

1MBI900V-120-50

IGBT Modules

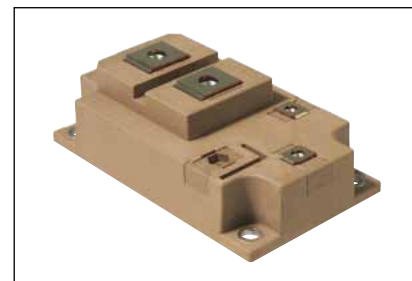
IGBT MODULE (V series) 1200V / 900A / 1 in one package

■ 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)

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=100°C 900	A
	I_c pulse	1ms	1080	
	- I_c		900	
	- I_c pulse	1ms	1800	
Collector power dissipation	P_c	1 device	4280	W
Junction temperature	T_j		175	°C
Operating junction temperature (under switching conditions)	T_{jop}		150	
Case temperature	T_c		125	
Storage temperature	T_{stg}		-40~+125	
Isolation voltage	Between terminal and copper base (*1) V_{iso}	AC : 1min.	2500	VAC
Screw torque	Mounting (*2)	M5 or M6	6.0	Nm
	Terminals (*3)	M4	2.0	
		M6	5.0	

Note *1: All terminals should be connected together during the test.

Note *2: Recommendable Value : 3.0-6.0 Nm (M5, M6)

Note *3: Recommendable Value : 1.1-2.0 Nm (M4)

Recommendable Value : 2.5-5.0 Nm (M6)

● 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		-	-	4.0	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 = 900mA		6.0	6.5	7.0	V
Collector-Emitter saturation voltage	V _{CE (sat)} (terminal)	V _{GE} = 15V I _C = 900A	T _J =25°C	-	2.10	2.55	V
			T _J =125°C	-	2.35	-	
			T _J =150°C		2.40		
	V _{CE (sat)} (chip)		T _J =25°C	-	1.90	2.15	
			T _J =125°C	-	2.15	-	
			T _J =150°C		2.20		
Internal gate resistance	R _{g(int)}	-		-	0.9	-	Ω
Input capacitance	C _{ies}	V _{GE} = 0V, V _{CE} = 10V, f = 1MHz		-	73	-	nF
Turn-on time	t _{on}	V _{CC} = 600V, I _C = 900A V _{GE} = ±15V, R _G = 1.5/-0.9Ω T _J =150°C, L _s =35nH		-	0.75	-	μs
	t _r			-	0.32	-	
	t _{r(i)}			-	0.15	-	
Turn-off time	t _{off}			-	0.85	-	
	t _f			-	0.10	-	
Forward on voltage	V _F (terminal)	V _{GE} = 0V I _F = 900A	T _J =25°C	-	2.00	2.45	V
			T _J =125°C	-	2.15	-	
			T _J =150°C		2.10		
	V _F (chip)		T _J =25°C	-	1.70	2.15	
			T _J =125°C	-	1.85	-	
			T _J =150°C		1.80		
Reverse recovery time	t _{rr}	I _F = 900A		-	0.3	-	μs

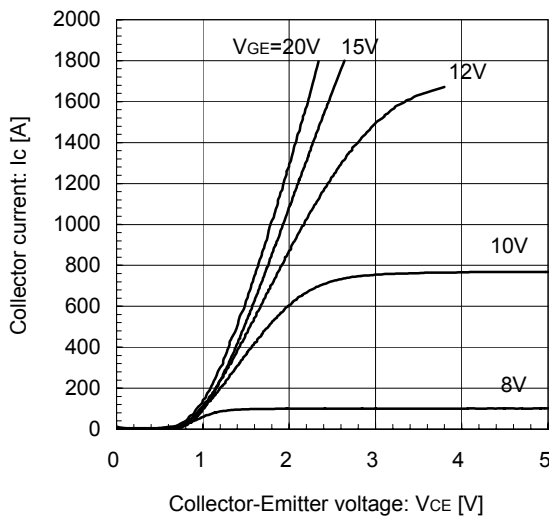
● Thermal resistance characteristics

Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	max.	
Thermal resistance (1device)	R _{th(j-c)}	IGBT FWD	-	-	0.035 0.060	°C/W
Contact thermal resistance (*4)	R _{th(c-f)}	with Thermal Compound	-	0.0063	-	

