1MBH05D-060

Molded IGBT

600V / 5A Molded Package

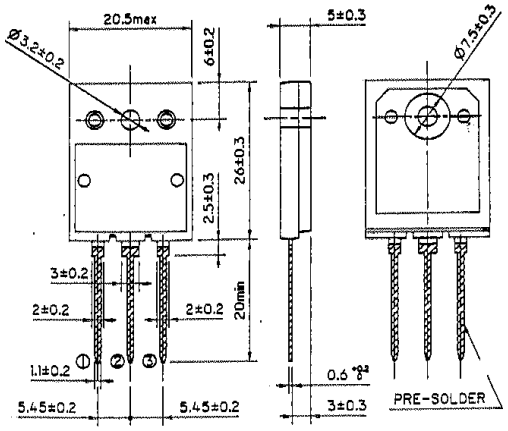
■ Features

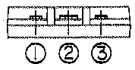
· Small molded package
· Low power loss
· Soft switching with low switching surge and noise
· High reliability, high ruggedness (RBSOA, SCSOA etc.)
· Comprehensive line-up

■ Applications

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

■ Outline drawings, mm TO-3PL





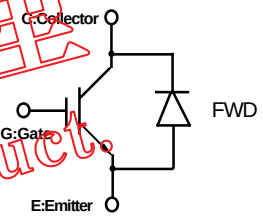
CONNECTION
① GATE
② COLLECTOR
③ EMITTER

■ Maximum ratings and characteristics

● **Absolute maximum ratings (Tc=25°C)**

Item			Symbol	Rating	Unit
Collector-Emitter voltage			V_{CES}	600	V
Gate-Emitter voltaga			V_{GES}	±20	V
Collector current	DC	Tc=25°C	I_{C25}	21	A
		Tc=120°C	I_{C120}	5	A
	1ms	Tc=25°C	Icp	52	A
Max. power dissipation (IGBT)			P_C	80	W
Max. power dissipation (FWD)			P_C	40	W
Operating temperature			T_j	+150	°C
Storage temperature			T_{stg}	-40 to +150	°C
Screw torque				70	N·cm

■ Equivalent Circuit Schematic



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

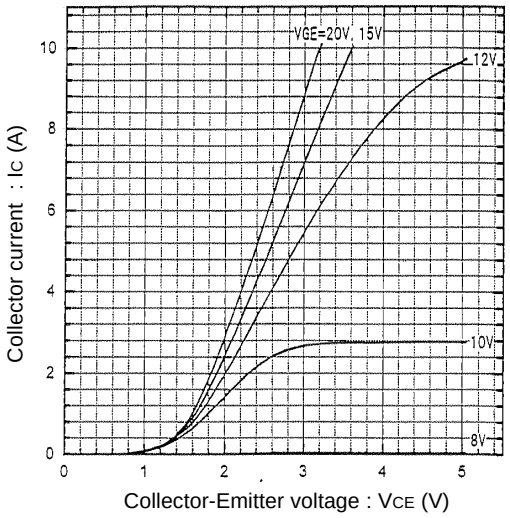
Item		Symbol	Characteristics Min.	Typ.	Max.	Conditions	Unit
Zero gate voltage collector current		I_{CES}	–	–	1.0	V_{GE}=0V, V_{CE}=600V	mA
Gate-Emitter leakage current		I_{GES}	–	–	20	V_{CE}=0V, V_{GE}=±20V	µA
Gate-Emitter threshold voltage		$V_{GE(th)}$	5.5	–	8.5	V_{CE}=20V, I_C=5mA	V
Collector-Emitter saturation voltage		$V_{CE(sat)}$	–	–	3.0	V_{GE}=15V, I_C=5A	V
Input capacitance		Cies	–	400	–	V_{GE}=0V	pF
Output capacitance		Coes	–	85	–	V_{CE}=10V	
Reverse transfer capacitance		Cres	–	15	–	f=1MHz	
Switching Time	Turn-on time	ton	–	–	1.2	V_{CC}=300V, I_C=5A	µs
		tr	–	–	0.6	V_{GE}=±15V	
	Turn-off time	toff	–	–	1.0	R_G=330 ohm	
		tf	–	–	0.35	(Half Bridge)	
	Turn-on time	ton	–	0.16	–	V_{CC}=300V, I_C=5A	µs
		tr	–	0.11	–	V_{GE}=+15V	
	Turn-off time	toff	–	0.30	–	R_G=33 ohm	
		tf	–	–	0.35	(Half Bridge)	
FWD forward on voltage		V_F	–	–	3.0	I_F=5A	V
Reverse recovery time		trr	–	–	0.3	I_F=5A, V_{GE}=-10V, V_R=200V, di/dt=100A/µs	µs

