

1MBH20D-060

Molded IGBT

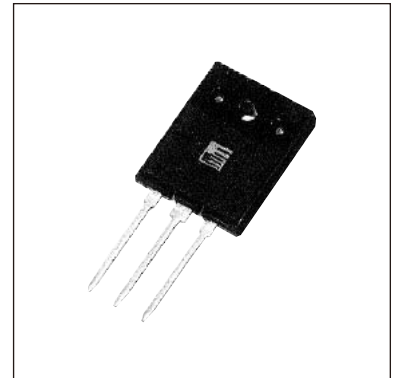
600V / 20A Molded Package

■ Features

- Small molded package
- Low power loss
- Soft switching with low switching surge and noise
- High reliability, high ruggedness (RBSOA, SCSOA etc.)
- Comprehensive line-up

■ Applications

- Inverter for Motor drive
- AC and DC Servo drive amplifier
- Uninterruptible power supply



■ Maximum Ratings and Characteristics

● Absolute Maximum Ratings (Tc=25°C)

Items	Symbols	Ratings	Units
Collector-Emitter Voltage	V _{CEs}	600	V
Gate-Emitter Voltage	V _{GEs}	±20	V
Collector Current	DC	TC=25°C	I _{C25} 45 A
		TC=110°C	I _{C110} 20 A
		TC=25°C	I _{cp} 152 A
IGBT Max. Power Dissipation	P _c	170	W
FWD Max. Power Dissipation	P _c	95	W
Operating Temperature	T _j	+150	°C
Storage Temperature	T _{stg}	-40 to +150	°C
Mounting Screw Torque	—	70	N·cm

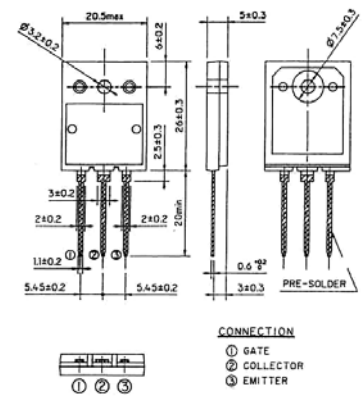
● Electrical Characteristics (at Tc=25°C unless otherwise specified)

Items	Symbols	Characteristics			Conditions	Units
		min.	typ.	max.		
Zero gate voltage Collector Current	I _{CEs}	—	—	1.0	V _{GE} = 0V, V _{CE} = 600V	mA
Gate-Emitter leakage Current	I _{GES}	—	—	20	V _{CE} = 0V, V _{GE} = ±20V	μA
Gate-Emitter Threshold Voltage	V _{GE(th)}	5.5	—	8.5	V _{CE} = 20V, I _c = 20mA	V
Collector-Emitter Saturation Voltage	V _{CE(sat)}	—	—	3.0	V _{GE} = 15V, I _c = 20A	V
Input capacitance	C _{ies}	—	1300	—	V _{GE} = 0V V _{CE} = 10V f = 1MHz	pF
Output capacitance	C _{oes}	—	300	—		
Reverse transfer capacitance	C _{res}	—	70	—		
Switching Time	Turn-on time	t _{on}	—	—	V _{CC} = 300V I _c = 20A V _{GE} = ±15V R _G = 120Ω (Half Bridge)	μs
		t _r	—	—		
	Turn-off time	t _{off}	—	—	V _{CC} = 300V I _c = 20A V _{GE} = +15V R _G = 12Ω (Half Bridge)	
		t _f	—	—		
	Turn-on time	t _{on}	—	0.16	—	
		t _r	—	0.11	—	
Turn-off time	t _{off}	—	0.30	—		
	t _f	—	—	0.35		
FWD forward voltage drop	V _F	—	—	3.0	I _F = 20A	V
Reverse recovery time	t _{rr}	—	—	0.3	I _F = 20A, V _{GE} = -10V V _R = 200V di/dt = 100A/μs	μs

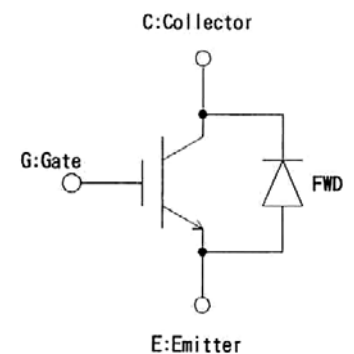
● Thermal resistance Characteristics

Items	Symbols	Characteristics			Conditions	Units
		min.	typ.	max.		
Thermal resistance	R _{th(j-c)}	—	—	0.73	IGBT	°C/W
	R _{th(j-c)}	—	—	1.31	FWD	

