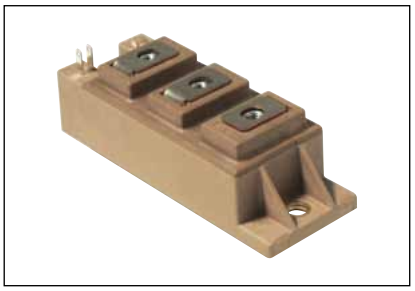
1MBI75U4F-120L-50

IGBT Modules

IGBT MODULE (U series)
1200V / 75A / 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		Ic	Continuous	Tc=25°C	100	A
				Tc=80°C	75	
		Icp	1ms	Tc=25°C	200	
				Tc=80°C	150	
		-Ic			35	
		-Ic pulse	1ms		70	
Collector power dissipation		Pc	1 device		400	W
Reverse voltage for FWD		VR			1200	V
Forword current for FWD		IF	Continuous		100	A
		IF pulse	1ms		200	
Junction temperature		Tj			+150	°C
Storage temperature		Tstg			-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)					

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 Tj= 25°C unless otherwise specified)

Items	Symbols	Conditions		Characteristics min.	Characteristics typ.	Characteristics max.	Units
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 = 75mA		4.5	6.5	8.5	V
Collector-Emitter saturation voltage	$V_{CE\ (sat)}$ (terminal)	V_{GE} = 15V, I_C = 75A	Tj=25°C	-	2.05	2.20	V
			Tj=125°C	-	2.25	-	
	$V_{CE\ (sat)}$ (chip)		Tj=25°C	-	1.90	2.05	
			Tj=125°C	-	2.10	-	
Input capacitance	Cies	V_{GE} = 0V, V_{CE} = 10V, f = 1MHz		-	8	-	nF
Turn-on time	ton	V_{CC} = 600V, I_C = 75A, V_{GE} = ±15V, R_G = 9.1Ω		-	0.32	1.20	μs
	tr			-	0.10	0.60	
	tr(i)			-	0.03	-	
Turn-off time	toff			-	0.41	1.00	
	tf			-	0.07	0.30	
Forward on voltage	V_F (terminal)	V_{GE} = 0V, I_F = 35A	Tj=25°C	-	1.65	2.00	V
			Tj=125°C	-	1.75	-	
	V_F (chip)		Tj=25°C	-	1.60	1.85	
			Tj=125°C	-	1.70	-	
Reverse Current	IR	V_{CE} = 1200V		-	-	1.0	mA
Forward on voltage	V_F (terminal)	V_{GE} = 0V, I_F = 100A	Tj=25°C	-	1.75	1.90	V
			Tj=125°C	-	1.90	-	
	V_F (chip)		Tj=25°C	-	1.60	1.75	
			Tj=125°C	-	1.75	-	
Reverse recovery time	trr	I_F = 100A		-	-	0.35	μs
Lead resistance, terminal-chip(*4)	R lead			-	1.39	-	mΩ

Note *4: Biggest internal terminal resistance among arm.

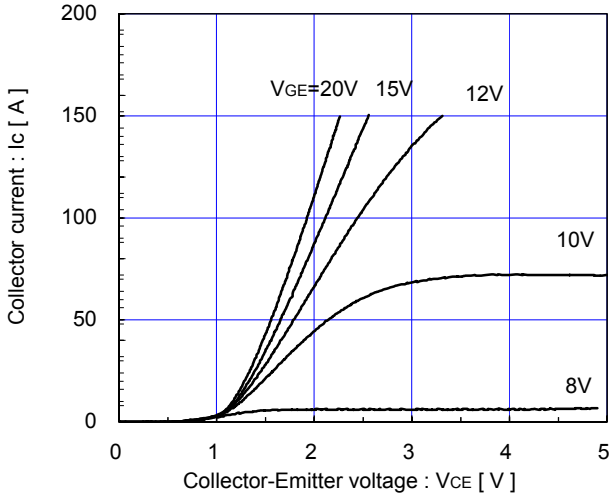
● Thermal resistance characteristics

Items	Symbols	Conditions	Characteristics min.	Characteristics typ.	Characteristics max.	Units
Thermal resistance (1device)	Rth(j-c)	IGBT	-	-	0.31	°C/W
		Inverse Diode	-	-	0.88	
		FWD	-	-	0.40	
Contact thermal resistance	Rth(c-f)	with Thermal Compound (*5)	-	0.05	-	

