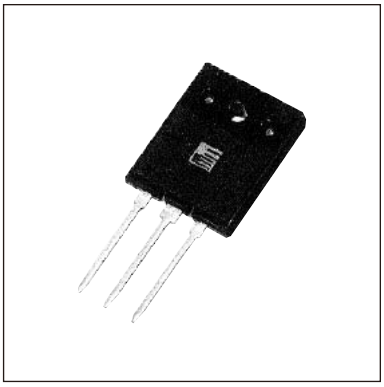
e-Front runners

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℃	I_{C25}	45	A
		TC=110℃	I_{C110}	20	A
	1ms	TC=25℃	Icp	152	A
IGBT Max. Power Dissipation			Pc	170	W
FWD Max. Power Dissipation			Pc	95	W
Operating Temperature			Tj	+150	℃
Storage Temperature			Tstg	-40 to +150	℃
Mounting Screw Torque			—	70	N・cm

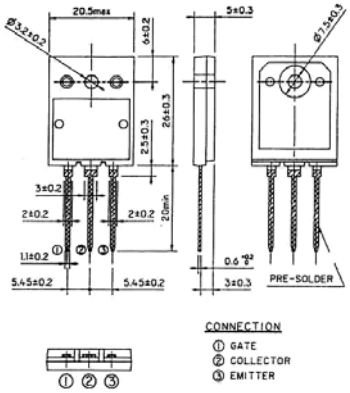
● Electrical Characteristics (at Tc=25°C unless otherwise specified)

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, Ic = 20mA	V
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$	—	—	3.0	V_{GE} = 15V, Ic = 20A	V
Input capacitance		Cies	—	1300	—	V_{GE} = 0V V_{CE} = 10V f = 1MHz	pF
Output capacitance		Coes	—	300	—		
Reverse transfer capacitance		Cres	—	70	—		
Switching Time	Turn-on time	ton	—	—	1.2	Vcc = 300V Ic = 20A V_{GE} = ±15V R_G = 120Ω (Half Bridge)	μs
		tr	—	—	0.6		
	Turn-off time	toff	—	—	1.0		
		tf	—	—	0.35		
	Turn-on time	ton	—	0.16	—	Vcc = 300V Ic = 20A V_{GE} = +15V R_G = 12Ω (Half Bridge)	
		tr	—	0.11	—		
	Turn-off time	toff	—	0.30	—		
		tf	—	—	0.35		
FWD forward voltage drop		VF	—	—	3.0	I_F = 20A	V
Reverse recovery time		trr	—	—	0.3	I_F = 20A, V_{GE} = -10V VR = 200V di/dt = 100A/μs	μs

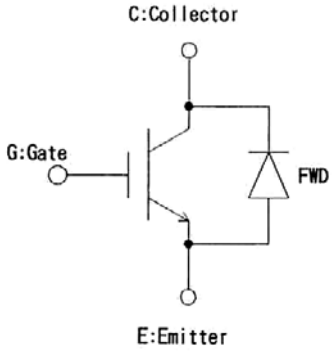
● Thermal resistance Characteristics

Items	Symbols	Characteristics			Conditions	Units
		min.	typ.	max.		
Thermal resistance	Rth(j-c)	—	—	0.73	IGBT	℃/W
	Rth(j-c)	—	—	1.31	FWD	

