weight: 370g (typ.)

■ Equivalent Circuit Schematic



## WARNING

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