● **Thermal resistance characteristics**

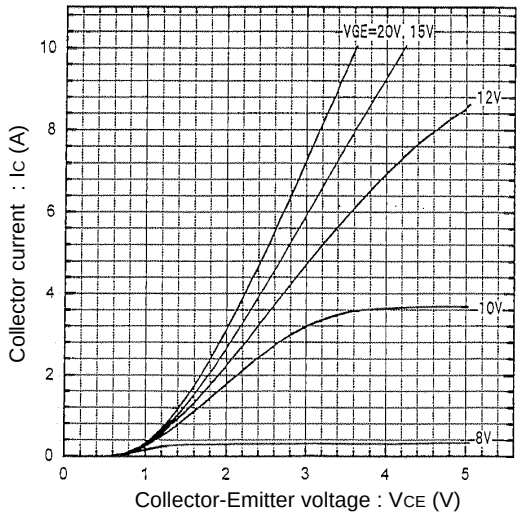
Item	Symbol	Characteristics Min.	Typ.	Max.	Conditions	Unit
Thermal resistance	Rth(j-c)	–	–	1.56	IGBT	°C/W
	Rth(j-c)	–	–	3.12	FWD	°C/W

■ Characteristics

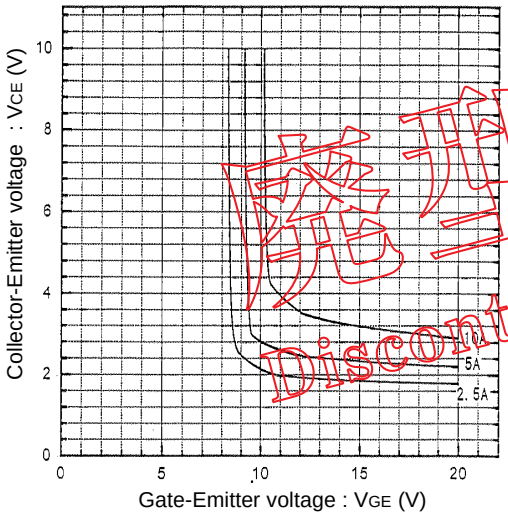
Collector current vs. Collector-Emitter voltage
Tj=25°C



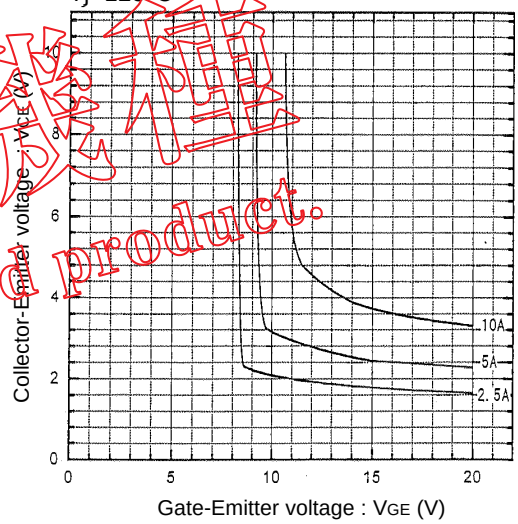
Collector current vs. Collector-Emitter voltage
Tj=125°C