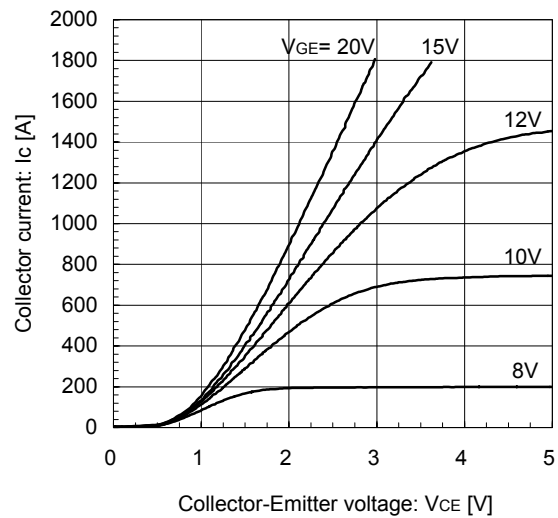
Note *4: This is the value which is defined mounting on the additional cooling fin with thermal compound.

■ Characteristics (Representative)

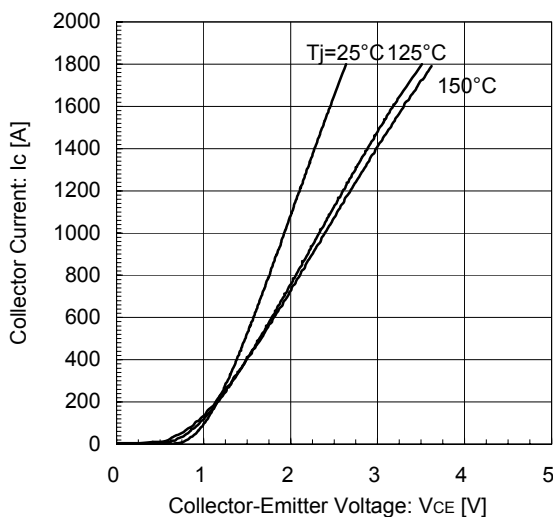
Collector current vs. Collector-Emmitter voltage (typ.)
 $T_j = 25^\circ\text{C}$ / chip



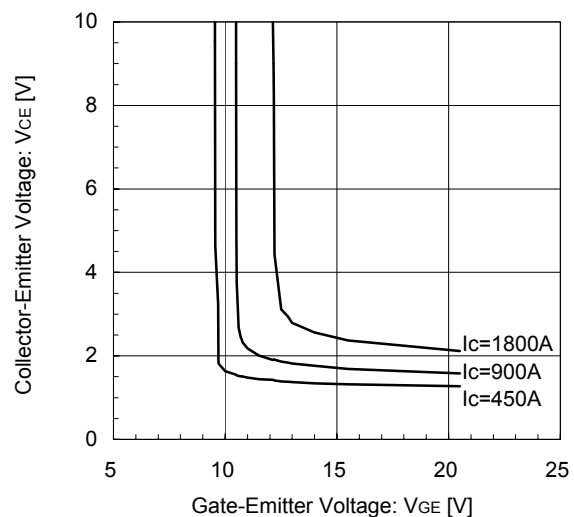
Collector current vs. Collector-Emmitter voltage (typ.)
 $T_j = 150^\circ\text{C}$ / chip



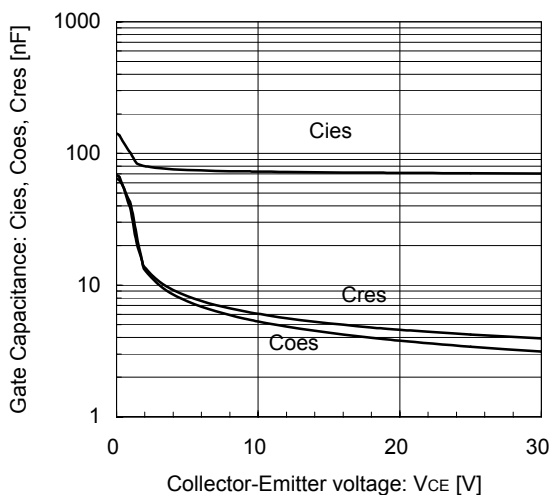
Collector current vs. Collector-Emmitter voltage (typ.)
 $V_{GE} = 15\text{V}$ / chip



