

3MBI150UC-120



IGBT Module U-Series 1200V / 150A 3 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 _{CEs}		1200	V	
Gate-Emitter voltage	V _{GES}		±20	V	
Collector current	I _c	Continuous	T _c =25°C	200	A
			T _c =80°C	150	
	I _{cp}	1ms	T _c =25°C	400	
			T _c =80°C	300	
-I _c			150		
-I _c pulse			300		
Collector Power Dissipation	P _c	1 device	735	W	
Junction temperature	T _j		+150	°C	
Storage temperature	T _{stg}		-40 to +125		
Isolation voltage	V _{iso}	AC:1min.	2500	VAC	
Screw Torque	Mounting *2		3.5	N·m	

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*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 _{CEs}	V _{GE} =0V, V _{CE} =1200V	–	–	1.0	mA	
Gate-Emitter leakage current	I _{GES}	V _{CE} =0V, V _{GE} =±20V	–	–	200	nA	
Gate-Emitter threshold voltage	V _{GE(th)}	V _{CE} =20V, I _c =150mA	4.5	6.5	8.5	V	
Collector-Emitter saturation voltage	V _{CE(sat)} (chip)	V _{GE} =15V, I _c =150A	T _j =25°C	–	1.75	2.10	V
			T _j =125°C	–	2.00	–	
Input capacitance	C _{ies}	V _{CE} =10V, V _{GE} =0V, f=1MHz	–	17	–	nF	
Turn-on time	t _{on}	V _{CC} =600V	–	0.36	1.20	µs	
	t _r	I _c =150A	–	0.21	0.60		
	t _{r(i)}	V _{GE} =±15V	–	0.03	–		
Turn-off time	t _{off}	R _G =2.2 Ω	–	0.37	1.00	µs	
	t _f		–	0.07	0.30		
Forward on voltage	V _F	V _{GE} =0V I _F =150A	T _j =25°C	–	1.60	1.90	V
	(chip)		T _j =125°C	–	1.70	–	
Reverse recovery time	t _{rr}	I _F =150A	–	–	0.35	µs	
Lead resistance, terminal-chip*3	R _{lead}	Without shunt resistance	–	5.1	–	mΩ	
Shunt resistance	R _{shunt}	Resistance of R1 to R6 *4	–	2.4	–		

*3: Biggest internal terminal resistance among arm.

*4 R1 to R2 is shown in equivalent circuit (p5)

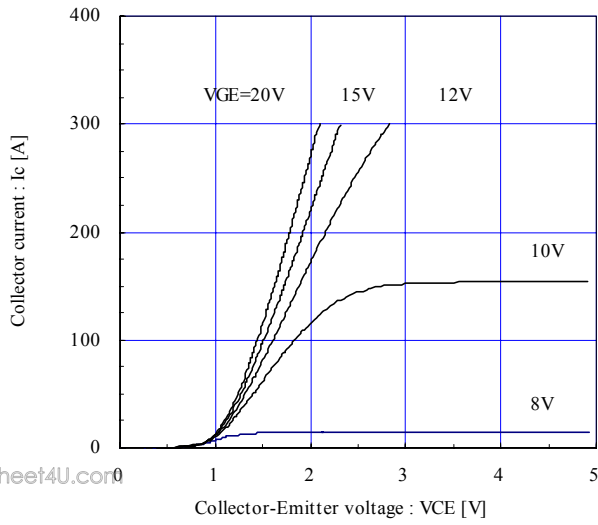
● Thermal resistance characteristics

Items	Symbols	Conditions	Characteristics			Unit
			Min.	Typ.	Max.	
Thermal resistance	R _{th(j-c)}	IGBT	–	–	0.17	°C/W
	R _{th(j-c)}	FWD	–	–	0.28	°C/W
Contact Thermal resistance	R _{th(c-f)} *5	With thermal compound	–	0.05	–	°C/W

