

3MBI150U-120



IGBT Module U-Series 1200V / 150A 3 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)

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	between terminal and copper base *1	V _{iso}	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	ICES	VGE=0V, VCE=1200V		—	—	1.0	mA
Gate-Emitter leakage current	IGES	VCE=0V, VGE=±20V		—	—	200	nA
Gate-Emitter threshold voltage	VGE(th)	VCE=20V, Ic=150mA		4.5	6.5	8.5	V
Collector-Emitter saturation voltage	VCE(sat) (terminal)	VGE=15V, Ic=150A	TJ=25°C	—	2.15	2.50	V
			TJ=125°C	—	2.40	—	
	VCE(sat) (chip)		TJ=25°C	—	1.75	2.10	
			TJ=125°C	—	2.00	—	
Input capacitance	Cies	VCE=10V, VGE=0V, f=1MHz		—	17	—	nF
Turn-on time	ton	VCC=600V Ic=150A VGE=±15V		—	0.36	1.20	μs
	tr			—	0.21	0.60	
	tr(i)			—	0.03	—	
Turn-off time	toff	RG=2.2 Ω		—	0.37	1.00	
	tf			—	0.07	0.30	
Forward on voltage	VF (terminal)	VGE=0V IF=150A	TJ=25°C	—	2.00	2.30	V
			TJ=125°C	—	2.10	—	
	VF (chip)		TJ=25°C	—	1.60	1.90	
			TJ=125°C	—	1.70	—	
Reverse recovery time	trr	IF=150A		—	—	0.35	μs
Lead resistance, terminal-chip*3	R lead			—	2.4	—	mΩ

*3:Biggest internal terminal resistance among arm.

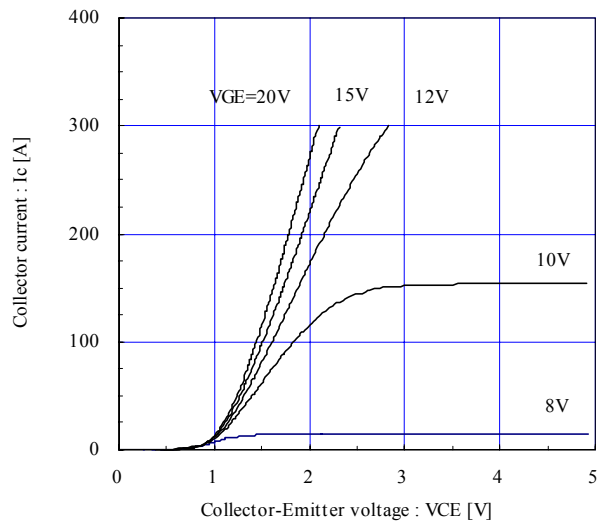
● Thermal resistance characteristics

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)*4}	With thermal compound	—	0.05	—	°C/W

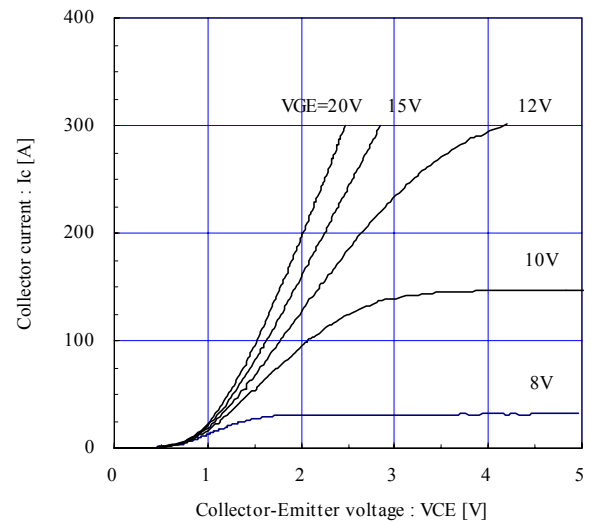
*4 : This is the value which is defined mounting on the additional cooling fin with thermal compound.