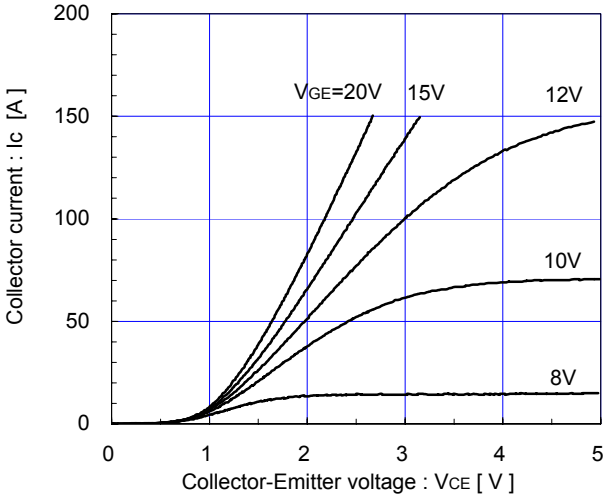
Note *5: This is the value which is defined mounting on the additional cooling fin with thermal compound.

■ Characteristics (Representative)

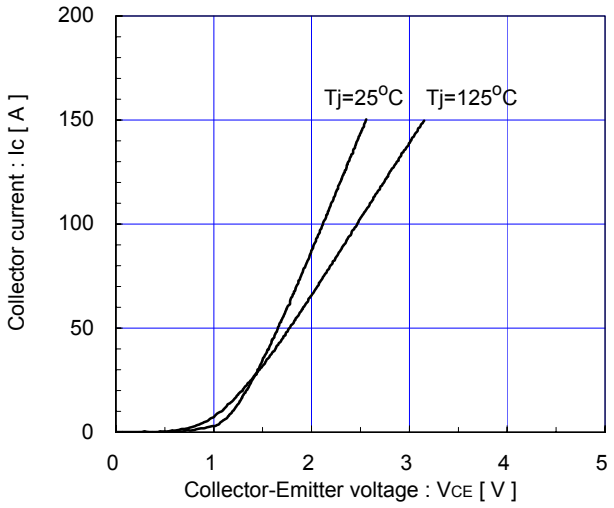
Collector current vs. Collector-Emitter voltage (typ.)
Tj=25°C / chip



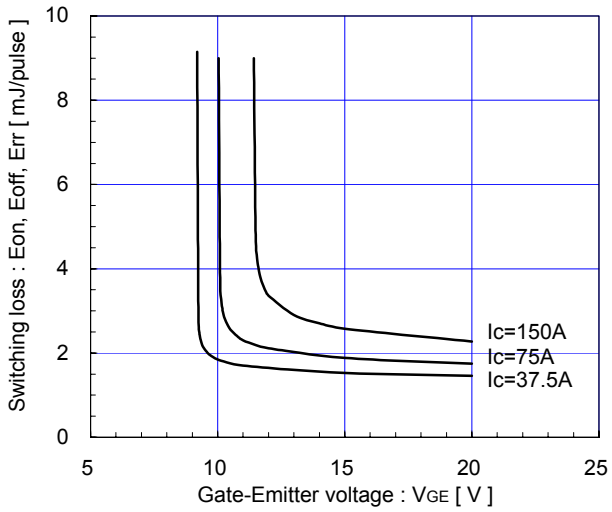
Collector current vs. Collector-Emitter voltage (typ.)
Tj=125°C / chip



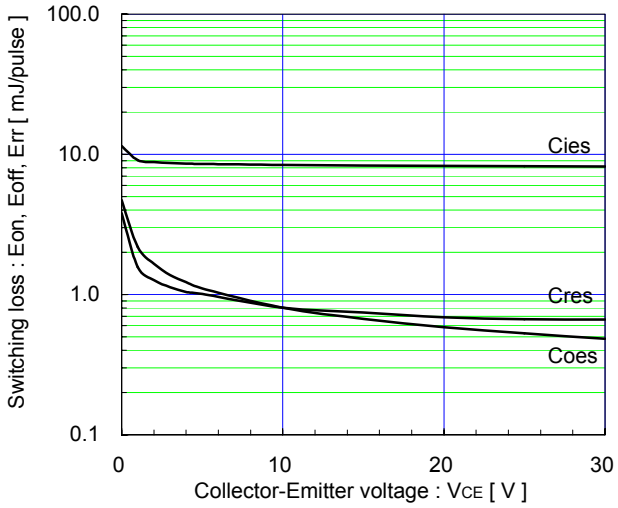
Collector current vs. Collector-Emitter voltage (typ.)
VGE=15V / chip



