

1MBI200U4H-120L-50

IGBT Modules

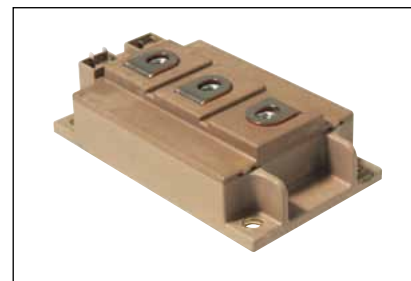
IGBT MODULE (U series) 1200V / 200A / 1 in one package

■ Features

- High speed switching
- Voltage drive
- Low Inductance module structure

■ Applications

- Inverter DB for Motor Drive
- AC and DC Servo Drive Amplifier (DB)
- Active PFC
- Industrial machines



■ Maximum Ratings and Characteristics

● Absolute Maximum Ratings (at Tc=25°C unless otherwise specified)

Items	Symbols	Conditions	Maximum ratings	Units
Collector-Emitter voltage	V_{CES}		1200	V
Gate-Emitter voltage	V_{GES}		±20	V
Collector current	I_c	Continuous	Tc=25°C 300	A
			Tc=80°C 200	
	I_c pulse	1ms	Tc=25°C 600	
			Tc=80°C 400	
	- I_c		100	
	- I_c pulse	1ms	200	
Collector power dissipation	P_c	1 device	1040	W
Reverse voltage for FWD	V_R		1200	V
Forward current for FWD	I_F	Continuous	300	A
	I_F pulse	1ms	600	
Junction temperature	T_j		+150	°C
Storage temperature	T_{stg}		-40~+125	°C
Isolation voltage	Between terminal and copper base (*1) V_{iso}	AC : 1min.	2500	VAC
Screw torque	Mounting (*2)	-	3.5	Nm
	Terminals (*3)	-	4.5	

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

Note *2: Recommendable Value : 2.5 to 3.5 Nm (M5 or M6)

Note *3: Recommendable Value : 2.5 to 3.5 Nm (M5)

● Electrical characteristics (at T_j = 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		-	-	2.0	mA
Gate-Emitter leakage current	I _{GES}	V _{CE} = 0V, V _{GE} = ±20V		-	-	400	nA
Gate-Emitter threshold voltage	V _{GE (th)}	V _{CE} = 20V, I _C = 200mA		4.5	6.5	8.5	V
Collector-Emitter saturation voltage	V _{CE (sat)} (terminal)	V _{GE} = 15V I _C = 200A	T _J =25°C	-	2.10	2.25	V
	V _{CE (sat)} (chip)		T _J =125°C	-	2.30	-	
			T _J =25°C	-	1.90	2.05	
			T _J =125°C	-	2.10	-	
Input capacitance	C _{ies}	V _{GE} = 0V, V _{CE} = 10V, f = 1MHz		-	22	-	nF
Turn-on time	t _{on}	V _{CC} = 600V, I _C = 200A V _{GE} = ±15V, R _G = 3Ω		-	0.32	1.20	μs
	t _r			-	0.10	0.60	
	t _{r(i)}			-	0.03	-	
Turn-off time	t _{off}			-	0.41	1.00	
	t _f			-	0.07	0.30	
Forward on voltage	V _F (terminal)	V _{GE} = 0V I _F = 100A	T _J =25°C	-	1.75	1.90	V
	V _F (chip)		T _J =125°C	-	1.85	-	
			T _J =25°C	-	1.60	1.75	
			T _J =125°C	-	1.75	-	
Reverse Current	I _R	V _{CE} = 1200V		-	-	3.0	mA
Forward on voltage	V _F (terminal)	V _{GE} = 0V I _F = 300A	T _J =25°C	-	1.85	2.00	V
	V _F (chip)		T _J =125°C	-	2.00	-	
			T _J =25°C	-	1.60	1.75	
			T _J =125°C	-	1.75	-	
Reverse recovery time	t _{rr}	I _F = 300A		-	-	0.35	μs
Lead resistance, terminal-chip(*4)	R lead			-	1.00	-	mΩ

Note *4: Biggest internal terminal resistance among arm.