■ Characteristics (Representative)

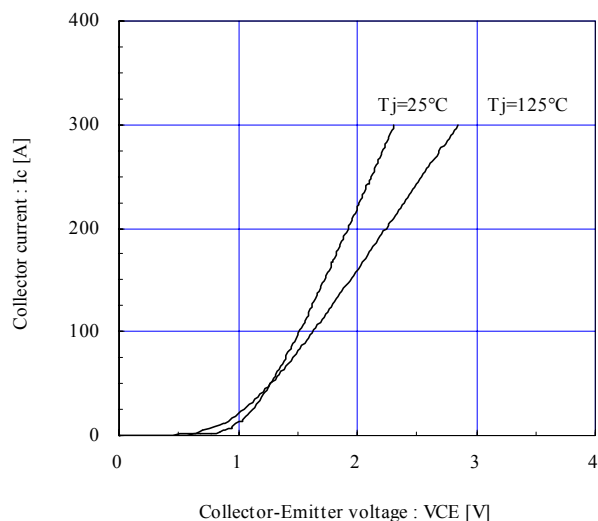
Collector current vs. Collector-Emitter voltage (typ.)

 $T_j = 25^\circ\text{C}$ / chip

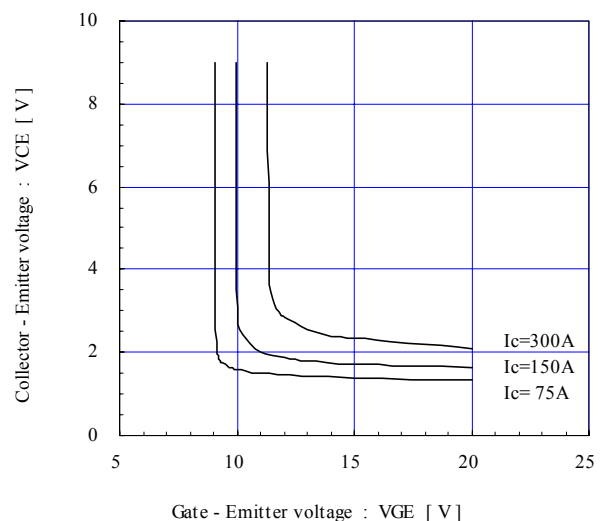
Collector current vs. Collector-Emitter voltage (typ.)

 $T_j = 125^\circ\text{C}$ / chip

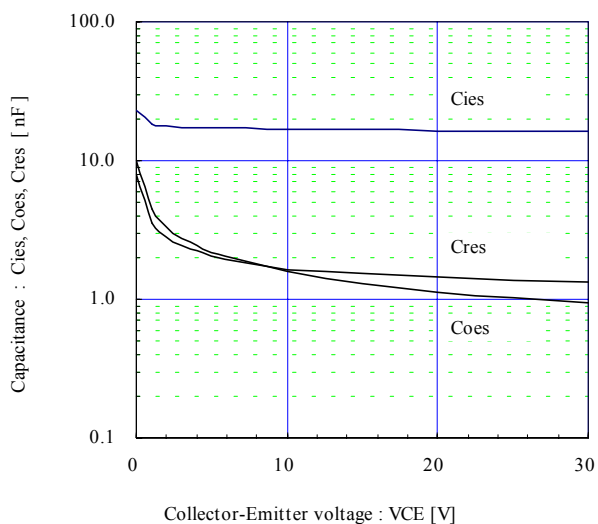
Collector current vs. Collector-Emitter voltage (typ.)

