

# 6MBI150VB-120-50

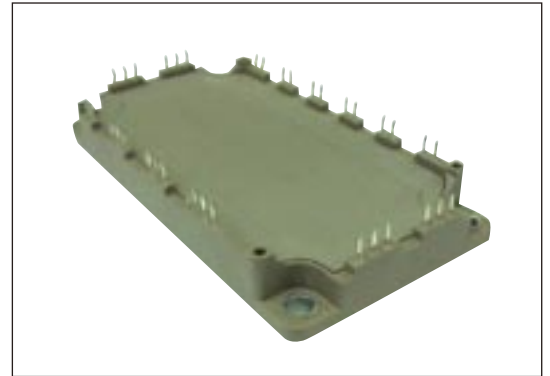
## IGBT MODULE (V series) 1200V / 150A / 6 in one package

### ■ Features

- Compact Package
- P.C.Board Mount
- Low  $V_{CE(sat)}$

### ■ 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 $T_c=25^\circ\text{C}$ unless otherwise specified)

Items		Symbols	Conditions		Maximum ratings	Units
Inverter	Collector-Emitter voltage	$V_{CES}$			1200	V
	Gate-Emitter voltage	$V_{GES}$			$\pm 20$	V
	Collector current	$I_c$	Continuous	$T_c=80^\circ\text{C}$	150	A
		$I_{cp}$	1ms	$T_c=80^\circ\text{C}$	300	
		$-I_c$			150	
		$-I_c$ pulse	1ms		300	
Collector power dissipation	$P_c$	1 device		770	W	
Junction temperature	$T_j$			175	$^\circ\text{C}$	
Operating junction temperature (under switching conditions)	$T_{jop}$			150		
Case temperature	$T_c$			125		
Storage temperature	$T_{stg}$			-40 to +125		
Isolation voltage	between terminal and copper base (*1) between thermistor and others (*2)	$V_{iso}$	AC : 1min.		2500	VAC
Screw torque	Mounting (*3)	-	M5		3.5	N m

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 : 2.5-3.5 Nm (M5)

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

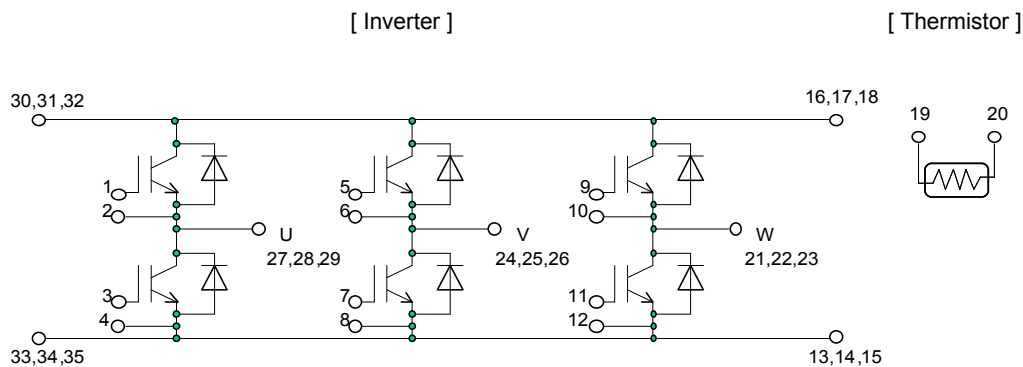
Items	Symbols	Conditions	Characteristics			Units	
			min.	typ.	max.		
Zero gate voltage collector current	$I_{CES}$	$V_{GE} = 0V, V_{CE} = 1200V$	-	-	1.0	mA	
Gate-Emitter leakage current	$I_{GES}$	$V_{GE} = 0V, V_{GE} = \pm 20V$	-	-	200	nA	
Gate-Emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = 20V, I_c = 150mA$	6.0	6.5	7.0	V	
Collector-Emitter saturation voltage	$V_{CE(sat)}$ (terminal)	$V_{GE} = 15V$ $I_c = 150A$	Tj=25°C	-	2.50	2.95	V
			Tj=125°C	-	2.80	-	
			Tj=150°C	-	2.85	-	
	$V_{CE(sat)}$ (chip)	$V_{GE} = 15V$ $I_c = 150A$	Tj=25°C	-	1.75	2.20	
			Tj=125°C	-	2.05	-	
			Tj=150°C	-	2.10	-	
Input capacitance	$C_{ies}$	$V_{CE} = 10V, V_{GE} = 0V, f = 1MHz$	-	13.7	-	nF	
Turn-on time	$t_{on}$	$V_{CC} = 600V$ $I_c = 150A$ $V_{GE} = +15 / -15V$ $R_G = 1.1\Omega$	-	0.39	1.20	$\mu s$	
	$t_r$		-	0.09	0.60		
	$t_r(i)$		-	0.03	-		
Turn-off time	$t_{off}$	$R_G = 1.1\Omega$	-	0.53	1.00	$\mu s$	
	$t_f$		-	0.06	0.30		
Forward on voltage	$V_F$ (terminal)	$I_F = 150A$	Tj=25°C	-	2.45	2.90	V
			Tj=125°C	-	2.60	-	
			Tj=150°C	-	2.55	-	
	$V_F$ (chip)	$I_F = 150A$	Tj=25°C	-	1.70	2.15	
			Tj=125°C	-	1.85	-	
			Tj=150°C	-	1.80	-	
Reverse recovery time	$t_{rr}$	$I_F = \pm 20$	-	-	0.1	$\mu s$	
Thermistor	Resistance	$R$	T = 25°C	-	5000	-	$\Omega$
			T = 100°C	465	495	520	
	B value	$B$	T = 25 / 50°C	3305	3375	3450	K