■ Outline drawings, mm

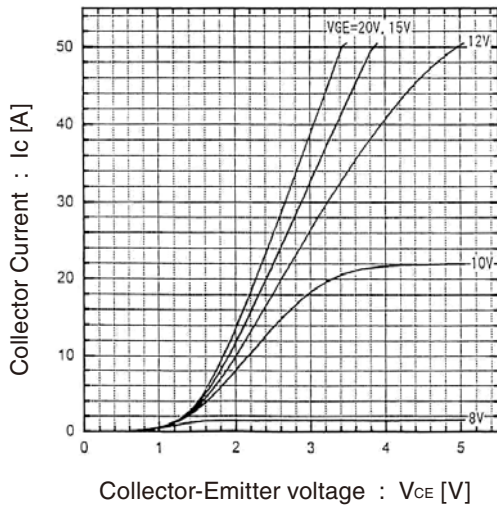


■ Equivalent circuit

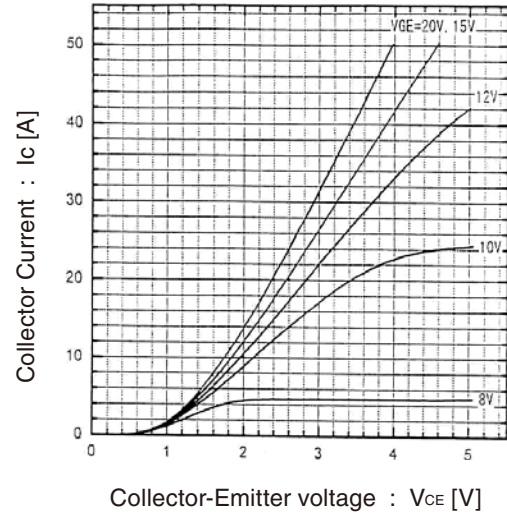


■ Characteristics

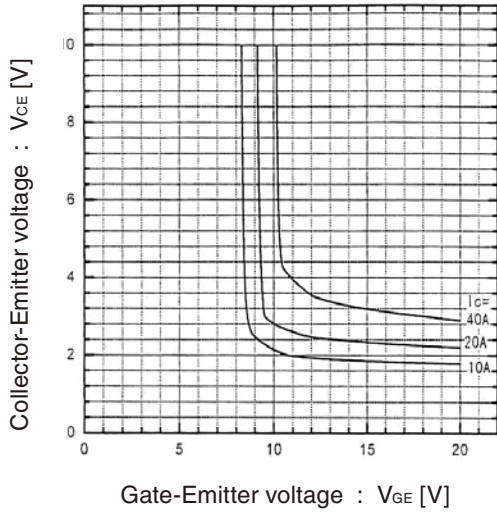
Collector current vs. Collector-Emmitter voltage
 $T_j = 25^\circ\text{C}$



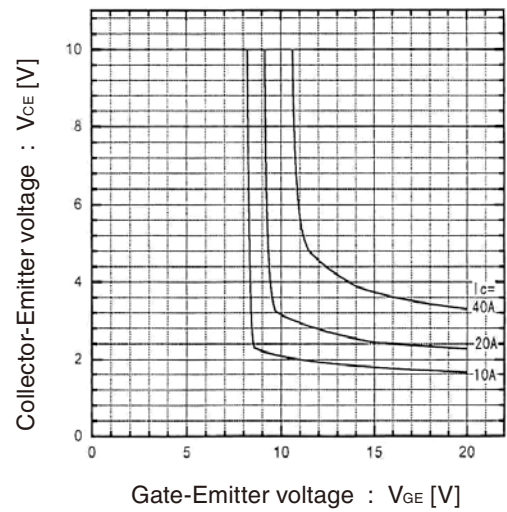
Collector current vs. Collector-Emmitter voltage
 $T_j = 125^\circ\text{C}$