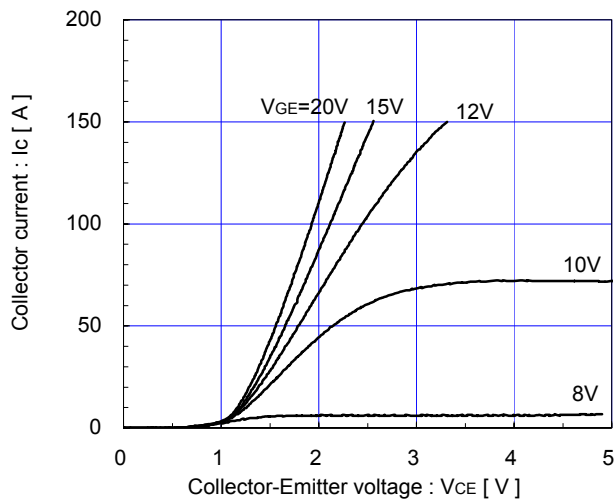
● Thermal resistance characteristics

Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	max.	
Thermal resistance (1device)	R _{th(j-c)}	IGBT	-	-	0.12	°C/W
		Inverse Diode	-	-	0.40	
		FWD	-	-	0.13	
Contact thermal resistance	R _{th(c-f)}	with Thermal Compound (*5)	-	0.025	-	

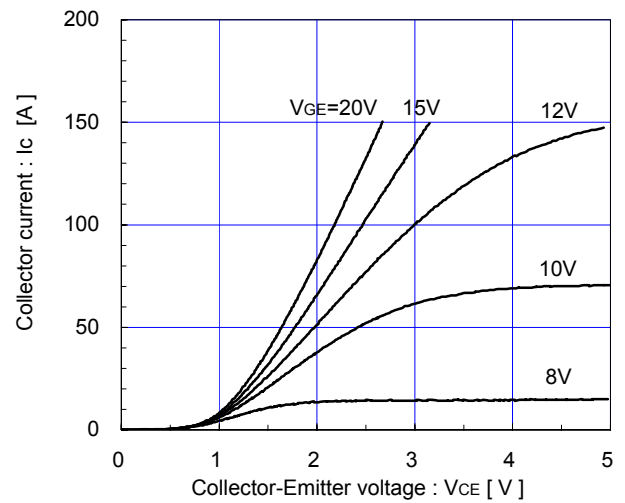
Note *5: This is the value which is defined mounting on the additional cooling fin with thermal compound.

■ Characteristics (Representative)

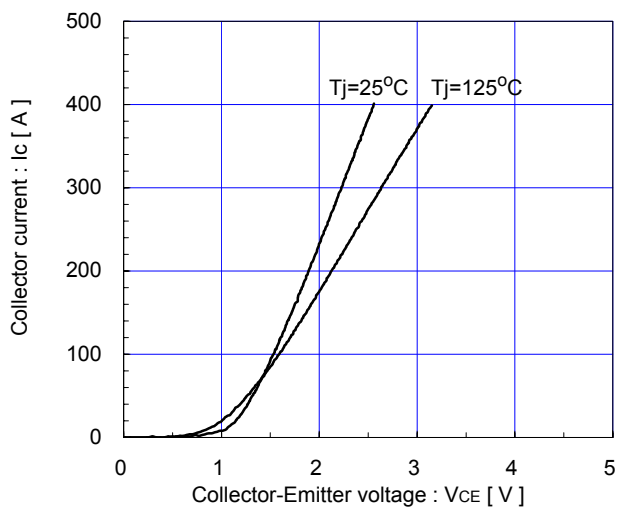
Collector current vs. Collector-Emitter voltage (typ.)
T_j=25°C / chip