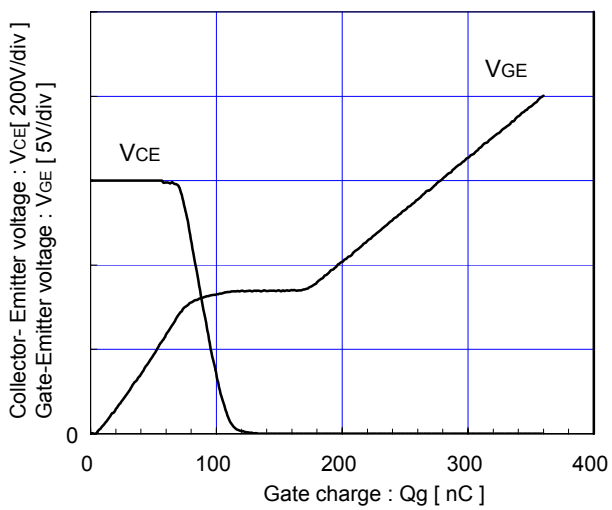
Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)
Tj=25°C / chip



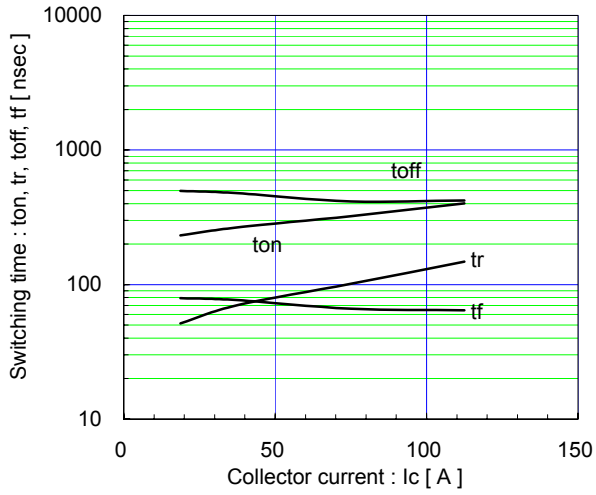
Capacitance vs. Collector-Emitter voltage (typ.)
VGE=0V, f=1MHz, Tj=25°C



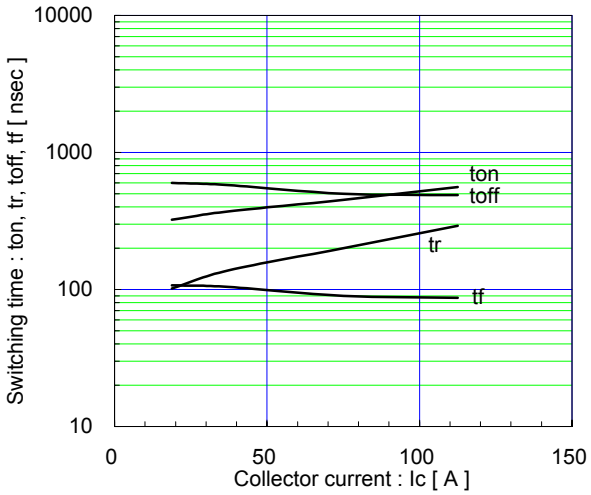
Dynamic Gate charge (typ.)
Vcc=600V, Ic=75A, Tj=25°C



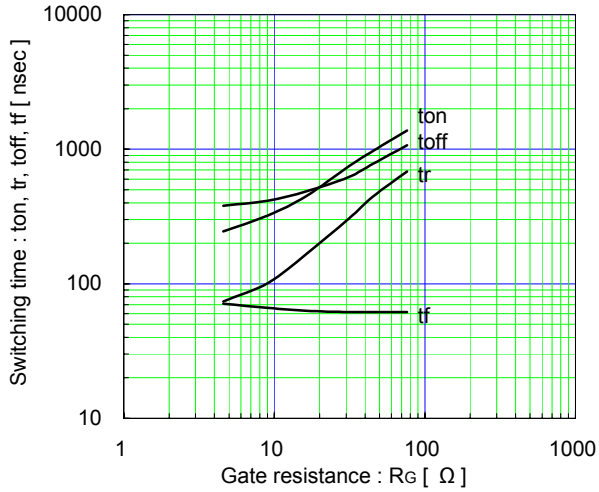
Switching time vs. Collector current (typ.)
Vcc=600V, VGE=±15V, RG=9.1Ω,Tj=25°C