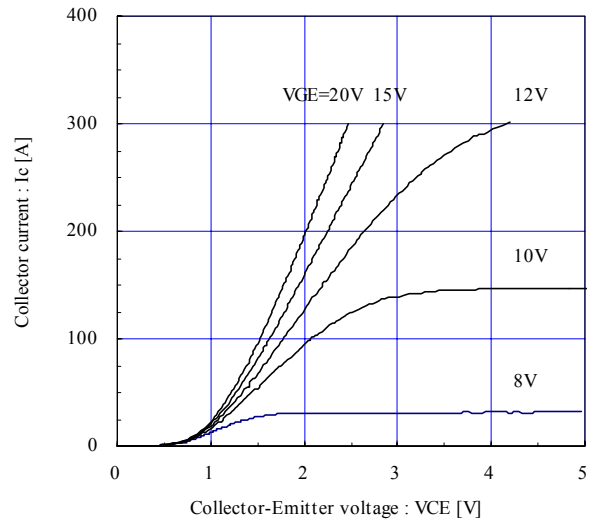
*5 : This is the value which is defined mounting on the additional cooling fin with thermal compound.

Characteristics (Representative)

Collector current vs. Collector-Emitter voltage (typ.)
Tj= 25°C / chip

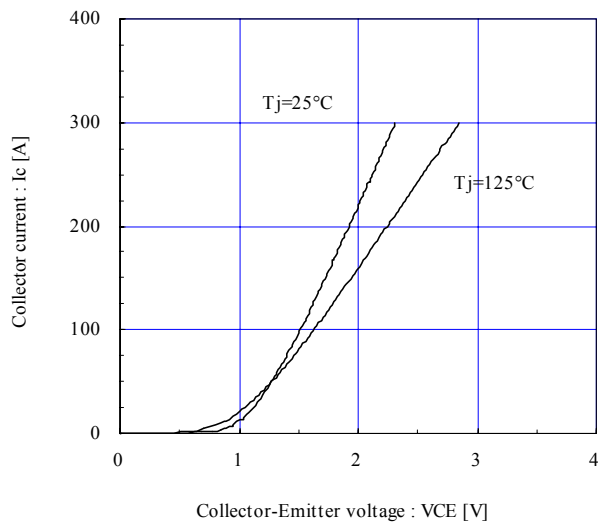


Collector current vs. Collector-Emitter voltage (typ.)
Tj= 125°C / chip

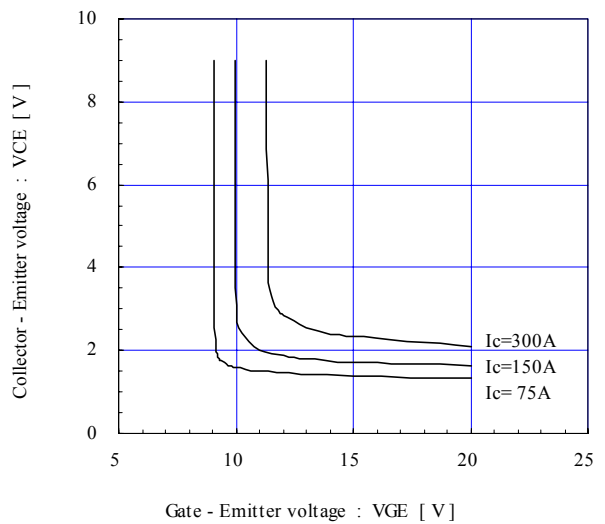


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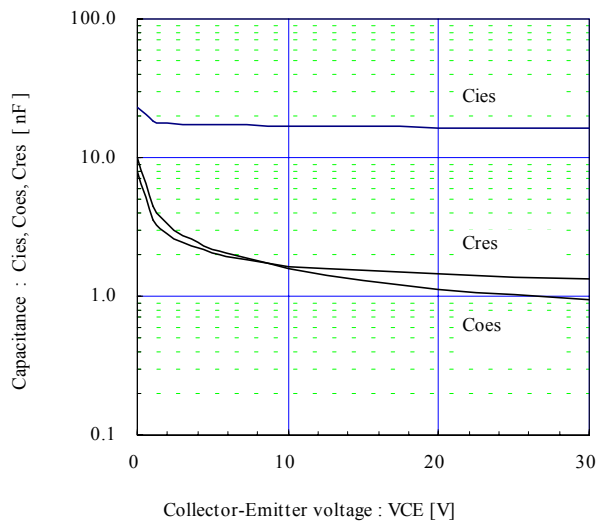
Collector current vs. Collector-Emitter voltage (typ.)
VGE=15V / chip