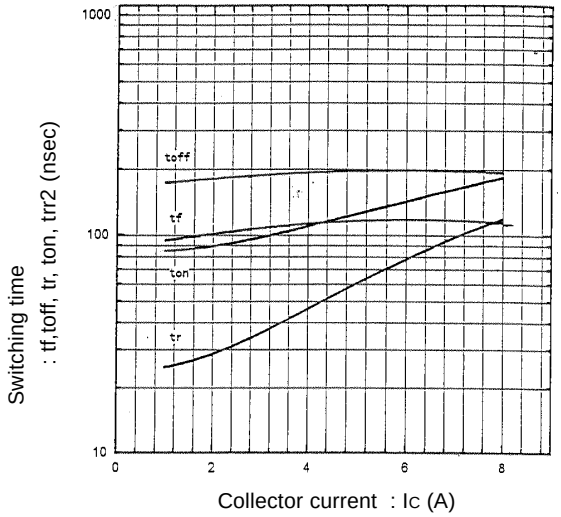
Collector-Emitter voltage vs. Gate-Emitter voltage
Tj=25°C



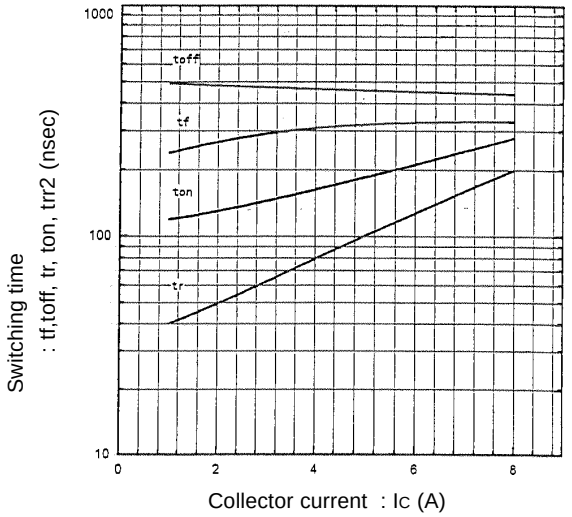
Collector-Emitter voltage vs. Gate-Emitter voltage
Tj=125°C