 $V_{GE} = 15\text{V}$ / chip

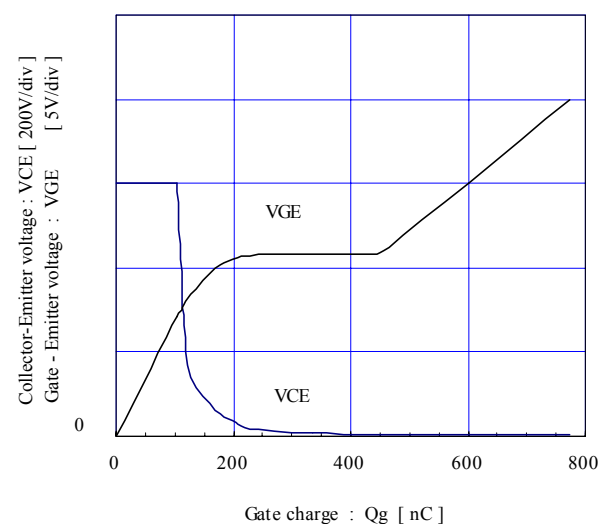
Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)

 $T_j = 25^\circ\text{C}$ / chip

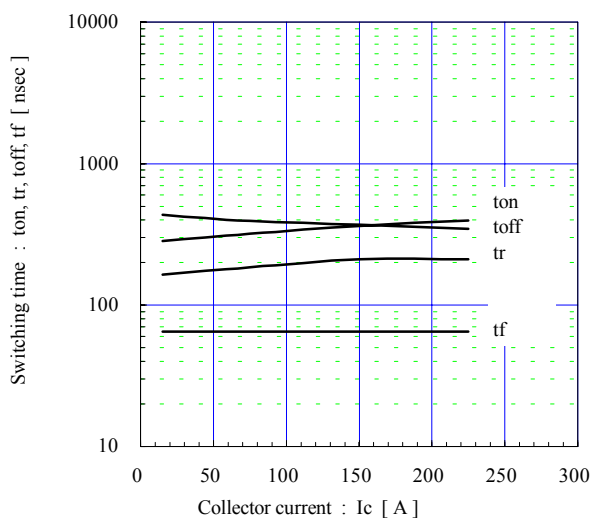
Capacitance vs. Collector-Emitter voltage (typ.)

 $V_{GE} = 0\text{V}$, $f = 1\text{MHz}$, $T_j = 25^\circ\text{C}$ 

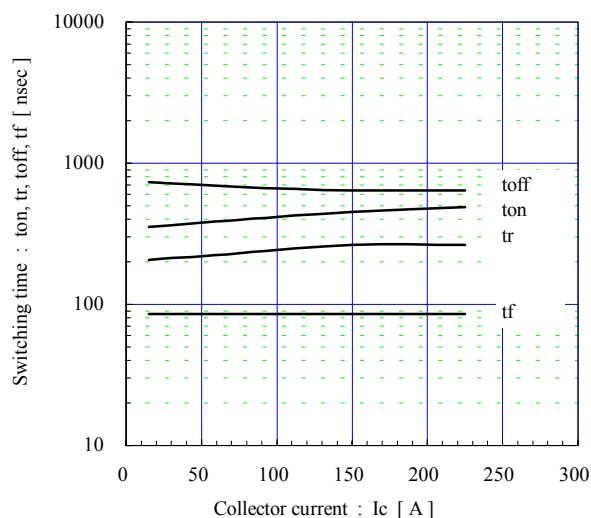
Dynamic Gate charge (typ.)

 $V_{ce} = 600\text{V}$, $I_c = 150\text{A}$, $T_j = 25^\circ\text{C}$ 

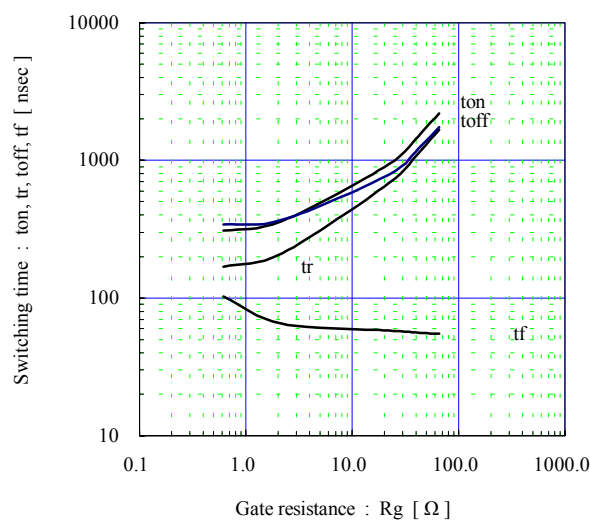
Switching time vs. Collector current (typ.)
 $V_{cc}=600V$, $V_{GE}=\pm 15V$, $R_g=2.2\Omega$, $T_j=25^\circ C$