Collector-Emmitter voltage vs. Gate-Emmitter voltage
 $T_j = 25^\circ\text{C}$ / chip

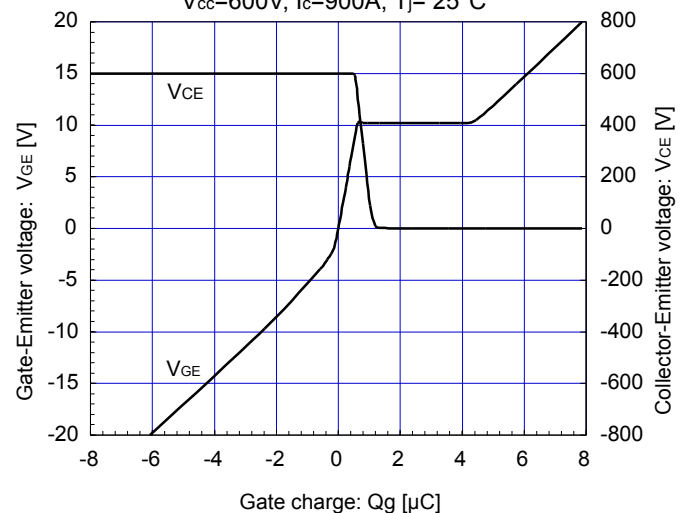


Gate Capacitance vs. Collector-Emmitter Voltage
 $V_{GE} = 0\text{V}$, $f = 1\text{MHz}$, $T_j = 25^\circ\text{C}$

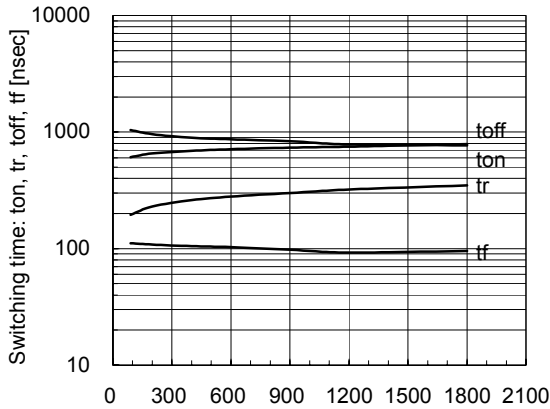


Dynamic Gate Charge (typ.)

$V_{CC} = 600\text{V}$, $I_c = 900\text{A}$, $T_j = 25^\circ\text{C}$

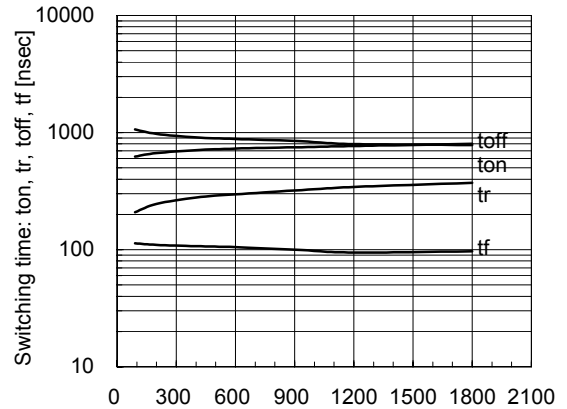


Switching time vs. Collector current (typ.)
 $V_{CC}=600V$, $V_{GE}=\pm 15V$, $R_G=+1.5/-0.9\Omega$, $T_J=125^\circ C$



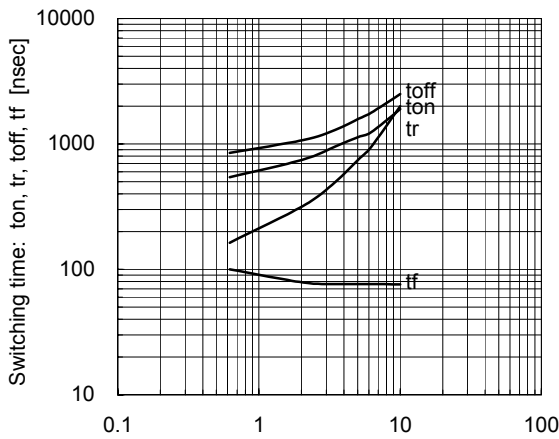
Collector current: I_C [A]