● Thermal resistance characteristics

Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	max.	
Thermal resistance (1device)	$R_{th(j-c)}$	Inverter IGBT	-	-	0.195	°C/W
		Inverter FWD	-	-	0.34	
Contact thermal resistance (1device) (*4)	$R_{th(c-f)}$	with Thermal Compound	-	0.05	-	

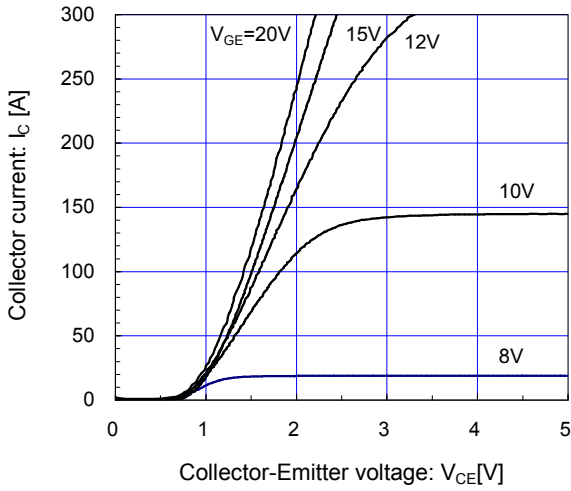
Note \*4: This is the value which is defined mounting on the additional cooling fin with thermal compound.

■ Equivalent Circuit Schematic

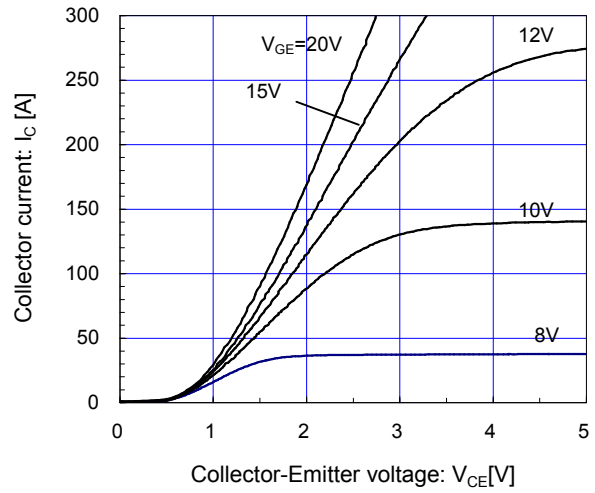


■ Characteristics (Representative)

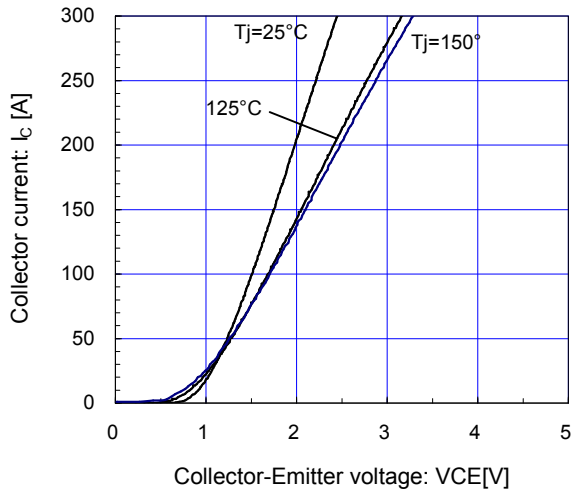
[ Inverter ]  
 Collector current vs. Collector-Emmitter voltage (typ.)  
 $T_j = 25^\circ\text{C}$  / chip