■ Outline drawings, mm

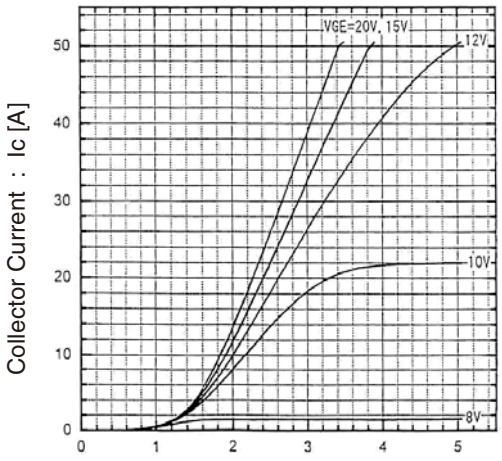


■ Equivalent circuit

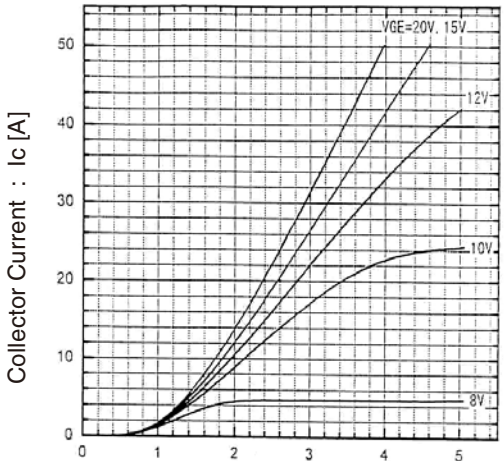


■ Characteristics

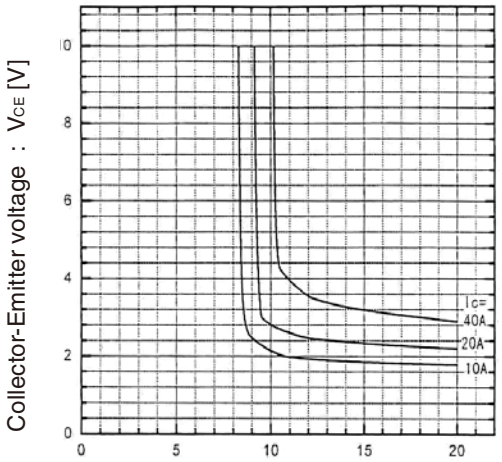
Collector current vs. Collector-Emitter voltage
Tj = 25℃



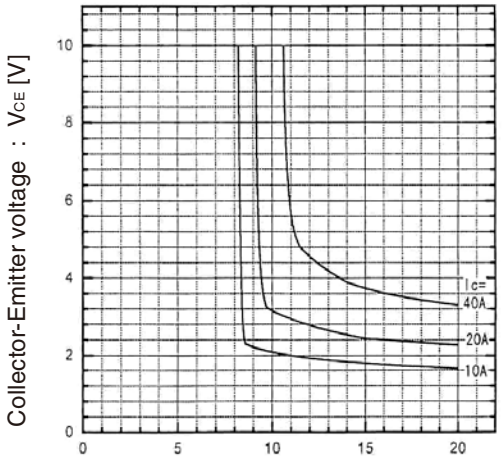
Collector current vs. Collector-Emitter voltage
Tj = 125℃



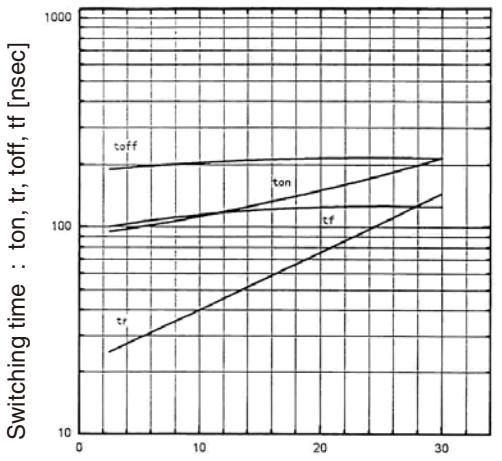
Collector-Emitter voltage vs. Gate-Emitter Voltage
Tj = 25℃



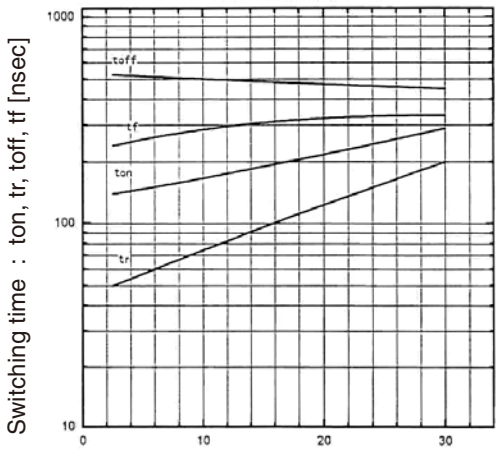
Collector-Emitter voltage vs. Gate-Emitter Voltage
Tj = 125℃