Switching time vs. Collector current
VCC=300V, RG=33Ω, VGE=±15V, Tj=25°C

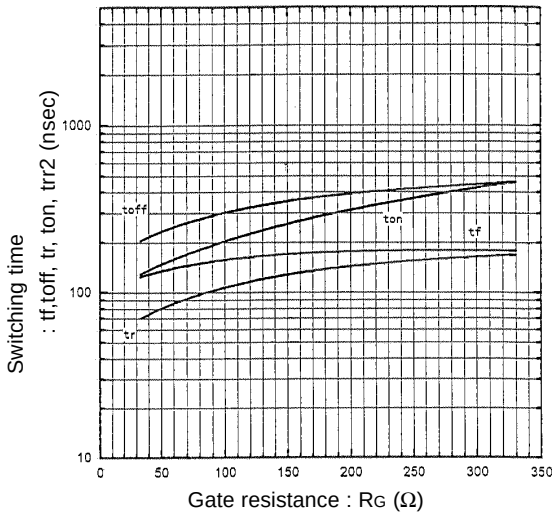


Switching time vs. Collector current
VCC=300V, RG=33Ω, VGE=±15V, Tj=125°C

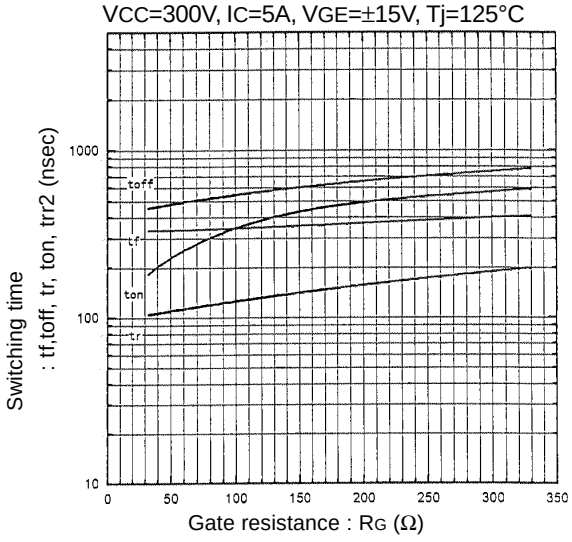


■ Characteristics

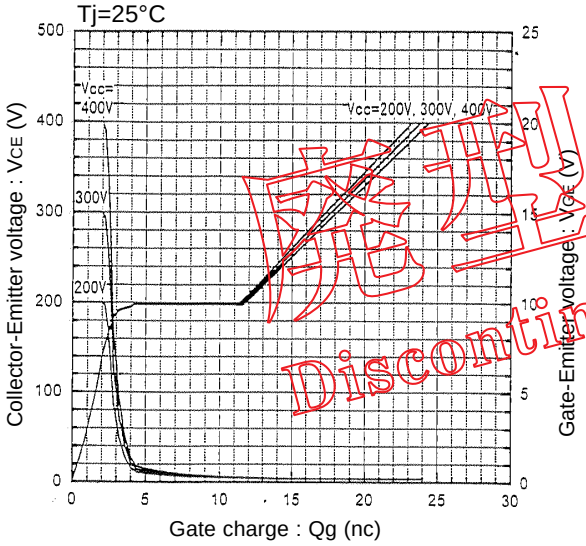
Switching time vs. RG
VCC=300V, IC=5A, VGE=±15V, Tj=25°C



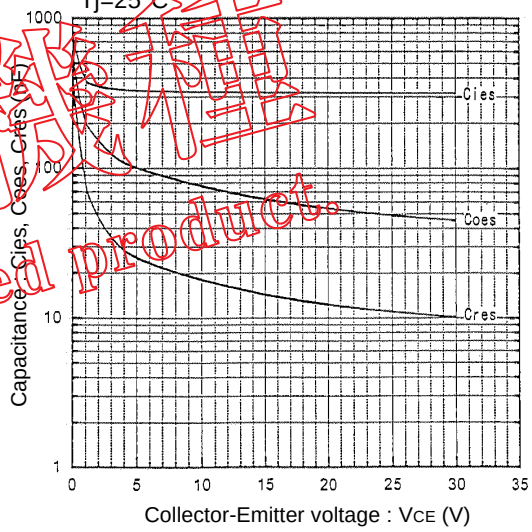
Switching time vs. RG
VCC=300V, IC=5A, VGE=±15V, Tj=125°C



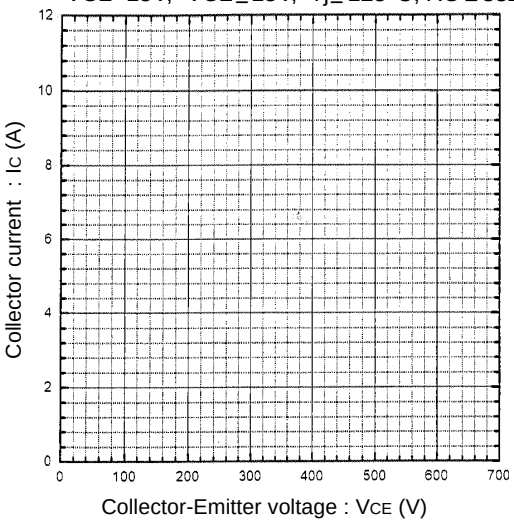
Dynamic input characteristics
Tj=25°C



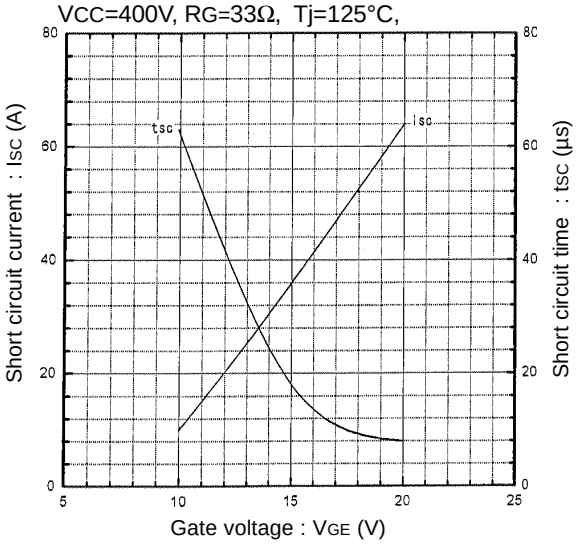
Capacitance vs. Collector-Emitter voltage
Tj=25°C