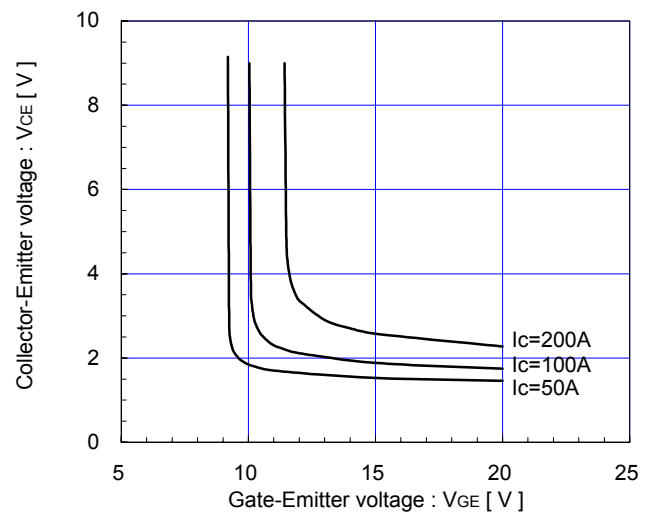
Collector current vs. Collector-Emitter voltage (typ.)
T_j=125°C / chip



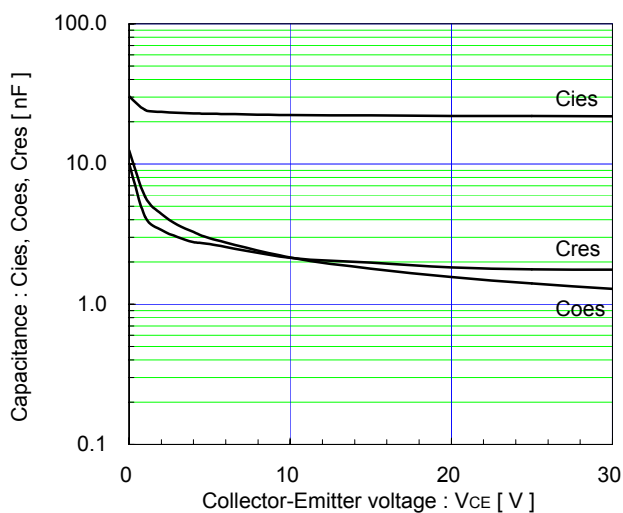
Collector current vs. Collector-Emitter voltage (typ.)
V_{GE}=15V / chip



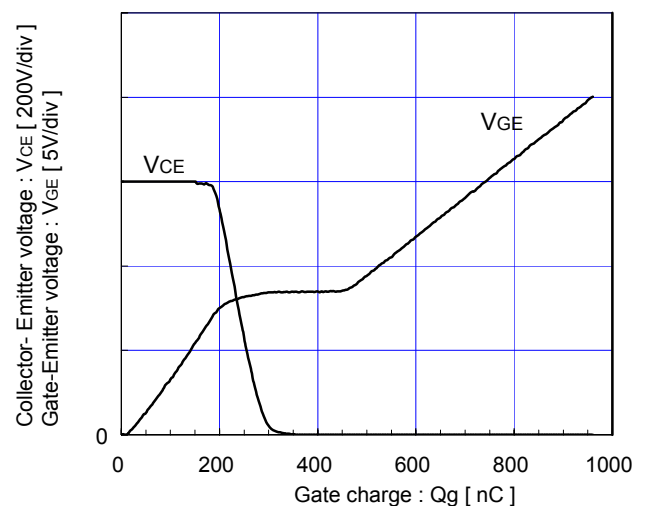
Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)
T_j=25°C / chip