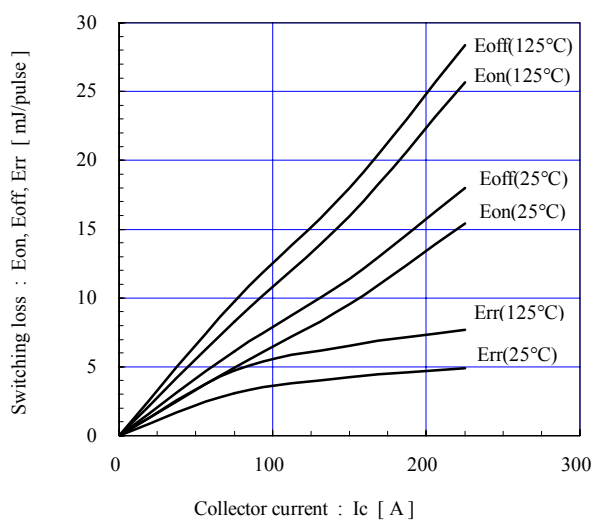
Switching time vs. Collector current (typ.)
 $V_{cc}=600V$, $V_{GE}=\pm 15V$, $R_g=2.2\Omega$, $T_j=125^\circ C$



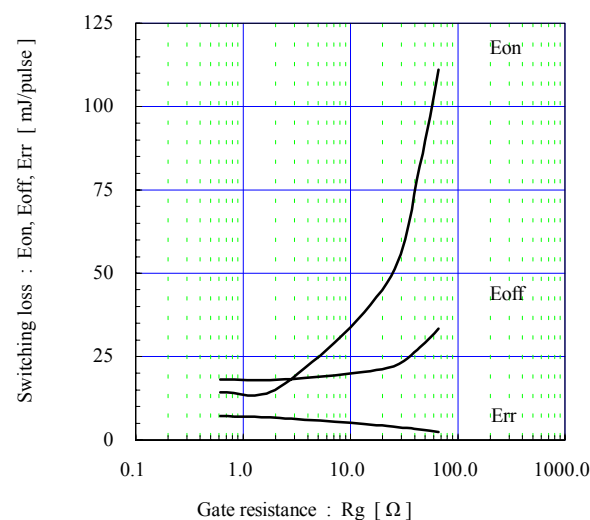
Switching time vs. Gate resistance (typ.)
 $V_{cc}=600V$, $I_c=150A$, $V_{GE}=\pm 15V$, $T_j=25^\circ C$



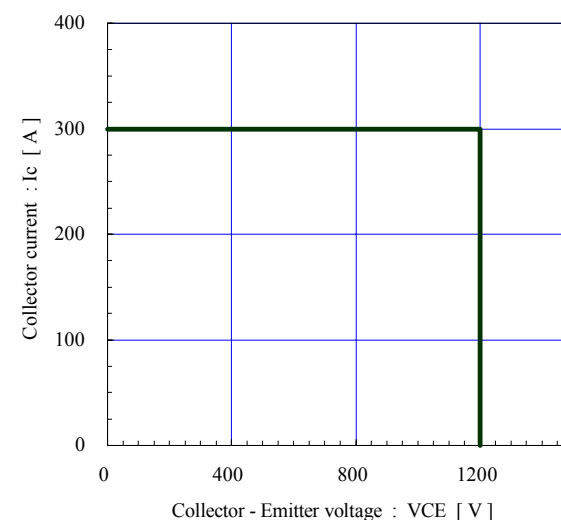
Switching loss vs. Collector current (typ.)
 $V_{cc}=600V$, $V_{GE}=\pm 15V$, $R_g=2.2\Omega$



