

# 6MBI100UC-120



## IGBT Module U-Series 1200V / 100A 6 in one-package

### ■ Features

- High speed switching
- Voltage drive
- Low inductance module structure
- With shunt resistors

### ■ 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)

Item	Symbol	Conditions	Rating	Unit	
Collector-Emitter voltage	V <sub>CES</sub>		1200	V	
Gate-Emitter voltage	V <sub>GES</sub>		±20	V	
Collector current	I <sub>c</sub>	Continuous	T <sub>c</sub> =25°C	150	A
			T <sub>c</sub> =80°C	100	
	I <sub>cp</sub>	1ms	T <sub>c</sub> =25°C	300	
			T <sub>c</sub> =80°C	200	
	-I <sub>c</sub>			100	
-I <sub>c</sub> pulse			200		
Collector Power Dissipation	P <sub>c</sub>	1 device	520	W	
Junction temperature	T <sub>j</sub>		+150	°C	
Storage temperature	T <sub>stg</sub>		-40 to +125		
Isolation voltage	V <sub>iso</sub>	AC:1min.	2500	VAC	
Screw Torque	Mounting	*2	3.5	N·m	

\*1 : All terminals should be connected together when isolation test will be done.

\*2 : Recommendable value : 2.5 to 3.5 N·m(M5)

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

Item	Symbols	Conditions	Characteristics			Unit	
			Min.	Typ.	Max.		
Zero gate voltage collector current	I <sub>CES</sub>	V <sub>GE</sub> =0V, V <sub>CES</sub> =1200V	–	–	1.0	mA	
Gate-Emitter leakage current	I <sub>GES</sub>	V <sub>CES</sub> =0V, V <sub>GE</sub> =±20V	–	–	200	nA	
Gate-Emitter threshold voltage	V <sub>GE(th)</sub>	V <sub>CES</sub> =20V, I <sub>c</sub> =100mA	4.5	6.5	8.5	V	
Collector-Emitter saturation voltage	V <sub>CE(sat)</sub> (chip)	V <sub>GE</sub> =15V, I <sub>c</sub> =100A	T <sub>j</sub> =25°C	–	1.75	2.10	V
			T <sub>j</sub> =125°C	–	2.00	–	
Input capacitance	C <sub>ies</sub>	V <sub>CES</sub> =10V, V <sub>GE</sub> =0V, f=1MHz	–	11	–	nF	
Turn-on time	t <sub>on</sub>	V <sub>CC</sub> =600V	–	0.36	1.20	μs	
	t <sub>r</sub>	I <sub>c</sub> =100A	–	0.21	0.60		
	t <sub>r(i)</sub>	V <sub>GE</sub> =±15V	–	0.03	–		
Turn-off time	t <sub>off</sub>	R <sub>G</sub> =5.6 Ω	–	0.37	1.00	μs	
	t <sub>f</sub>		–	0.07	0.30		
Forward on voltage	V <sub>F</sub>	V <sub>GE</sub> =0V I <sub>F</sub> =100A	T <sub>j</sub> =25°C	–	1.60	1.90	V
	(chip)		T <sub>j</sub> =125°C	–	1.70	–	
Reverse recovery time	t <sub>rr</sub>	I <sub>F</sub> =100A	–	–	0.35	μs	
Lead resistance, terminal-chip*3	R <sub>lead</sub>	Without shunt resistance	–	5.7	–	mΩ	
Shunt resistance	R <sub>shunt</sub>	Resistance of R1,R2,R3 *4	–	1.5	–		

\*3: Biggest internal terminal resistance among arm.