Switching time vs. Collector current (typ.)
 $V_{CC}=600V$, $V_{GE}=\pm 15V$, $R_G=+1.5/-0.9\Omega$, $T_J=150^\circ C$



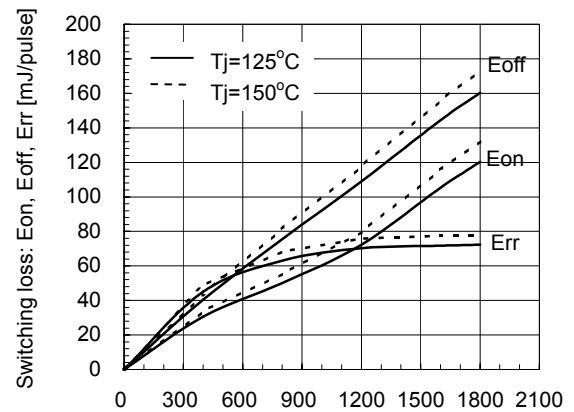
Collector current: I_C [A]

Switching time vs. Gate resistance (typ.)
 $V_{CC}=600V$, $I_C=900A$, $V_{GE}=\pm 15V$, $T_J=125^\circ C$



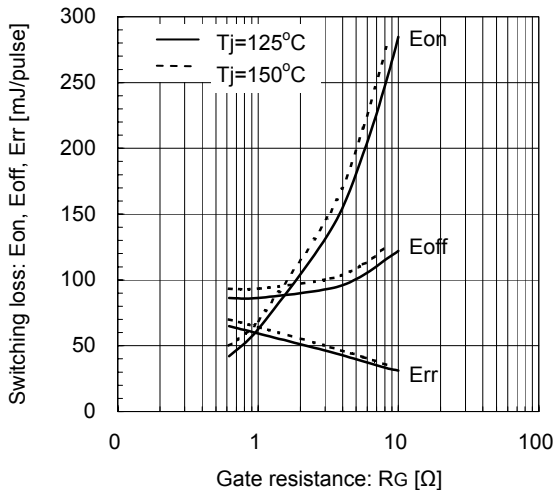
Gate resistance: R_G [Ω]

Switching loss vs. Collector current (typ.)
 $V_{CC}=600V$, $V_{GE}=\pm 15V$, $R_G=+1.5/-0.9\Omega$, $T_J=125^\circ C$, $150^\circ C$



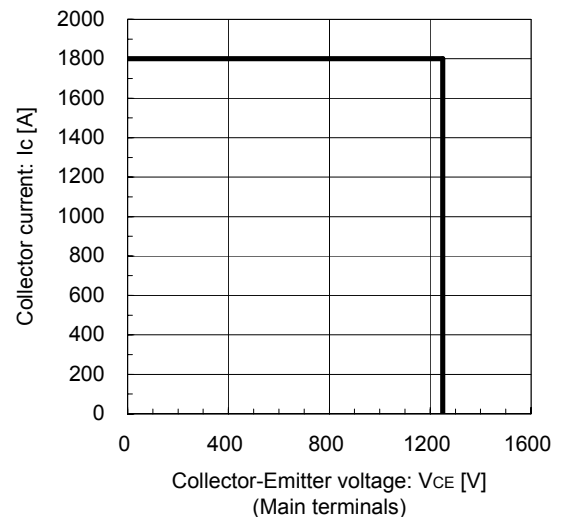
Collector current: I_C [A]

Switching loss vs. Gate resistance (typ.)
 $V_{CC}=600V$, $I_C=900A$, $V_{GE}=\pm 15V$, $T_J=125^\circ C$, $150^\circ C$

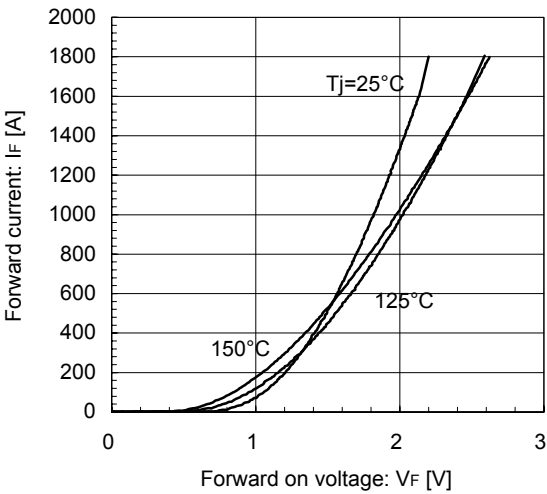


Gate resistance: R_G [Ω]