Switching time vs. Collector current
Vcc=300V, RG=12Ω, VGE=±15V, Tj=25℃

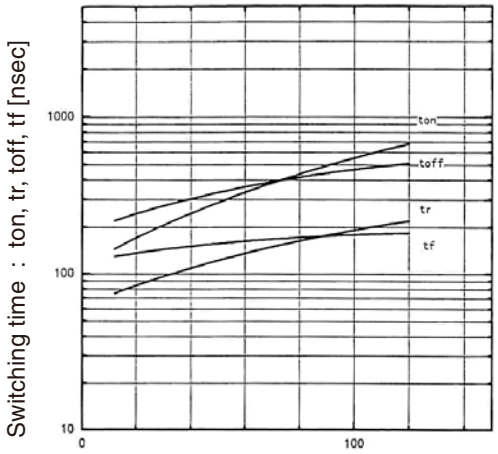


Switching time vs. Collector current
Vcc=300V, RG=12Ω, VGE=±15V, Tj=125℃

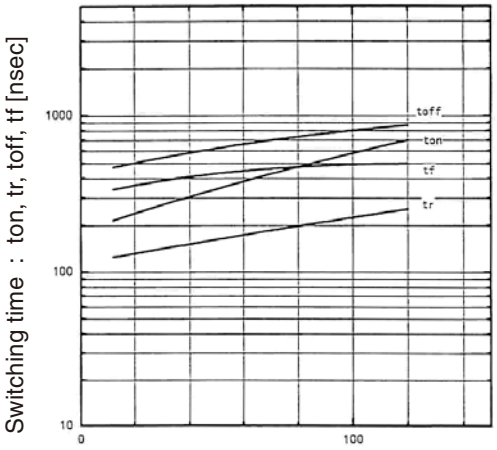


■ Characteristics

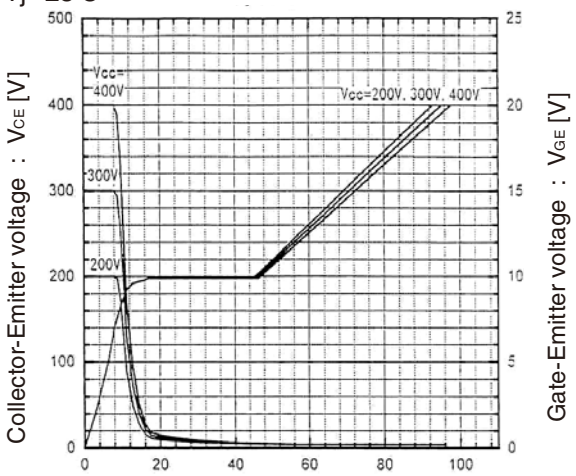
Switching time vs. RG
Vcc=300V, IC=20A, V_{GE}=±15V, Tj=25℃



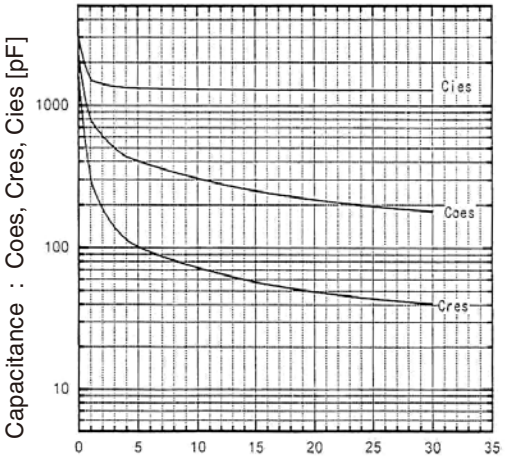
Switching time vs. RG
Vcc=300V, IC=20A, V_{GE}=±15V, Tj=125℃



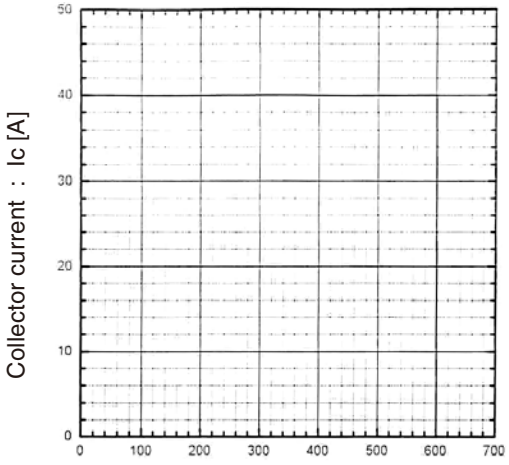
Dynamic input characteristics
Tj=25℃



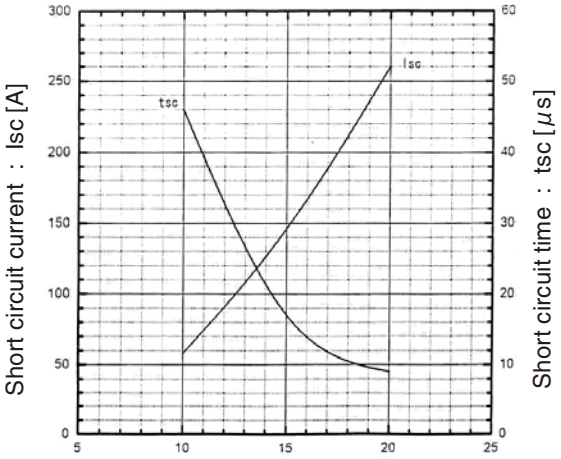
Capacitance vs. Collector-Emitter voltage
Tj=25℃