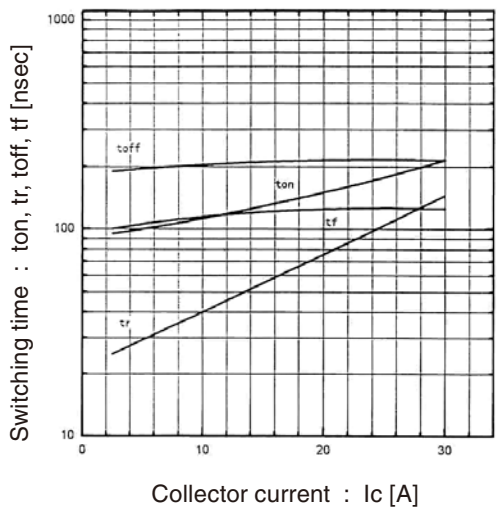
Collector-Emmitter voltage vs. Gate-Emmitter Voltage
 $T_j = 25^\circ\text{C}$



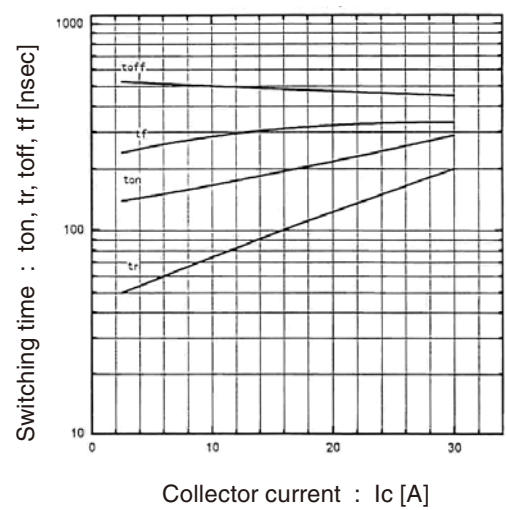
Collector-Emmitter voltage vs. Gate-Emmitter Voltage
 $T_j = 125^\circ\text{C}$



Switching time vs. Collector current
 $V_{cc}=300\text{V}, R_G=12\Omega, V_{GE}=\pm 15\text{V}, T_j=25^\circ\text{C}$



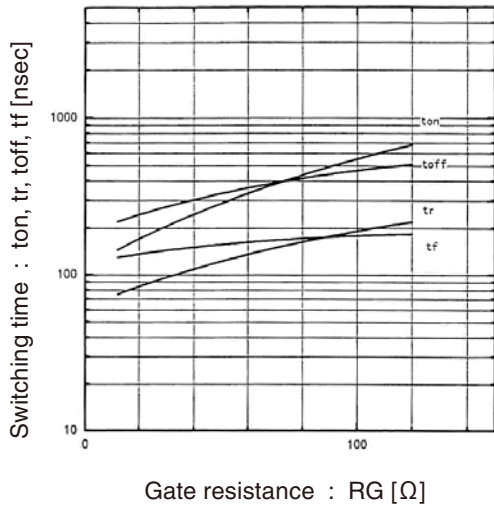
Switching time vs. Collector current
 $V_{cc}=300\text{V}, R_G=12\Omega, V_{GE}=\pm 15\text{V}, T_j=125^\circ\text{C}$