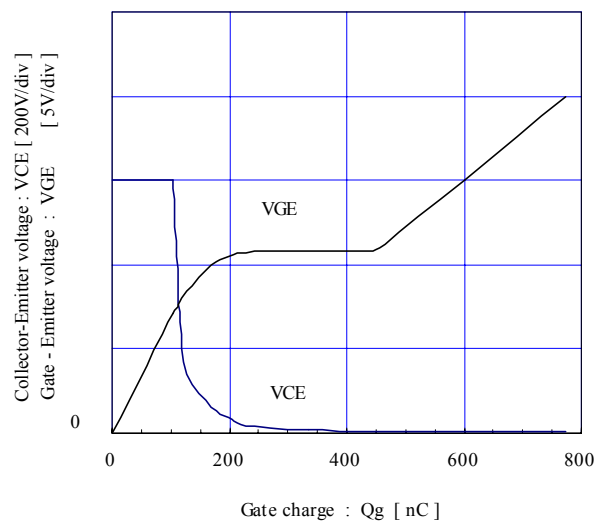
Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)
Tj=25°C / chip



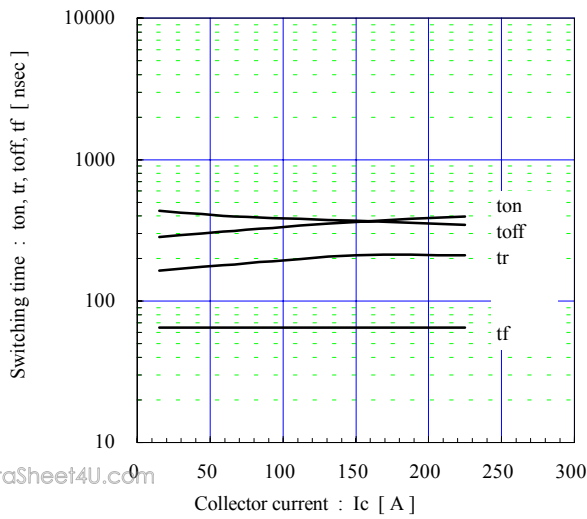
Capacitance vs. Collector-Emitter voltage (typ.)
VGE=0V, f= 1MHz, Tj= 25°C



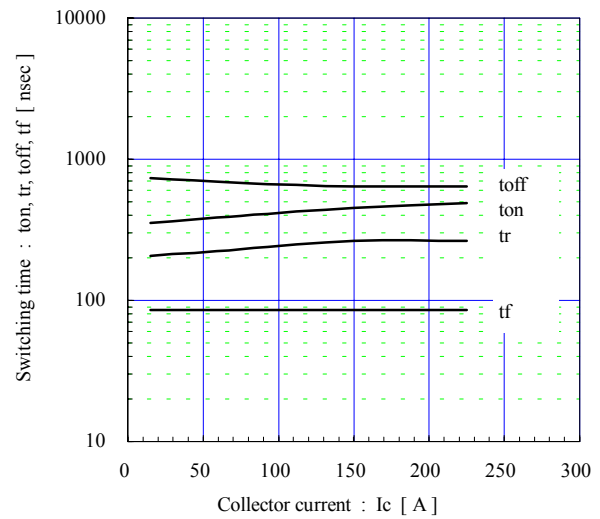
Dynamic Gate charge (typ.)
Vcc=600V, Ic=150A, Tj= 25°C