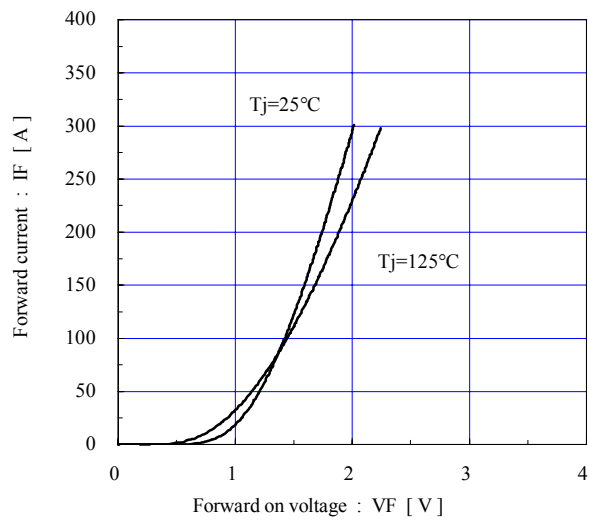
Switching loss vs. Gate resistance (typ.)
 $V_{cc}=600V$, $I_c=150A$, $V_{GE}=\pm 15V$, $T_j=125^\circ C$



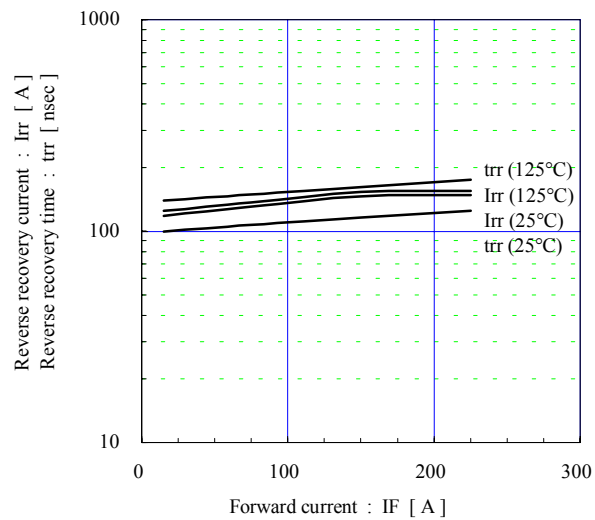
Reverse bias safe operating area (max.)
 $+V_{GE}=15V$, $-V_{GE} \leq 15V$, $R_g \geq 2.2\Omega$, $T_j \leq 125^\circ C$



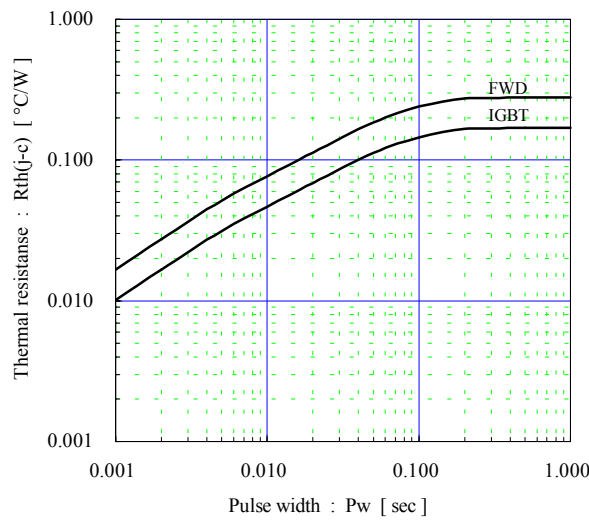
Forward current vs. Forward on voltage (typ.)
chip



Reverse recovery characteristics (typ.)
 $V_{cc}=600\text{V}$, $V_{GE}=\pm 15\text{V}$, $R_g=2.2\Omega$