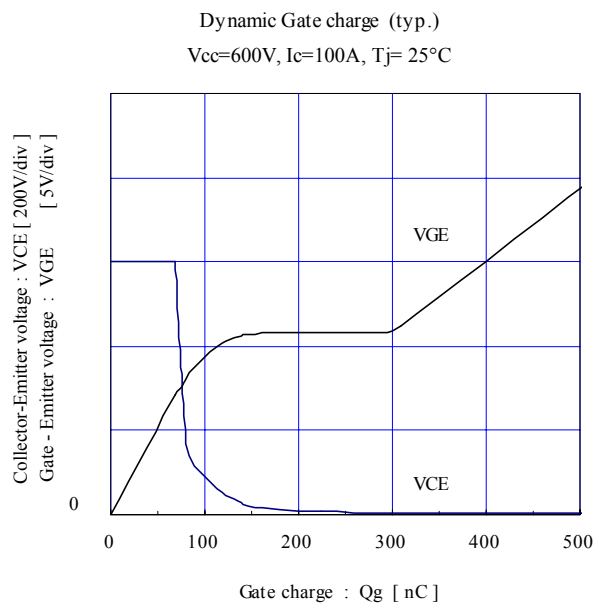
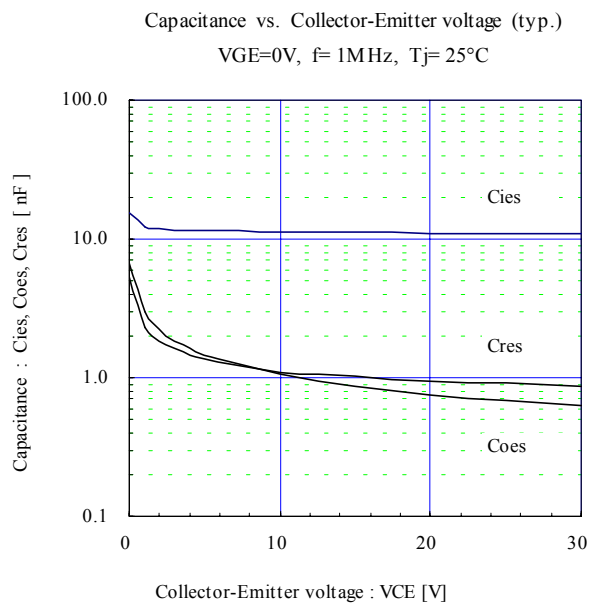
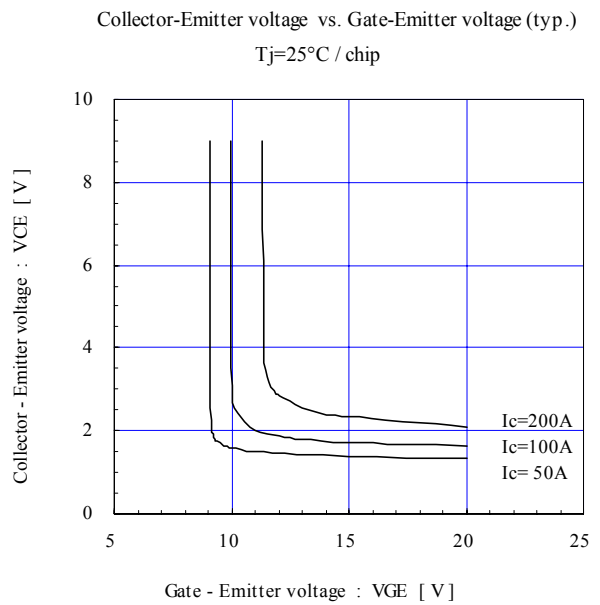
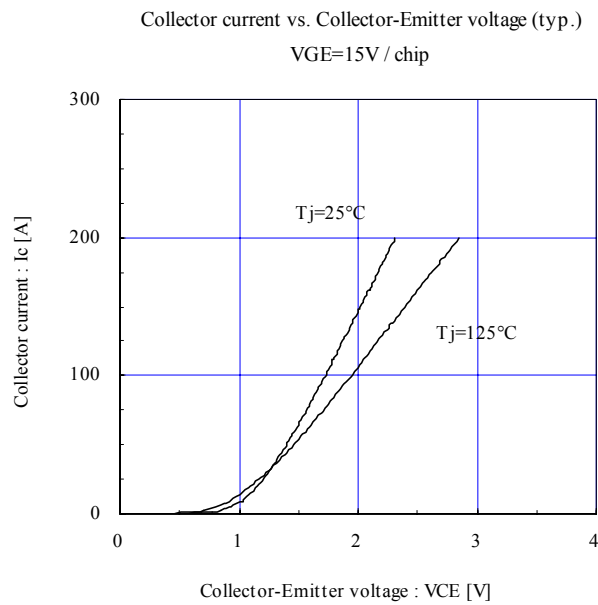
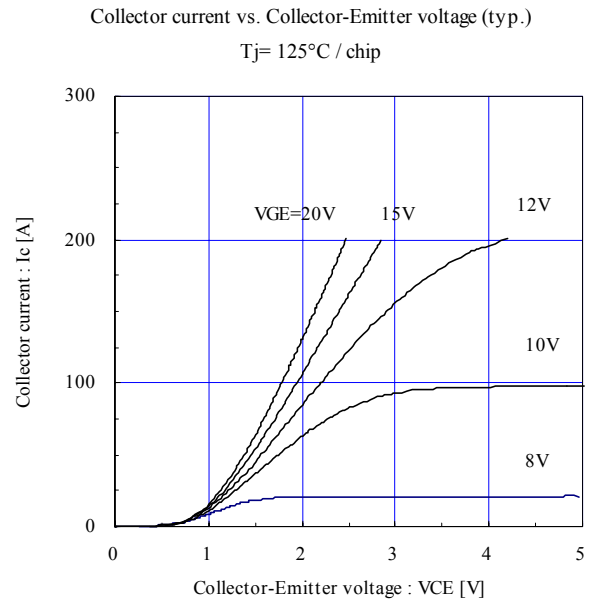
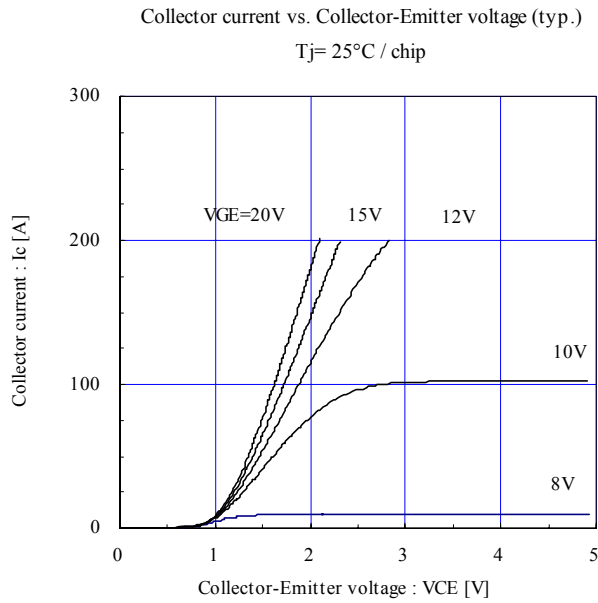
\*4: R1, R2,R3 is shown in equivalent circuit (p5)