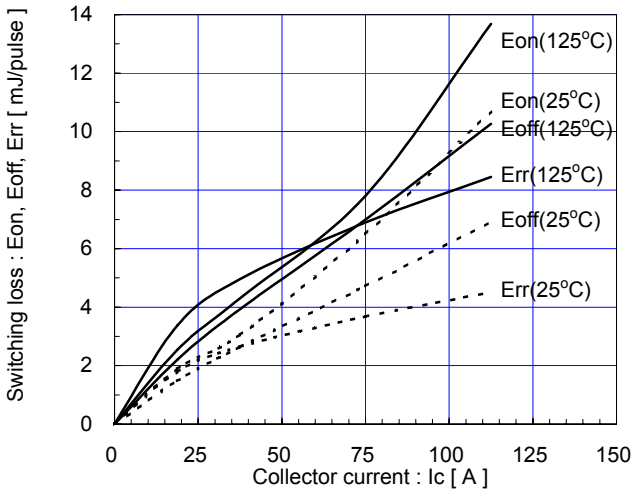
Switching time vs. Collector current (typ.)
Vcc=600V, VGE=±15V, RG=9.1Ω,Tj=125°C



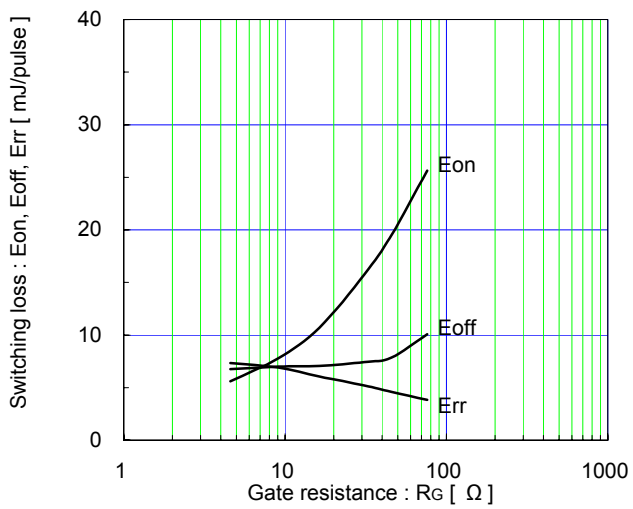
Switching time vs. Gate resistance (typ.)
Vcc=600V, Ic=75A, VGE=±15V, Tj=25°C



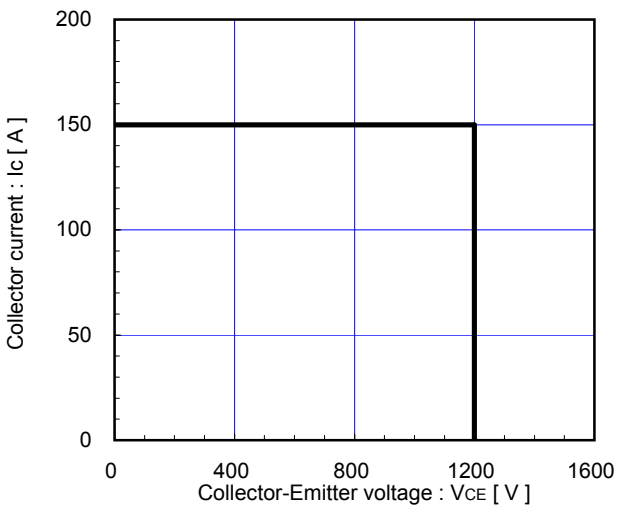
Switching loss vs. Collector current (typ.)
Vcc=600V, VGE=±15V, RG=9.1Ω



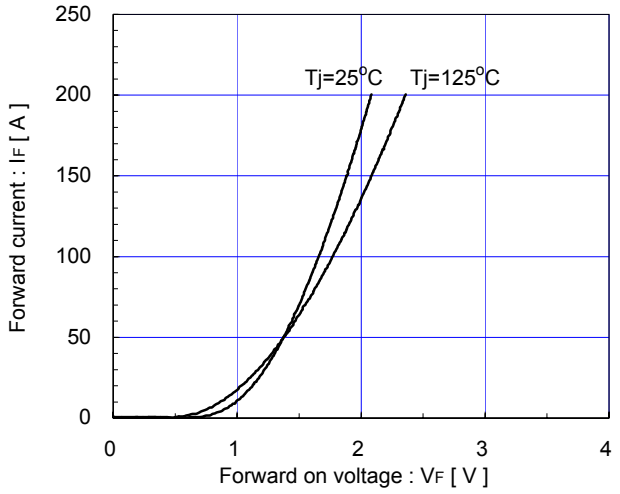
Switching loss vs. Gate resistance (typ.)
Vcc=600V, Ic=75A, VGE=±15V, Tj=125°C