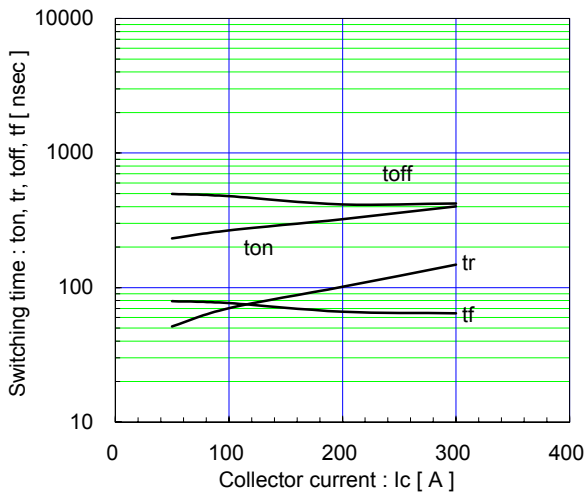
Capacitance vs. Collector-Emitter voltage (typ.)
V_{GE}=0V, f=1MHz, T_j=25°C



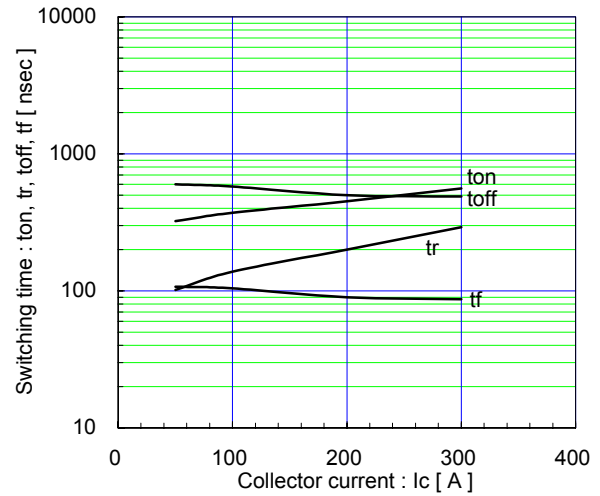
Dynamic Gate charge (typ.)
V_{CC}=600V, I_c=200A, T_j=25°C



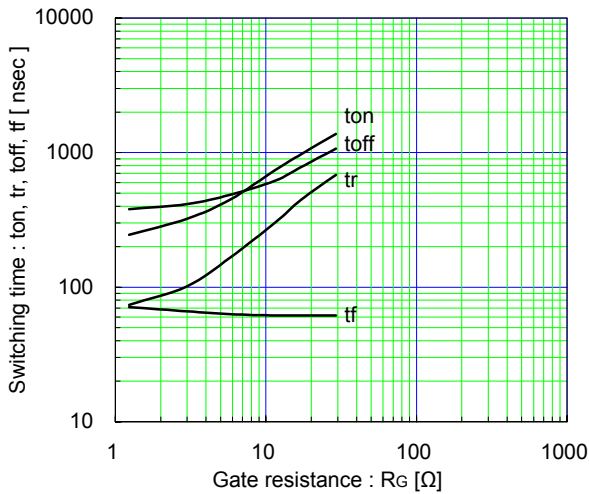
Switching time vs. Collector current (typ.)
V_{CC}=600V, V_{GE}=±15V, R_G=3Ω, T_j=25°C



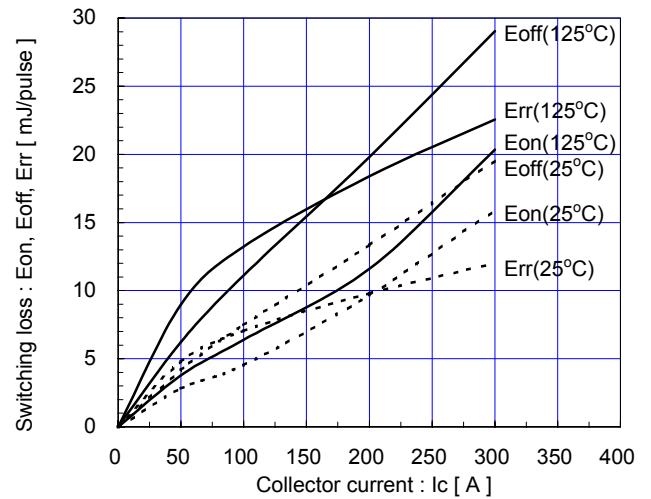
Switching time vs. Collector current (typ.)
V_{CC}=600V, V_{GE}=±15V, R_G=3Ω, T_j=125°C