#### ● Thermal resistance characteristics

Items	Symbols	Conditions	Characteristics			Unit
			Min.	Typ.	Max.	
Thermal resistance	R <sub>th(j-c)</sub>	IGBT	–	–	0.24	°C/W
	R <sub>th(j-c)</sub>	FWD	–	–	0.39	°C/W
Contact Thermal resistance	R <sub>th(c-f)</sub> *5	With thermal compound	–	0.05	–	°C/W

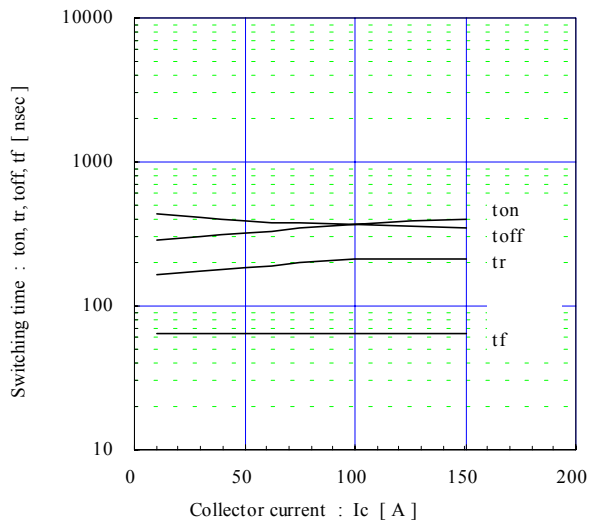
\*5 : This is the value which is defined mounting on the additional cooling fin with thermal compound

Characteristics (Representative)



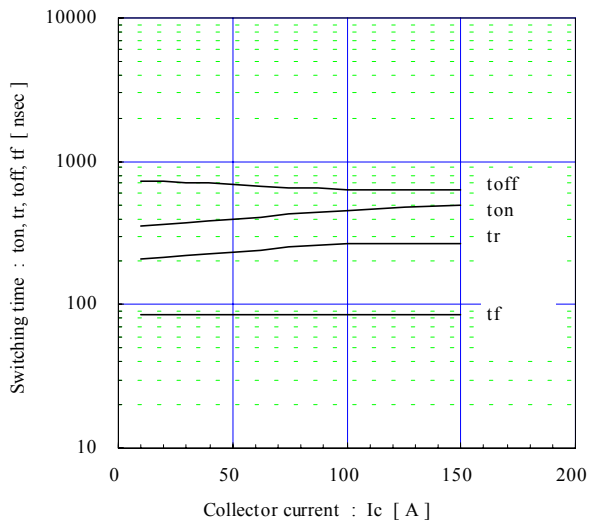
Switching time vs. Collector current (typ.)