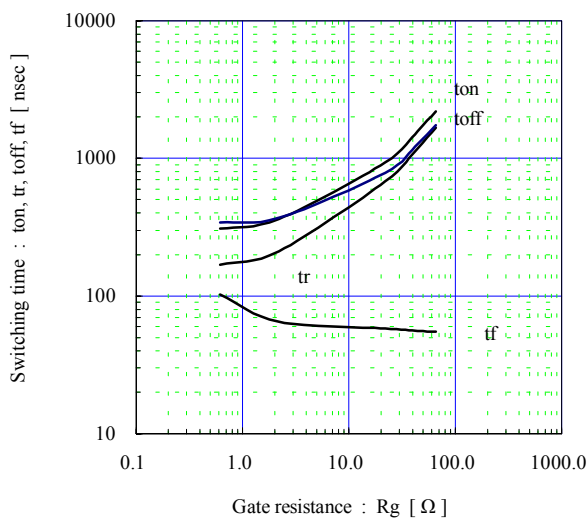
Switching time vs. Collector current (typ.)
 $V_{cc}=600V, V_{GE}=\pm 15V, R_g=2.2\Omega, T_j=25^\circ C$



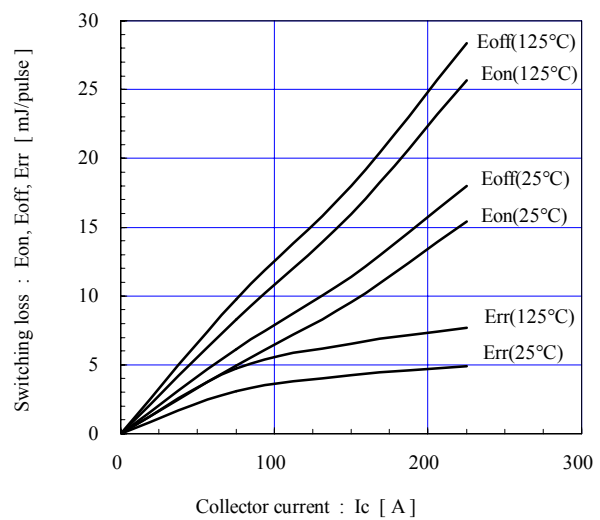
Switching time vs. Collector current (typ.)
 $V_{cc}=600V, V_{GE}=\pm 15V, R_g=2.2\Omega, T_j=125^\circ C$



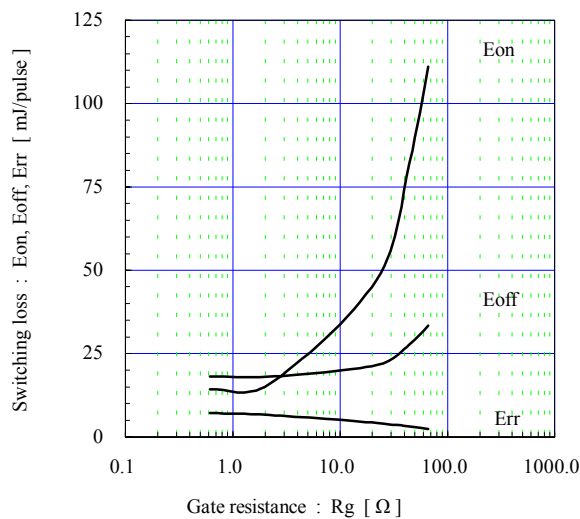
Switching time vs. Gate resistance (typ.)
 $V_{cc}=600V, I_c=150A, V_{GE}=\pm 15V, T_j=25^\circ C$



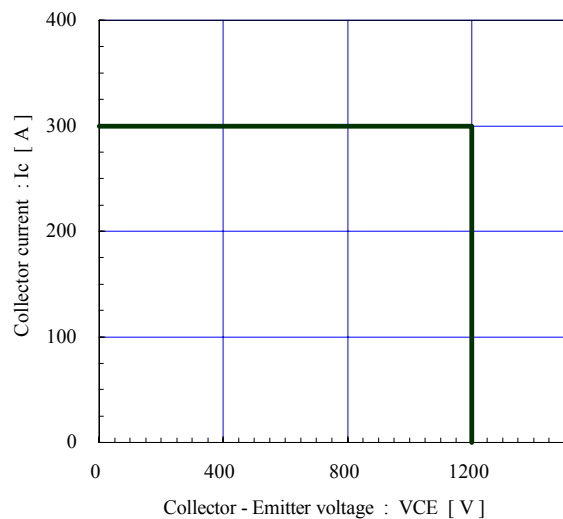
Switching loss vs. Collector current (typ.)
 $V_{cc}=600V, V_{GE}=\pm 15V, R_g=2.2\Omega$