■ Characteristics

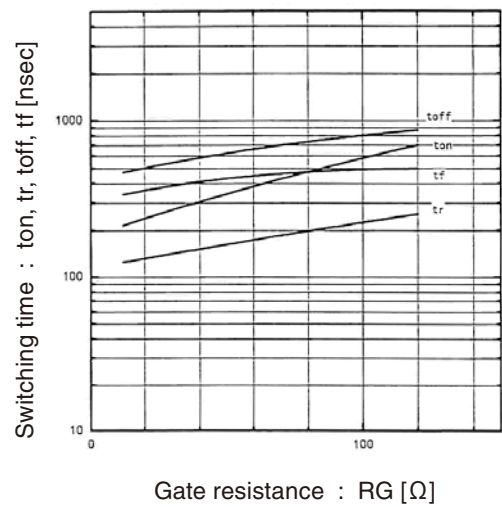
Switching time vs. RG

V_{CC}=300V, I_C=20A, V_{GE}=±15V, T_J=25°C



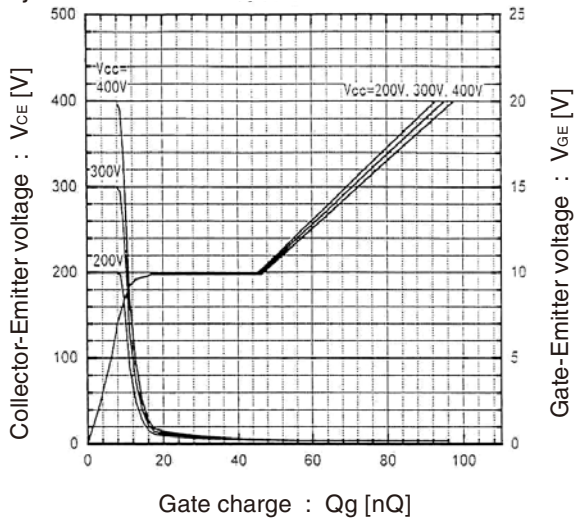
Switching time vs. RG

V_{CC}=300V, I_C=20A, V_{GE}=±15V, T_J=125°C



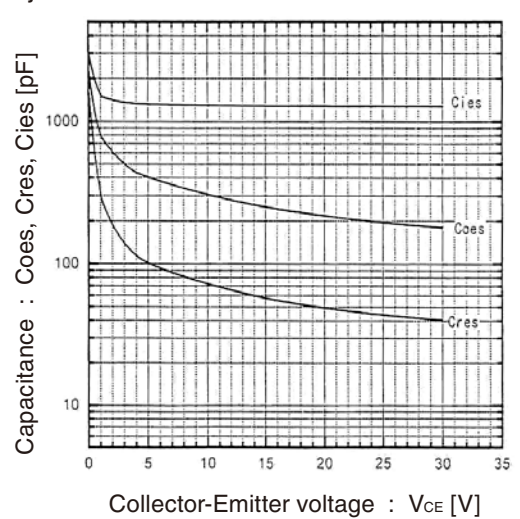
Dynamic input characteristics

T_J=25°C



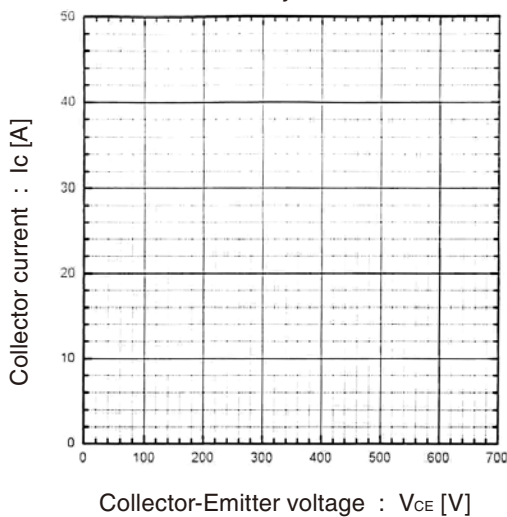
Capacitance vs. Collector-Emitter voltage