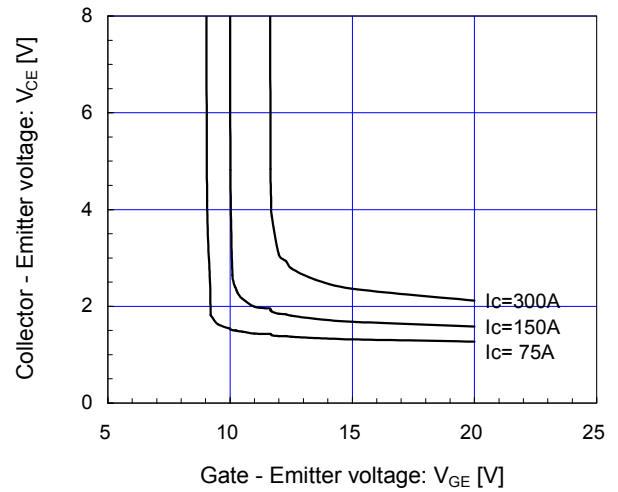
[ Inverter ]  
 Collector current vs. Collector-Emmitter voltage (typ.)  
 $T_j = 150^\circ\text{C}$  / chip



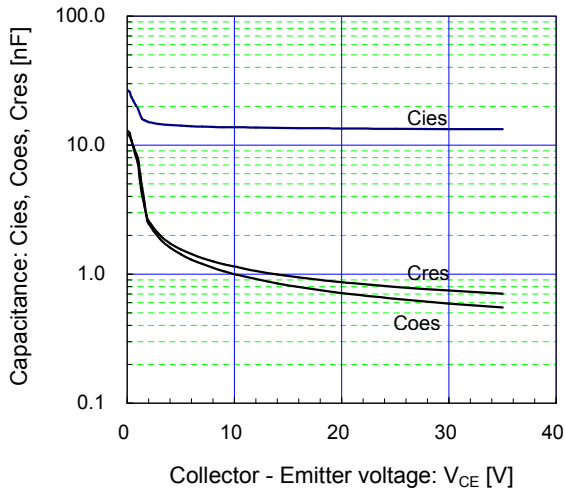
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 Collector current vs. Collector-Emmitter voltage (typ.)  
 $V_{GE} = 15\text{V}$  / chip



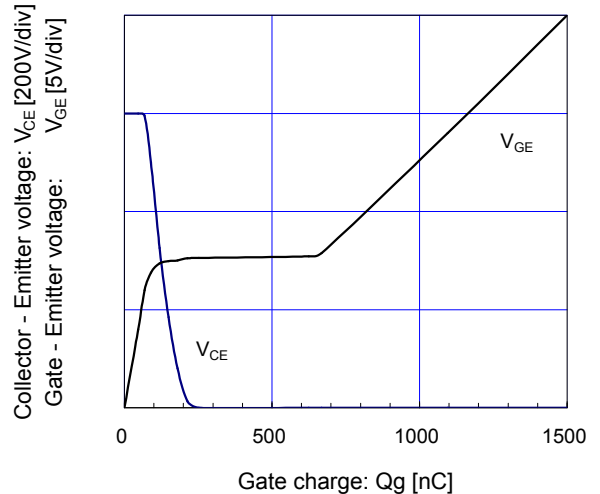
[ Inverter ]  
 Collector-Emmitter voltage vs. Gate-Emmitter voltage (typ.)  
 $T_j = 25^\circ\text{C}$  / chip