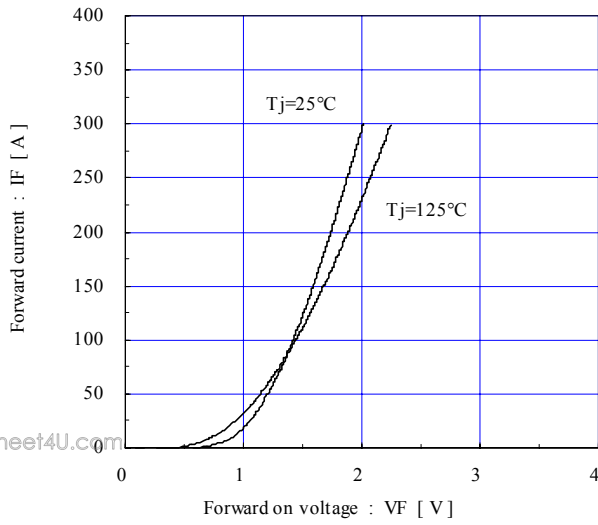
Switching loss vs. Gate resistance (typ.)
 $V_{cc}=600V, I_c=150A, V_{GE}=\pm 15V, T_j=125^\circ C$



Reverse bias safe operating area (max.)
 $+V_{GE}=15V, -V_{GE} \le 15V, R_g \ge 2.2\Omega, T_j \le 125^\circ C$



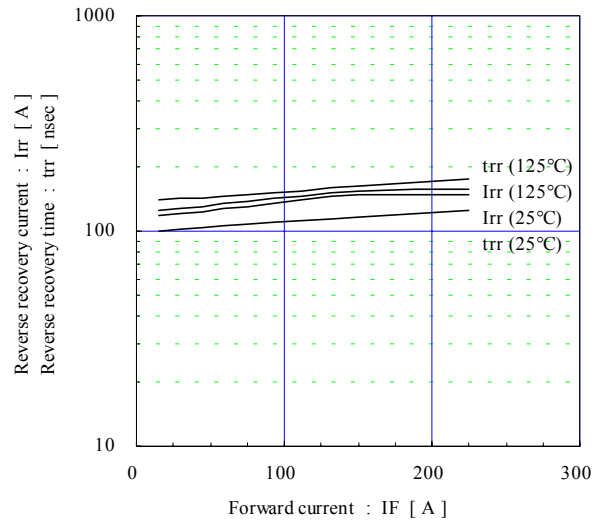
Forward current vs. Forward on voltage (typ.)
chip



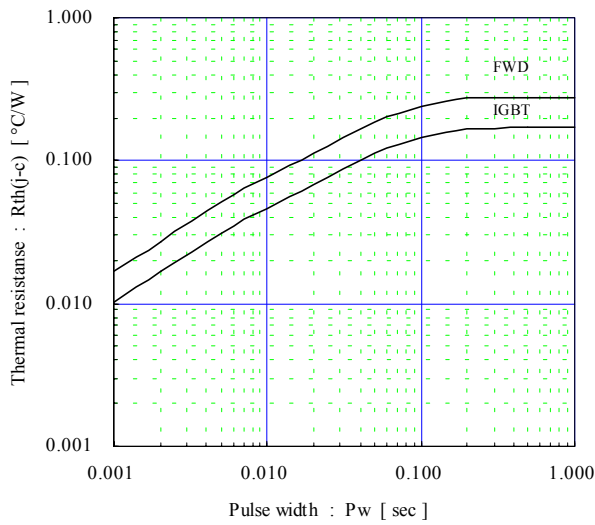
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Reverse recovery characteristics (typ.)