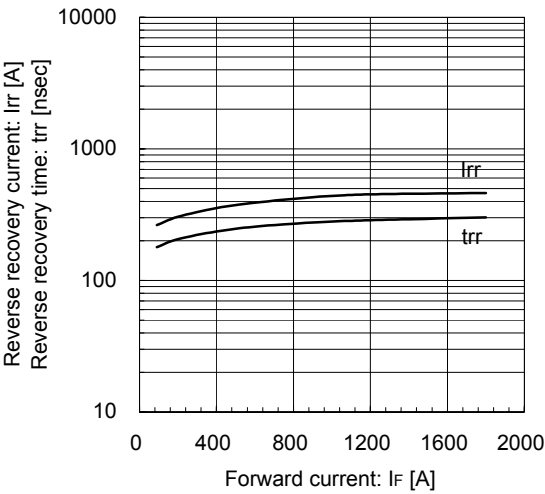
Reverse bias safe operating area (max.)
 $V_{GE}=\pm 15V$, $R_G=+1.5/-0.9\Omega$, $T_J=150^\circ C$, $L_s=35nH$



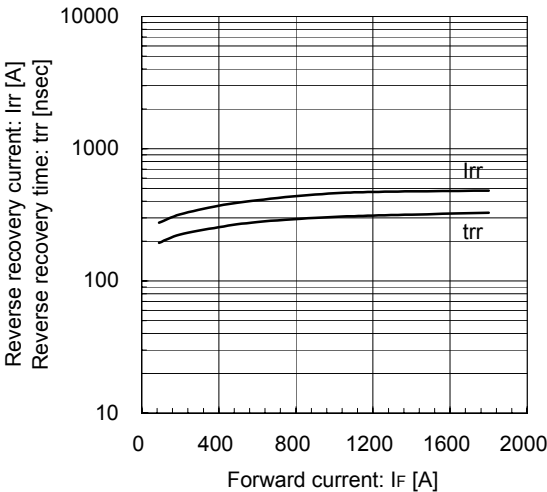
Forward Current vs. Forward Voltage (typ.)
chip



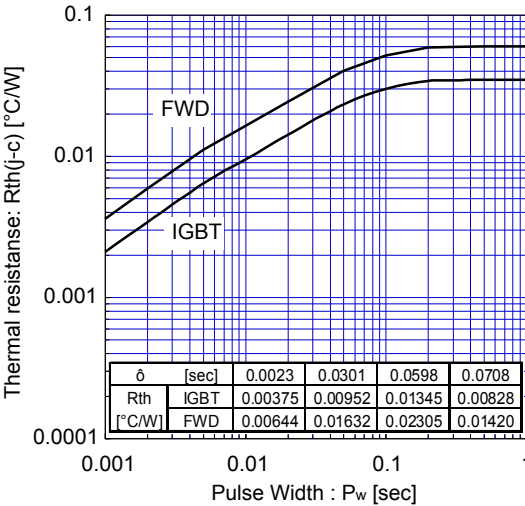
Reverse Recovery Characteristics (typ.)
Vcc=600V, VGE=±15V, RG=+1.5/-0.9Ω, TJ=125°C



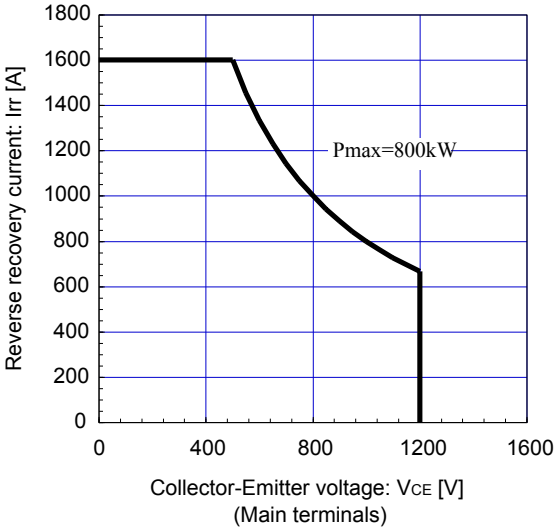
Reverse Recovery Characteristics (typ.)
Vcc=600V, VGE=±15V, RG=+1.5/-0.9Ω, TJ=150°C