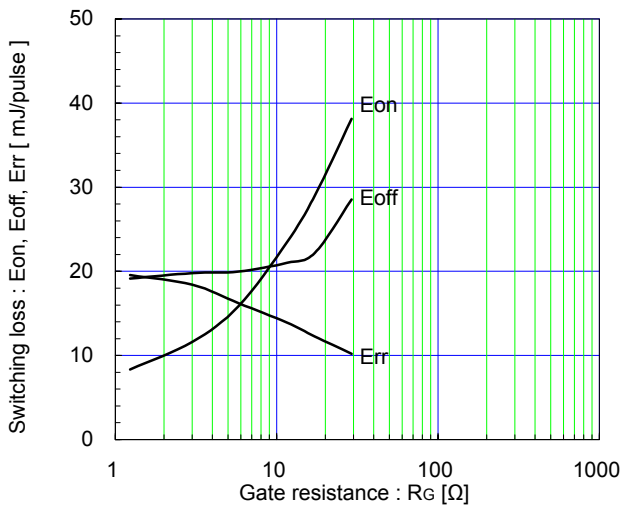
Switching time vs. Gate resistance (typ.)
V_{CC}=600V, I_c=200A, V_{GE}=±15V, T_j=25°C



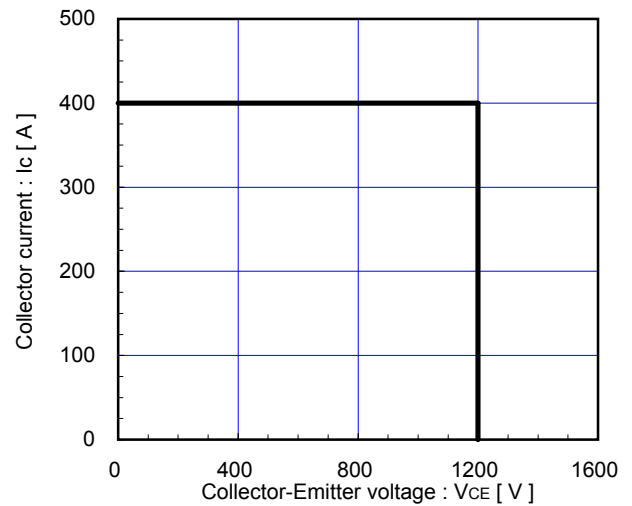
Switching loss vs. Collector current (typ.)
V_{CC}=600V, V_{GE}=±15V, R_G=3Ω