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

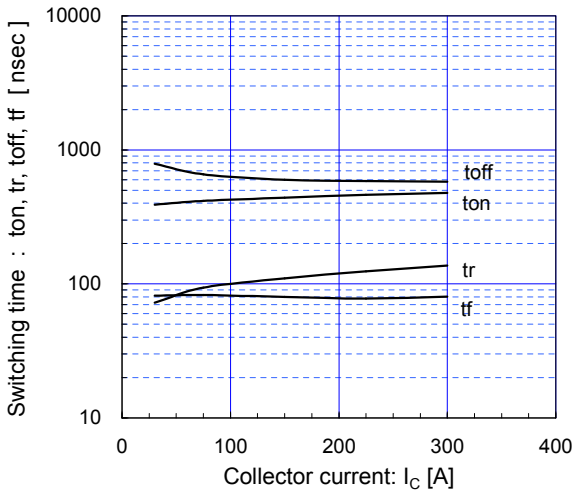


[ Inverter ]  
 Dynamic gate charge (typ.)  
 $V_{CC} = 600\text{V}$ ,  $I_c = 150\text{A}$ ,  $T_j = 25^\circ\text{C}$



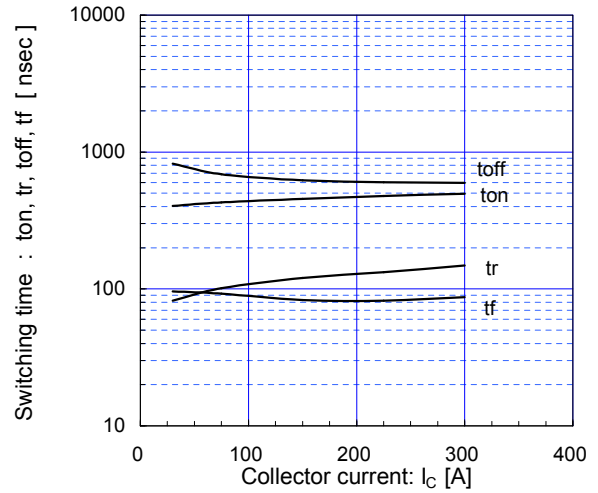
[ Inverter ]

Switching time vs. Collector current (typ.)  
 $V_{cc}=600V, V_{GE}=\pm 15V, R_g=1.1\Omega, T_j=125^\circ C$



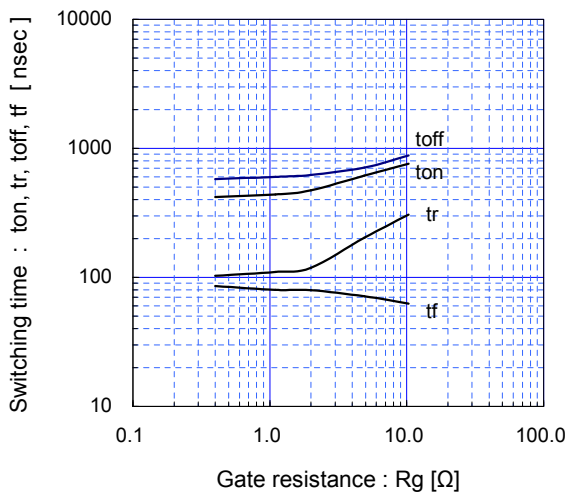
[ Inverter ]

Switching time vs. Collector current (typ.)  
 $V_{cc}=600V, V_{GE}=\pm 15V, R_g=1.1\Omega, T_j=150^\circ C$



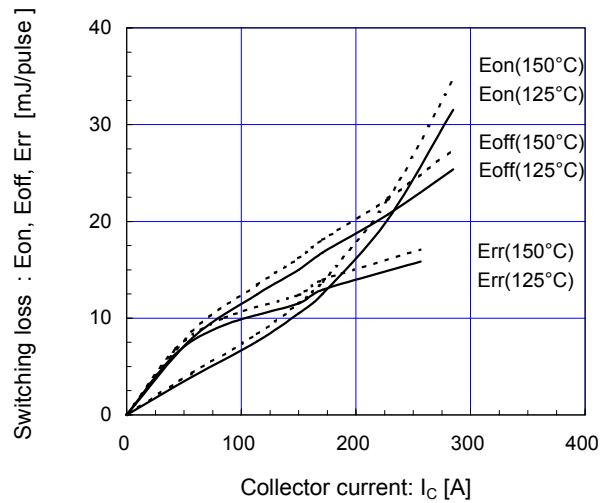
[ Inverter ]

Switching time vs. gate resistance (typ.)  
 $V_{cc}=600V, I_C=150A, V_{GE}=\pm 15V, T_j=125^\circ C$