V<sub>cc</sub>=600V, V<sub>GE</sub>=±15V, R<sub>g</sub>=5.6 ohm, T<sub>j</sub>= 25°C



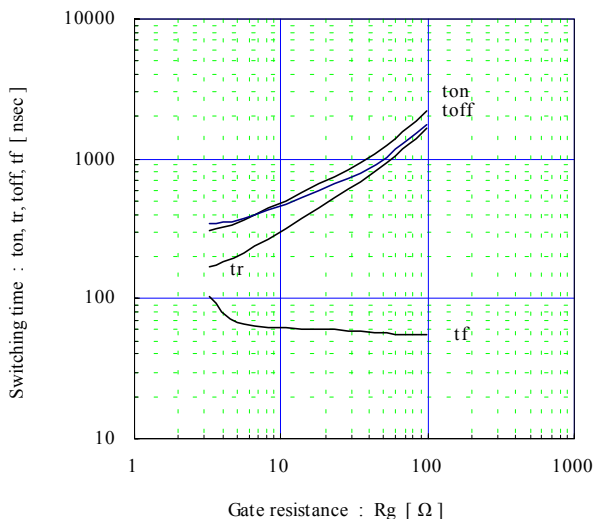
Switching time vs. Collector current (typ.)

V<sub>cc</sub>=600V, V<sub>GE</sub>=±15V, R<sub>g</sub>=5.6 ohm, T<sub>j</sub>=125°C



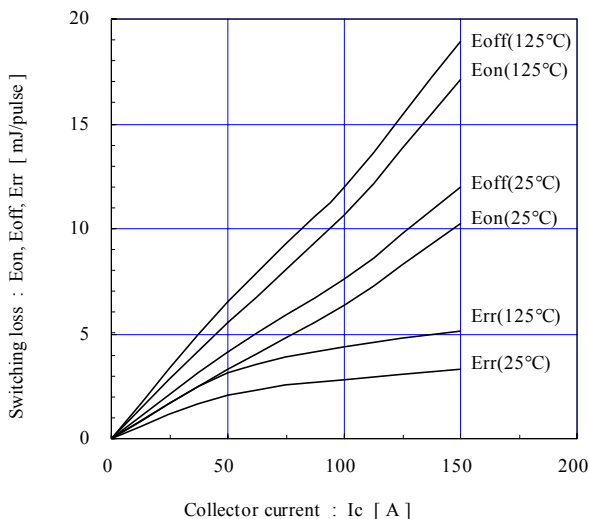
Switching time vs. Gate resistance (typ.)

V<sub>cc</sub>=600V, I<sub>c</sub>=100A, V<sub>GE</sub>=±15V, T<sub>j</sub>= 25°C



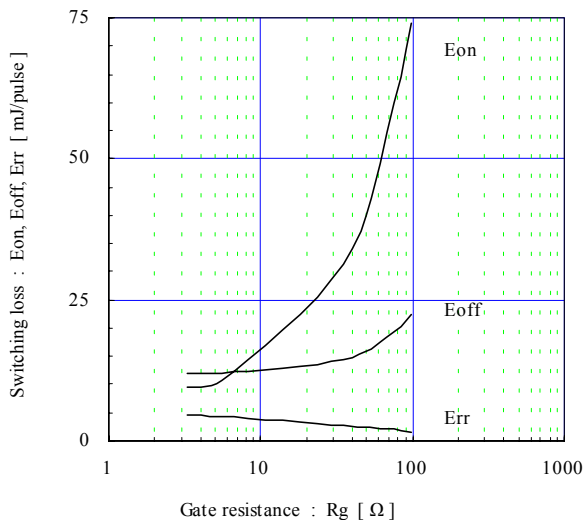
Switching loss vs. Collector current (typ.)