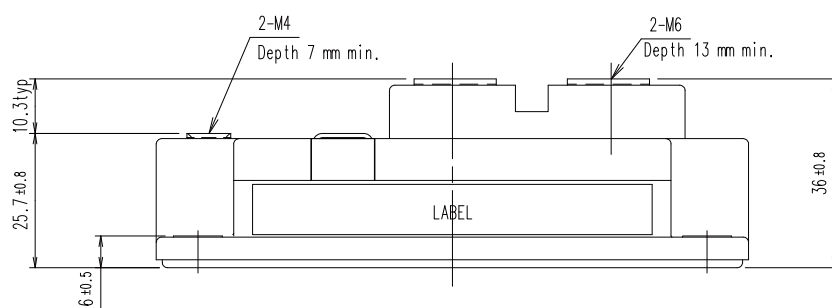
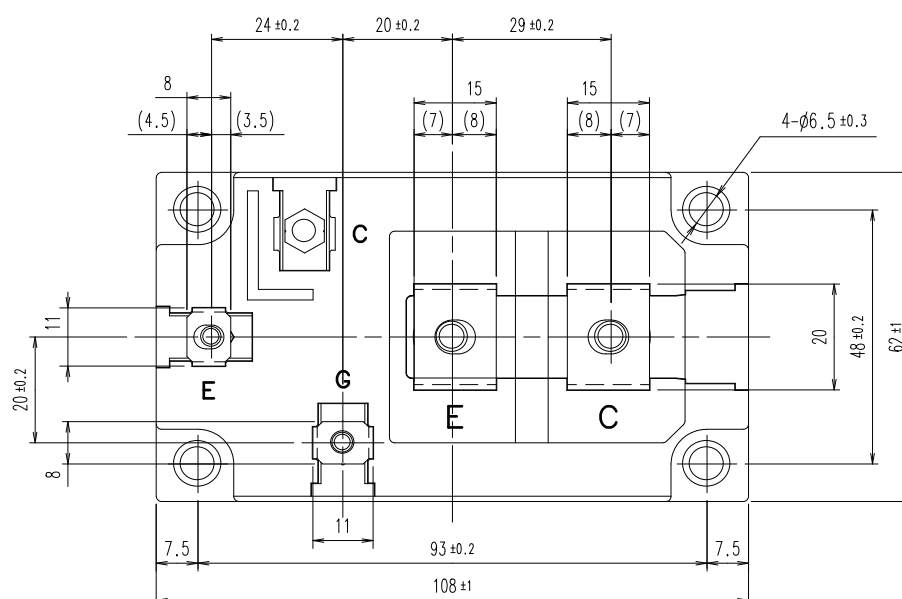
Transient Thermal Resistance (max.)



FWD safe operating area (max.)
TJ=150°C

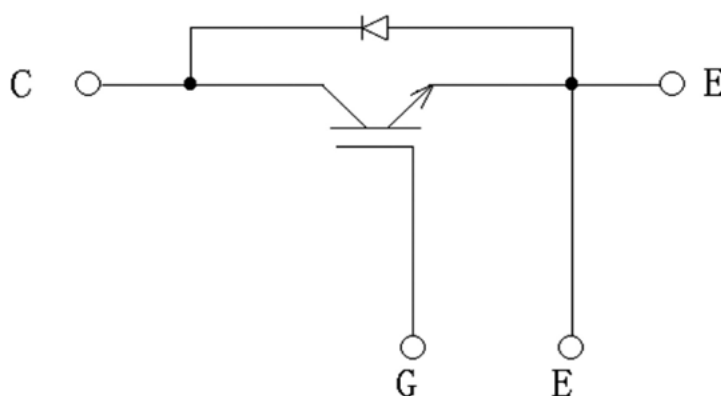


Outline Drawings(Unit:mm)



Weight: 370g (typ.)

Equivalent Circuit



WARNING

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