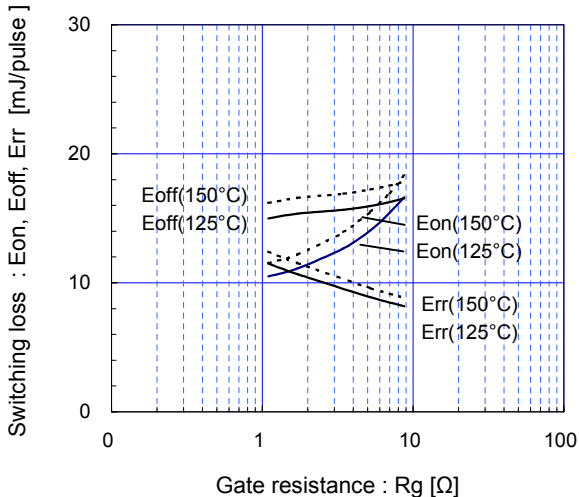
[ Inverter ]

Switching loss vs. Collector current (typ.)  
 $V_{cc}=600V, V_{GE}=\pm 15V, R_g=1.1\Omega$



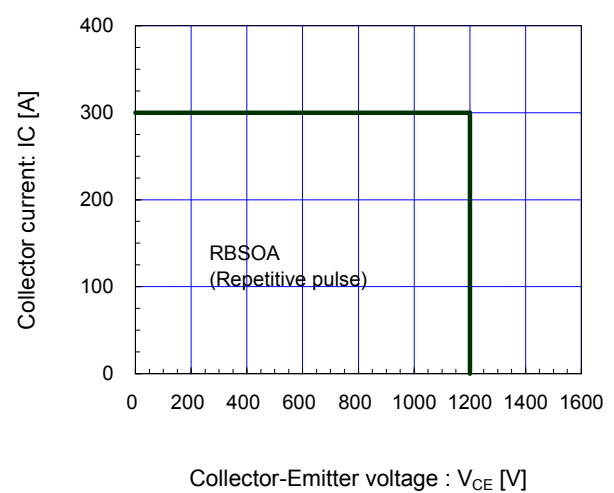
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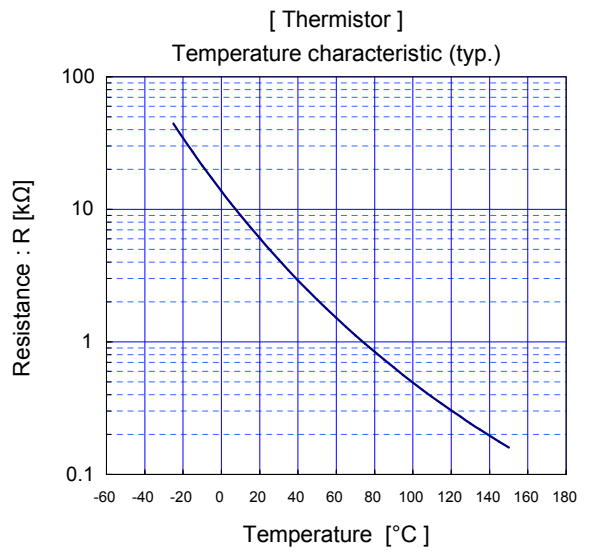
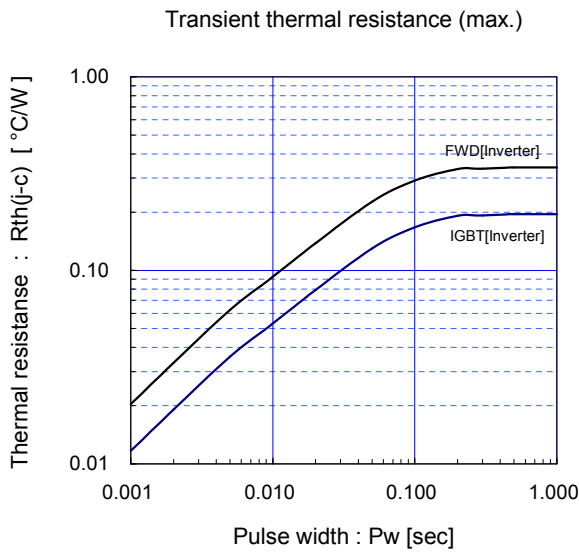
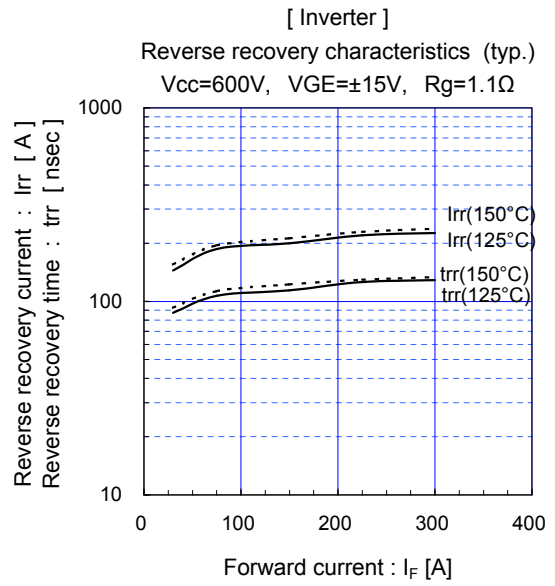
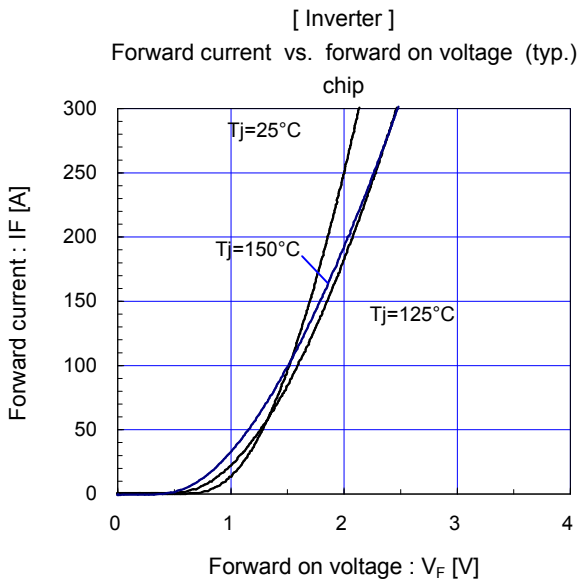
Switching loss vs. gate resistance (typ.)  
 $V_{cc}=600V, I_C=150A, V_{GE}=\pm 15V$