Reverse Biased Safe Operating Area
+VGE=15V, -VGE≦15V, Tj≦125°C, RG≧33Ω

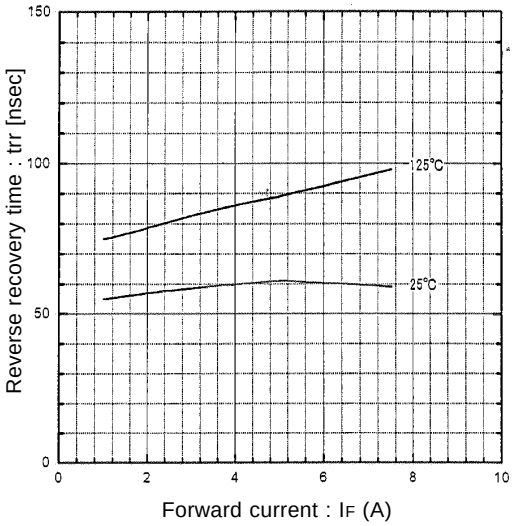


Typical short circuit capability
VCC=400V, RG=33Ω, Tj=125°C,

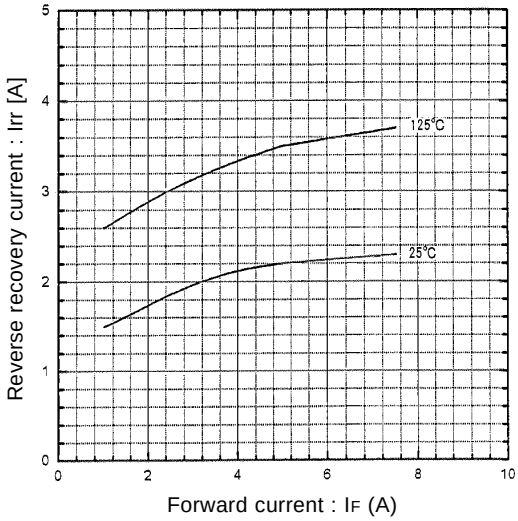


■ Characteristics

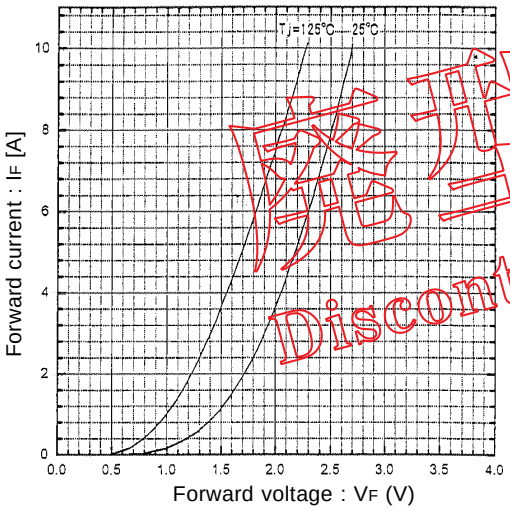
Reverse recovery time vs. Forward current
VR=200V, -di/dt=100A/μsec



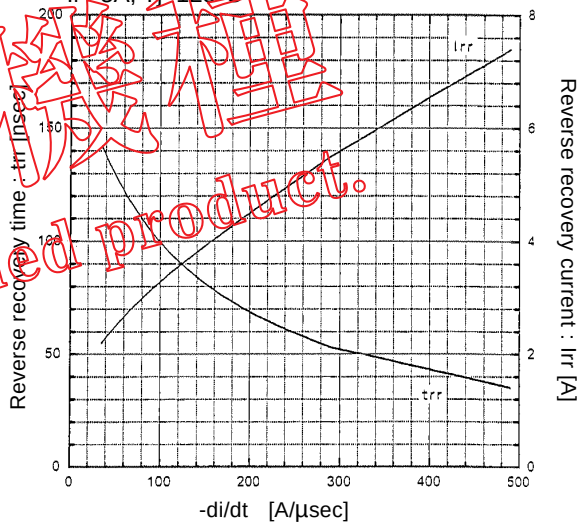
Reverse recovery current vs. Forward current
VR=200V, -di/dt=100A/μsec



Forward voltage vs. Forward current



Reverse recovery characteristics vs. -di/dt
IF=5A, Tj=125°C



Transient thermal resistance