V<sub>cc</sub>=600V, V<sub>GE</sub>=±15V, R<sub>g</sub>=5.6 ohm



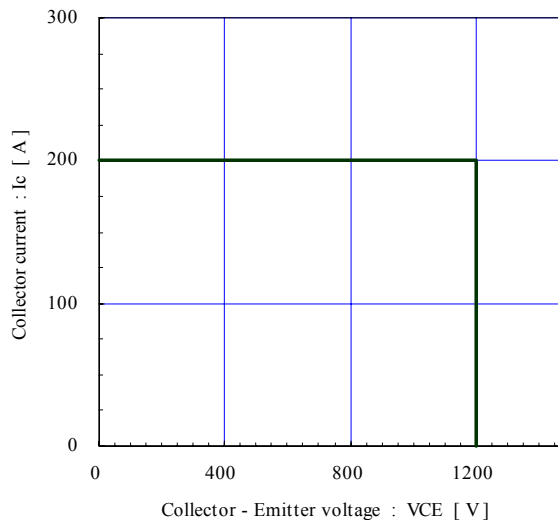
Switching loss vs. Gate resistance (typ.)

V<sub>cc</sub>=600V, I<sub>c</sub>=100A, V<sub>GE</sub>=±15V, T<sub>j</sub>= 125°C

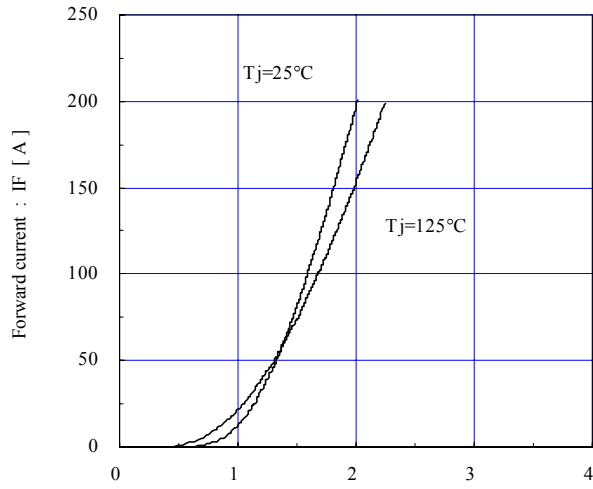


Reverse bias safe operating area (max.)

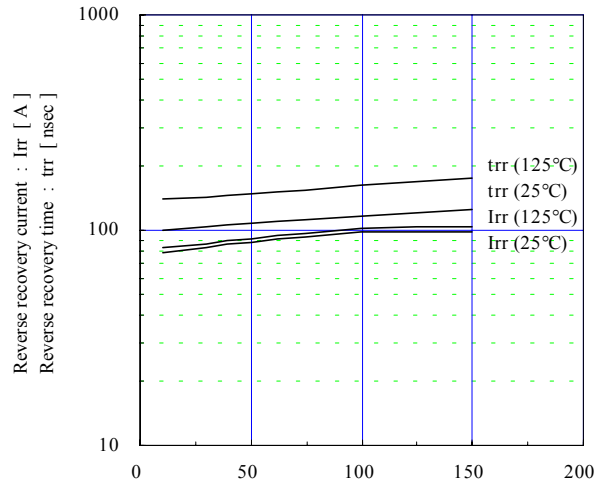
+V<sub>GE</sub>=15V, -V<sub>GE</sub> ≤ 15V, R<sub>g</sub> ≥ 5.6 ohm, T<sub>j</sub> ≤ 125°C



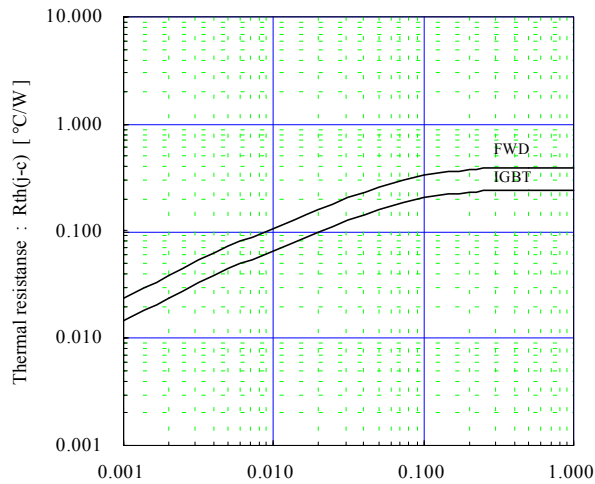
Forward current vs. Forward on voltage (typ.)  
chip