T_J=25°C



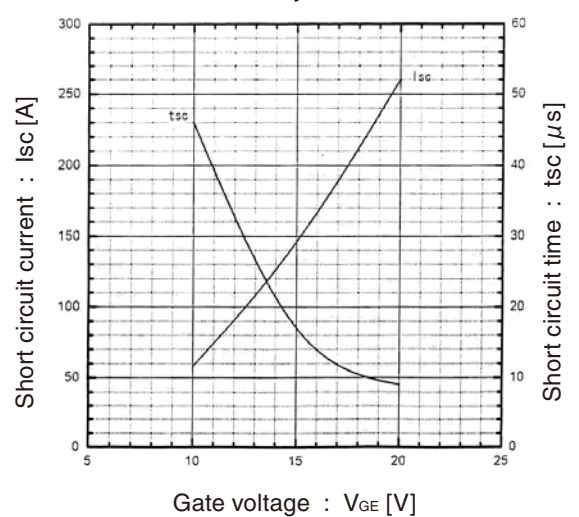
Reverse Biased Safe Operating Area

+V_{GE}=15V, -V_{GE}≤15V, T_J=125°C, R_G≥12Ω



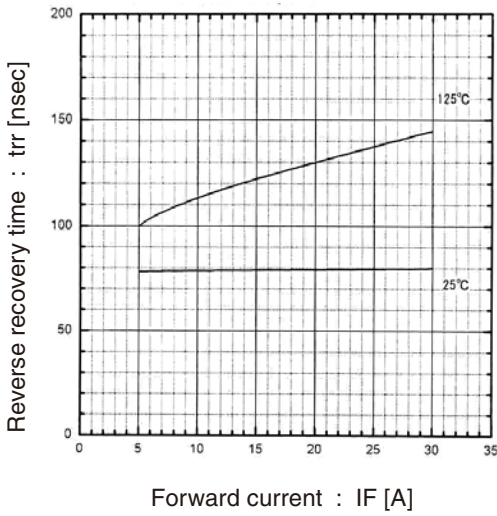
Typical short circuit capability

V_{CC}=400V, R_G=12Ω, T_J=125°C

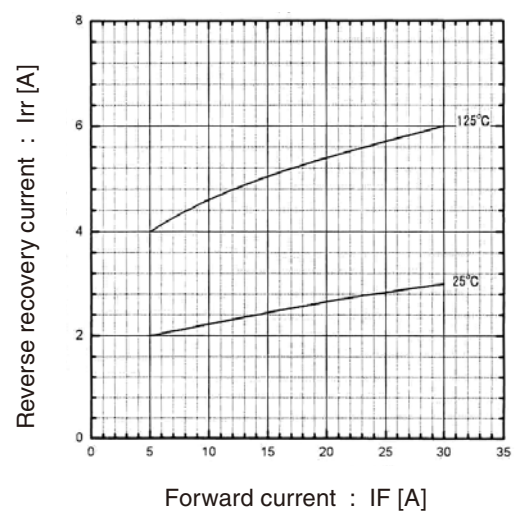


■ Characteristics

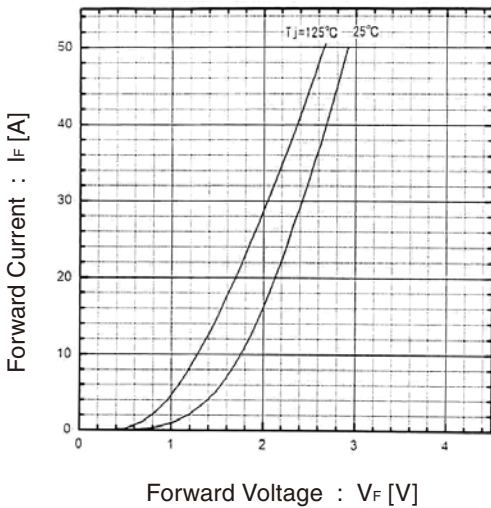
Reverse recovery time vs. Forward current
 $V_R=200V, -di/dt=100A/\mu sec$



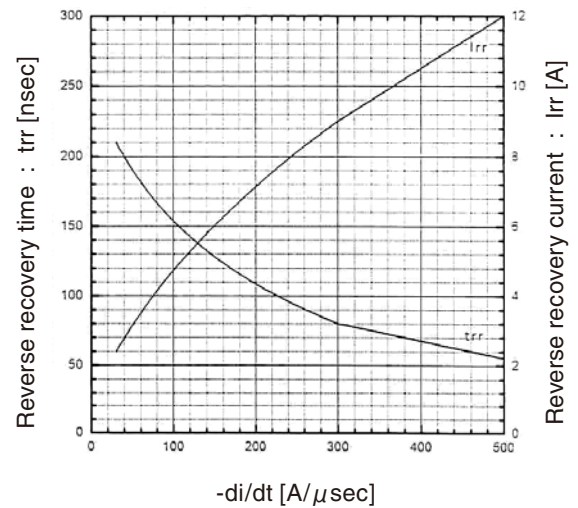
Reverse recovery current vs. Forward current
 $V_R=200V, -di/dt=100A/\mu sec$



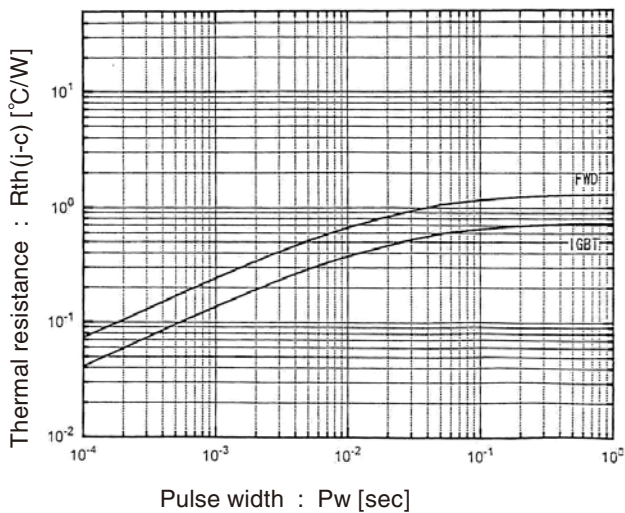
Forward voltage vs. Forward current



Reverse recovery characteristics vs. -di/dt
 $I_F=20A, T_j=125^\circ C$



Transient thermal resistance



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