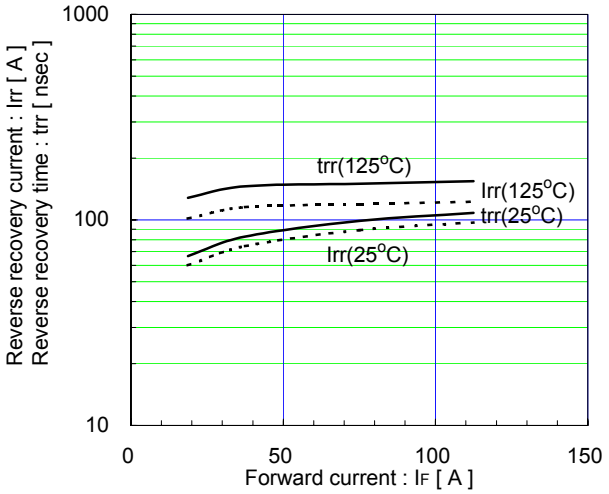
Reverse bias safe operating area (max.)
+VGE=15V, -VGE <= 15V, RG >= 9.1Ω, Tj <= 125°C



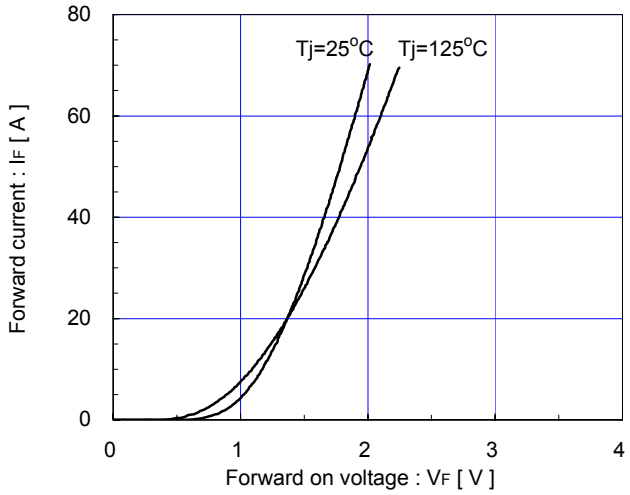
FWD
Forward current vs. Forward on voltage (typ.)
chip



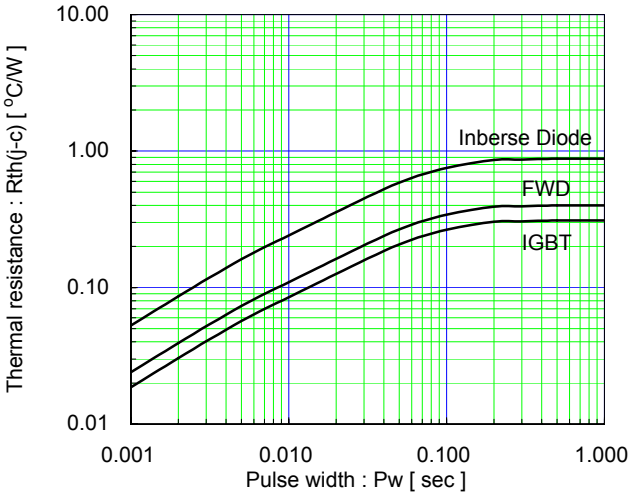
FWD
Reverse recovery characteristics (typ.)
Vcc=600V, VGE=±15V, RG=9.1Ω