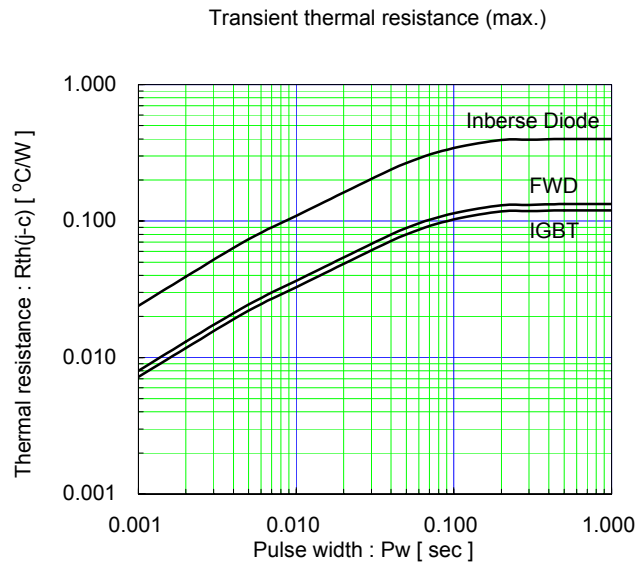
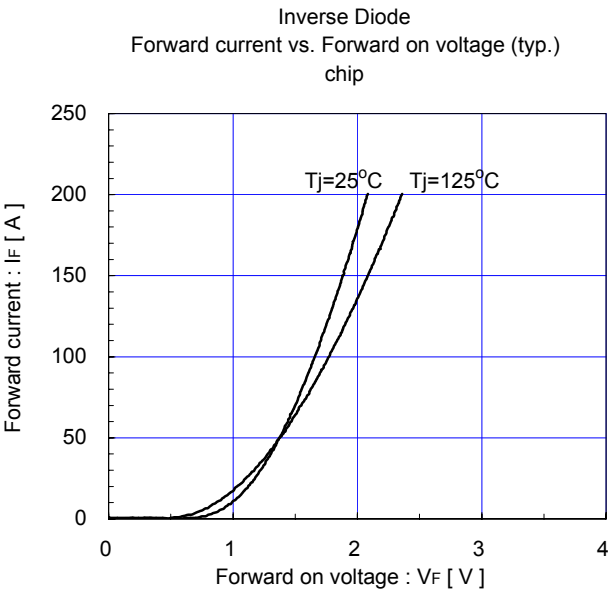
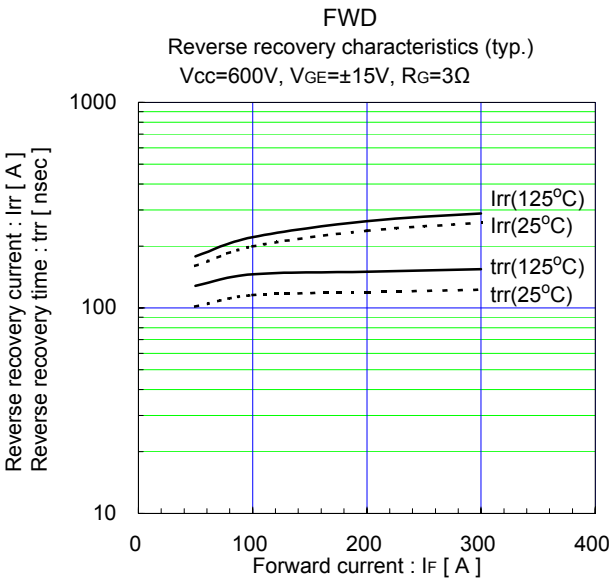
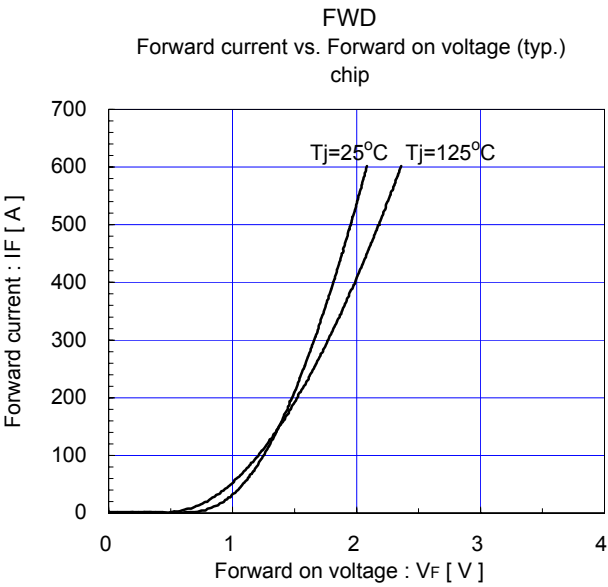


Switching loss vs. Gate resistance (typ.)
V_{CC}=600V, I_c=200A, V_{GE}=±15V, T_j=125°C