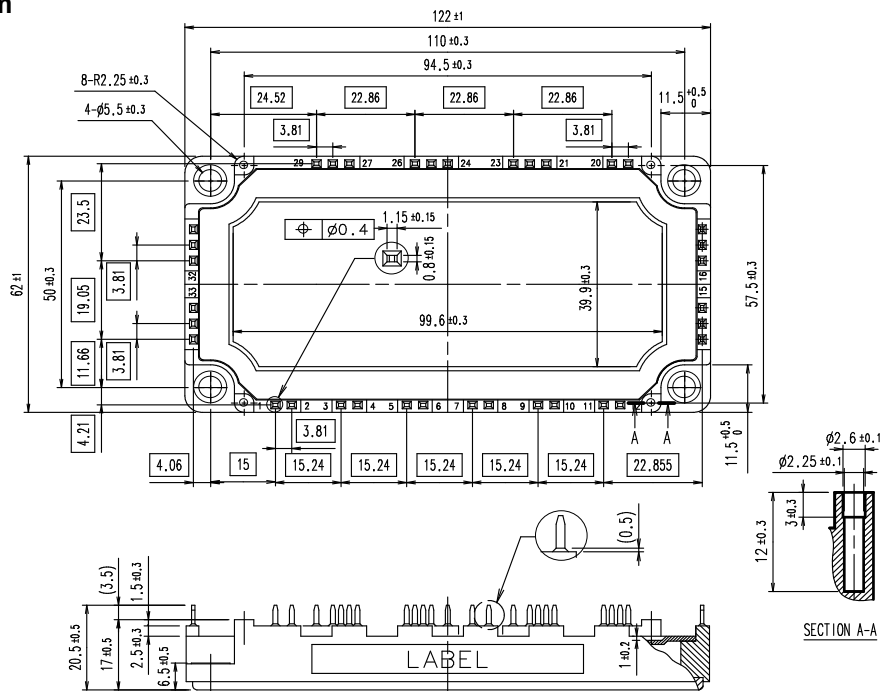
[ Inverter ]

Reverse bias safe operating area (max.)  
 $+V_{GE}=15V, -V_{GE} \leq 15V, R_g \geq 1.1\Omega, T_j \leq 125^\circ C$





■ Outline Drawings, mm



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