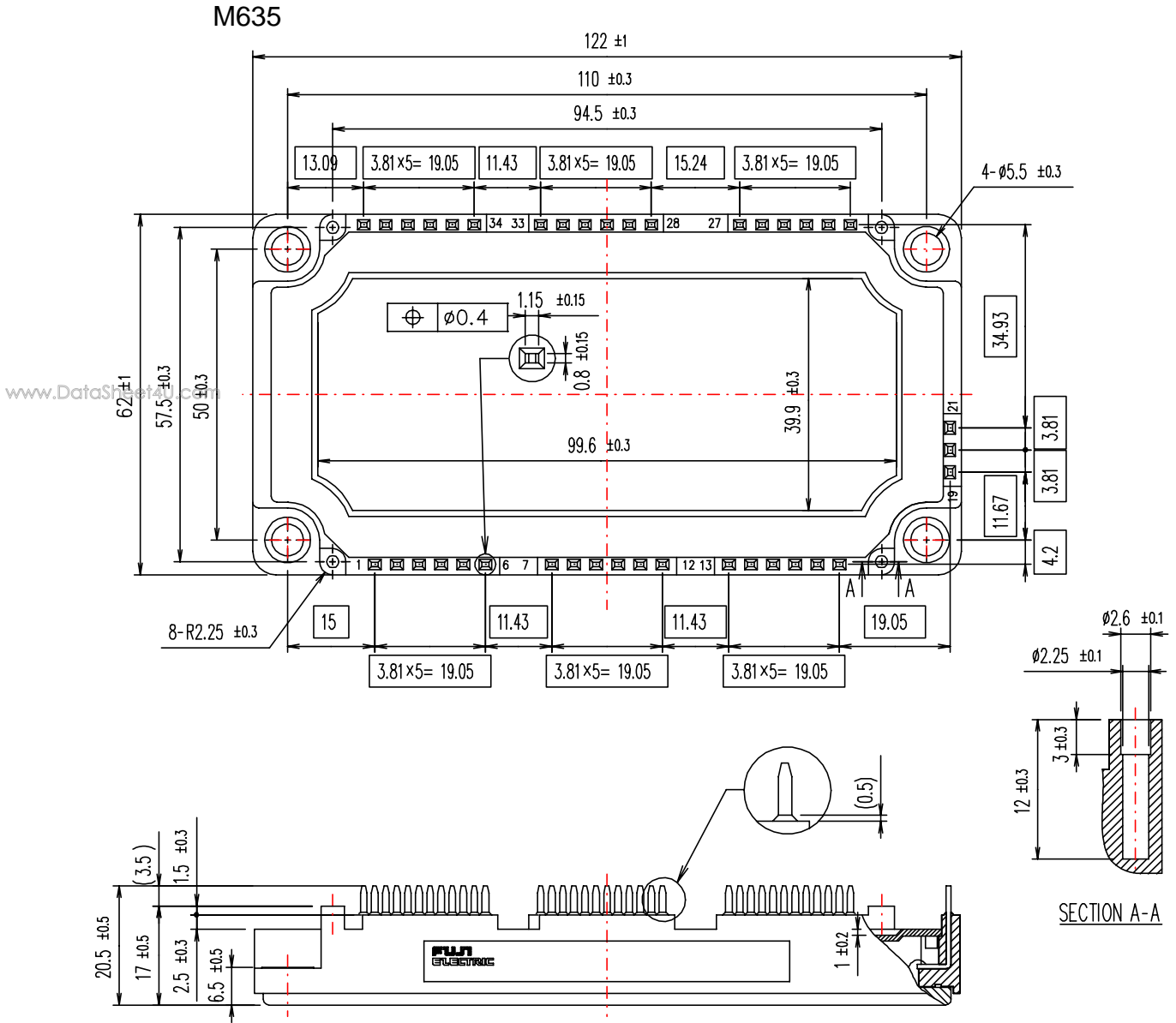
$V_{cc}=600\text{V}$, $V_{GE}=-15\text{V}$, $R_g=22\ \text{ohm}$



Transient thermal resistance (max.)



Outline Drawings, mm



() shows reference dimension.

Equivalent Circuit Schematic