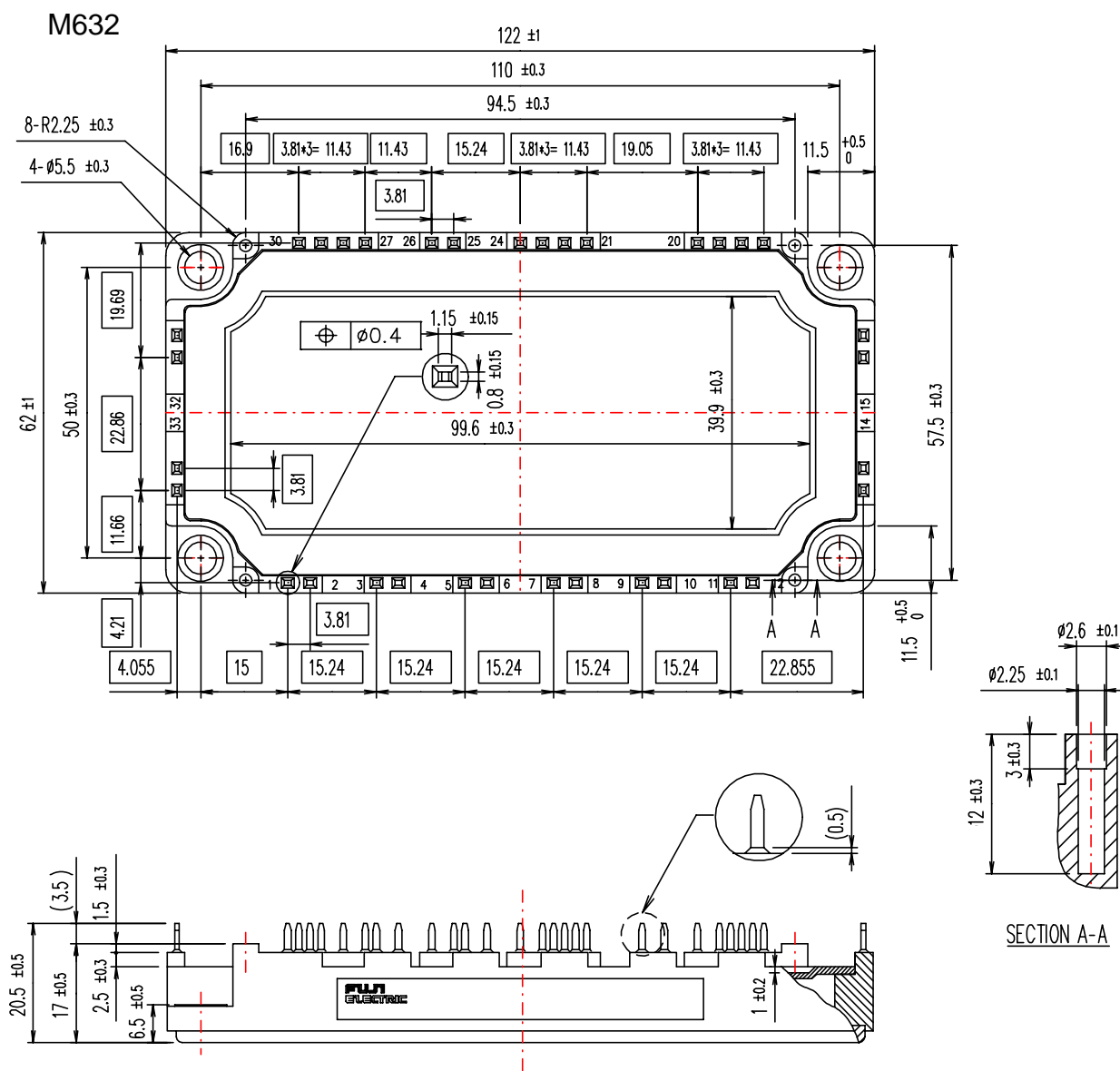
Reverse recovery characteristics (typ.)  
 $V_{cc}=600\text{V}, V_{GE}=\pm 15\text{V}, R_g=5.6\Omega$



Transient thermal resistance (max.)



Outline Drawings, mm



□ shows theoretical dimension.  
 ( ) shows reference dimension.

Equivalent Circuit Schematic