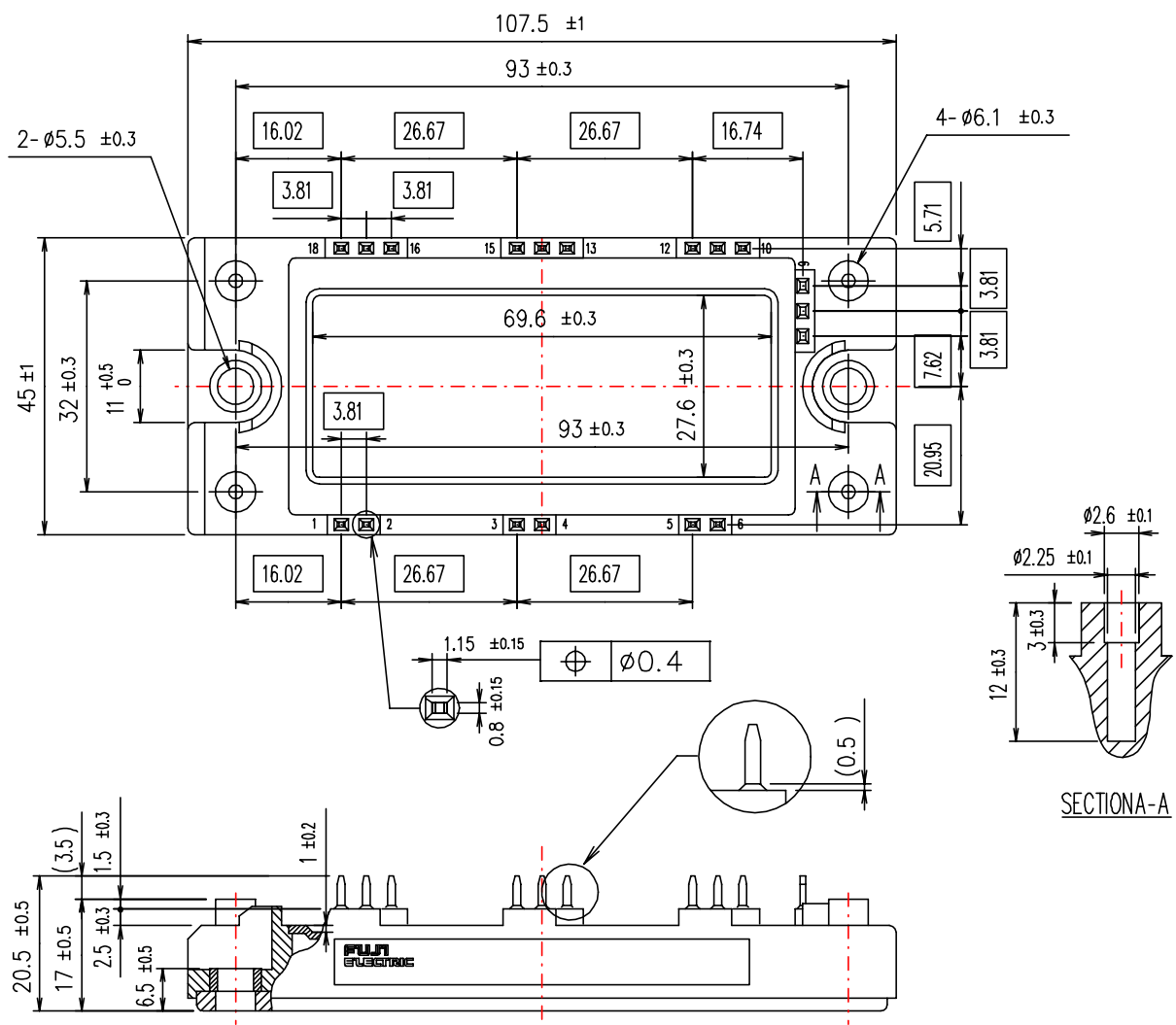


Transient thermal resistance (max.)



Outline Drawings, mm

M634



□ shows theoretical dimension.

() shows reference dimension.

Equivalent Circuit Schematic