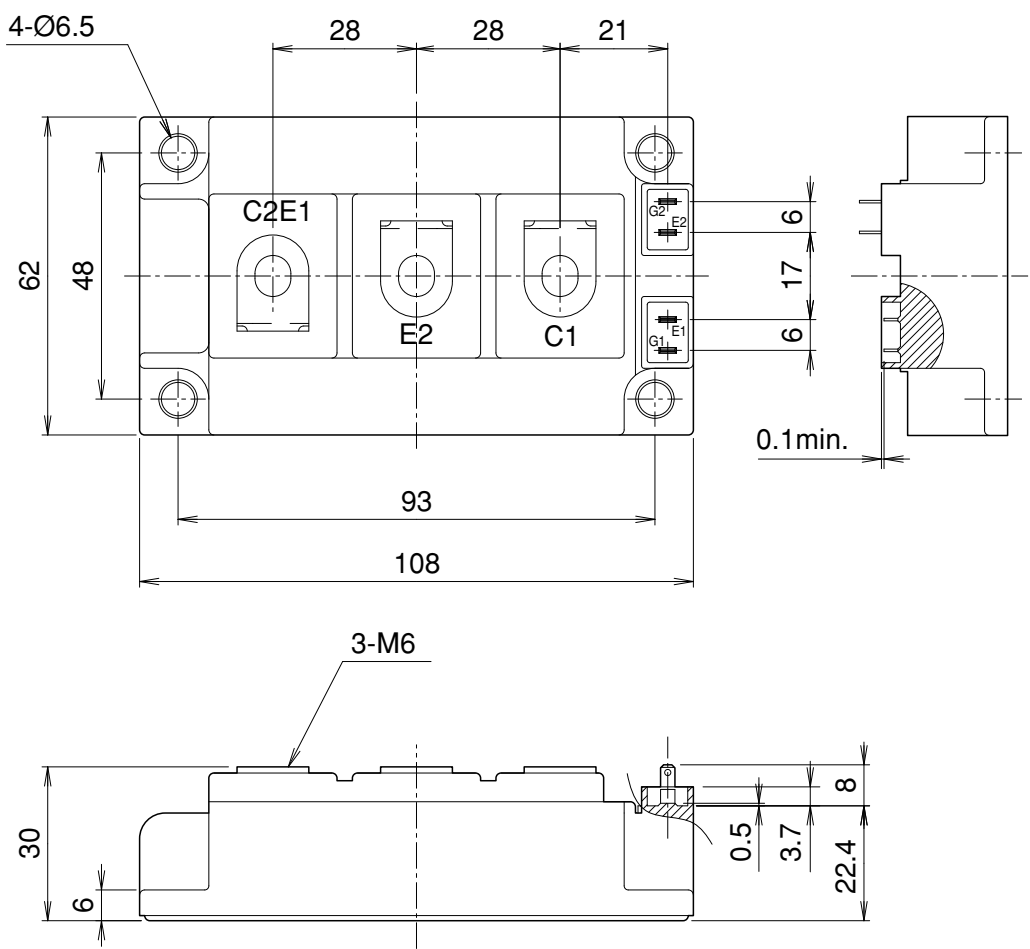


Reverse bias safe operating area (max.)
+V_{GE}=15V, -V_{GE} ≤ 15V, R_G ≥ 3Ω, T_j ≤ 125°C

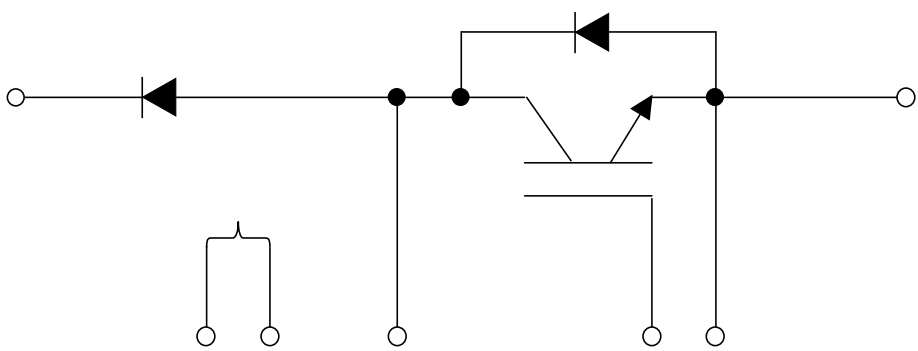




■ Outline Drawings, mm



■ Equivalent Circuit Schematic



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