Reverse Biased Safe Operating Area
+V_{GE}=15V, -V_{GE}≦15V, Tj=125℃, RG≧12Ω

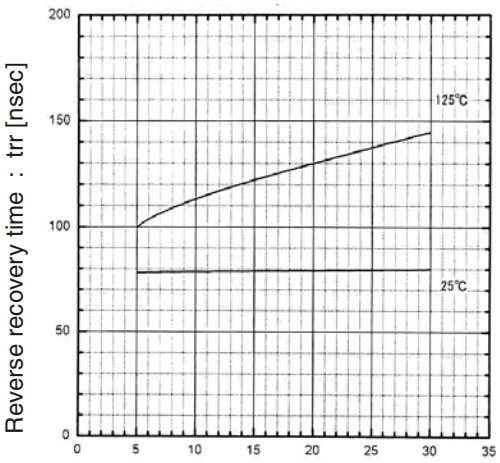


Typical short circuit capability
Vcc=400V, RG=12Ω, Tj=125℃

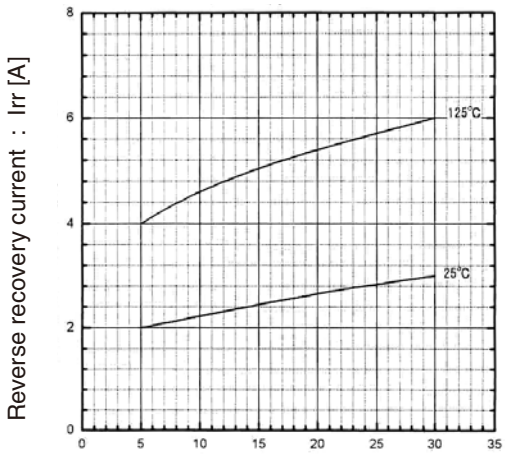


■ Characteristics

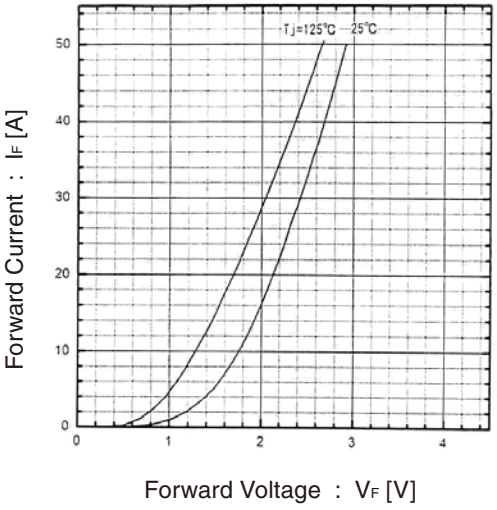
Reverse recovery time vs. Forward current
VR=200V, -di/dt=100A/μsec



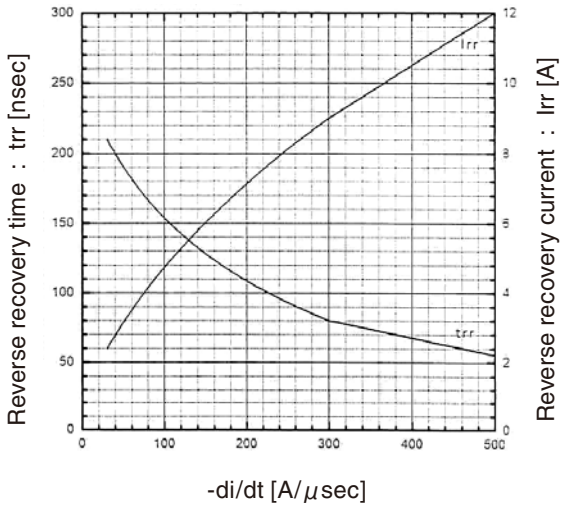
Reverse recovery current vs. Forward current
VR=200V, -di/dt=100A/μsec



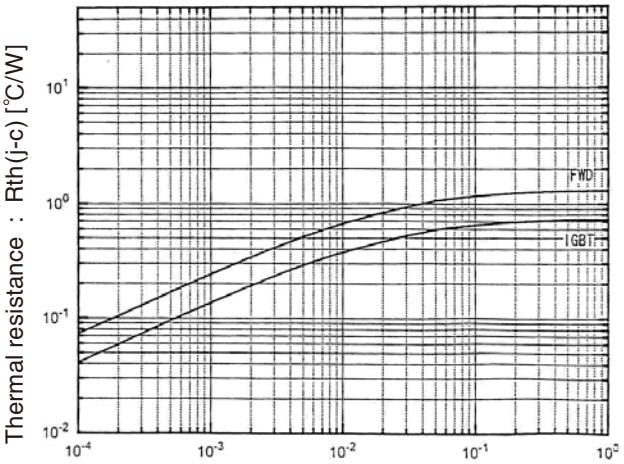
Forward voltage vs. Forward current



Reverse recovery chracteristics vs. -di/dt
IF=20A, Tj=125°C



Transient thermal resistance



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   • Medical equipment

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