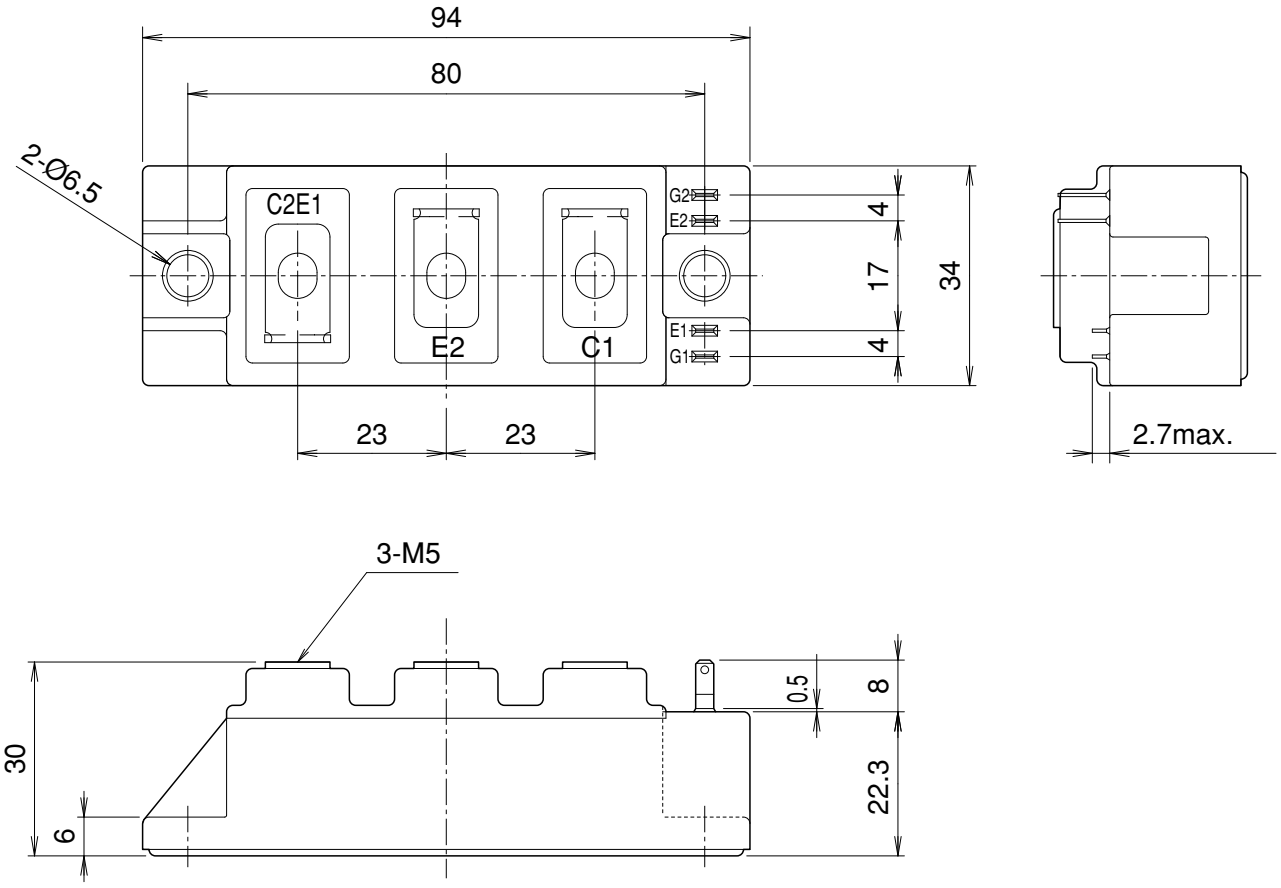
Inverse Diode
Forward current vs. Forward on voltage (typ.)
chip



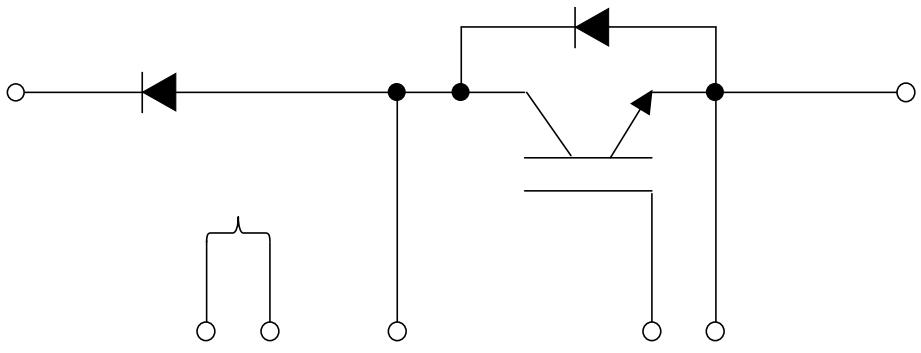
Transient thermal resistance (max.)



■ Outline Drawings, mm



■ Equivalent Circuit Schematic



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- Safety devices
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