FUJI ELECTRIC

1MBI 300S-120

1-Pack IGBT
1200V
1x300A

IGBT MODULE (S-Series)

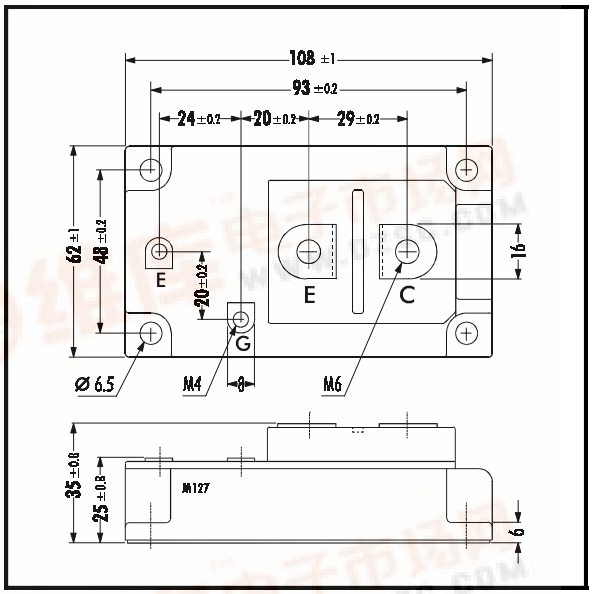
■ Features

- *NPT-Technology*
- *Square SC SOA at 10 x I_C*
- *High Short Circuit Withstand-Capability*
- *Small Temperature Dependence of the Turn-Off Switching Loss*
- *Low Losses And Soft Switching*

■ Applications

- *High Power Switching*
- *A.C. Motor Controls*
- *D.C. Motor Controls*
- *Uninterruptible Power Supply*

■ Outline Drawing



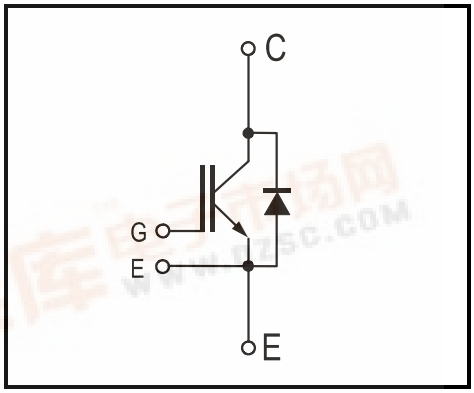
■ Maximum Ratings and Characteristics

• Absolute Maximum Ratings (T_c=25°C)

Items			Symbols	Ratings	Units
Collector-Emitter Voltage			V_{CES}	1200	V
Gate -Emitter Voltage			V_{GES}	± 20	
Collector Current	Continuous	25°C / 80°C	I_C	400 / 300	A
	1ms	25°C / 80°C	$I_{C\ PULSE}$	800 / 600	
	Continuous		$-I_C$	300	
	1ms		$-I_{C\ PULSE}$	600	
Max. Power Dissipation			P_C	2100	W
Operating Temperature			T_j	+150	°C
Storage Temperature			T_{stg}	-40 ~ +125	
Isolation Voltage *1	A.C. 1min.		V_{is}	2500	V
Screw Torque			Mounting *2	3.5	Nm
			Terminals *2	4.5	
			Terminals *2	1.7	

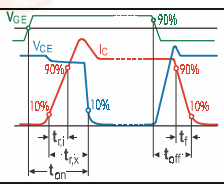
Note: 1*: All Terminals should be connected together when isolation test will be done.
2*: Recommendable Value: Mounting 2.5 – 3.5 Nm (M5) or (M6) ; Terminal 3.5 – 4.5 Nm (M6), 1.3 – 1.7 Nm (M4)

■ Equivalent Circuit



• Electrical Characteristics (at T_j=25°C)

Items	Symbols	Test Conditions		Min.	Typ.	Max.	Units
Zero Gate Voltage Collector Current	I_{CES}	V_{GE}=0V V_{CE}=1200V				4.0	mA
Gate-Emitter Leackage Current	I_{GES}	V_{CE}=0V V_{GE}=± 20V				800	nA
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	V_{GE}=20V I_C=300mA		5.5	7.2	8.5	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	V_{GE}=15V I_C=300A	T_j = 25°C		2.3	2.6	V
			T_j =125°C		2.8		
Input Capacitance	C_{ies}	V_{GE}=0V			36'000		pF
Output Capacitance	C_{oes}	V_{CE}=10V			7'500		
Reverse Transfer Capacitance	C_{res}	f=1MHz			6'600		
Turn-on Time	t_{ON}	V_{CC}= 600V			0.35	1.2	µs
	$t_{r,x}$	I_C = 300A			0.25	0.6	
	$t_{r,i}$	V_{GE}= ±15V			0.10		
Turn-off Time	t_{OFF}	R_G = 2.7Ω			0.45	1.0	
	t_f	Inductive Load			0.08	0.3	
Diode Forward On-Voltage	V_F	I_F=300A; V_{GE}=0V	T_j = 25°C		2.3	3.0	V
			T_j =125°C		2.0		
Reverse Recovery Time	t_{rr}	I_F=300A				350	ns



• Thermal Characteristics

Items	Symbols	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance	$R_{th(j-c)}$	IGBT			0.06	°C/W
	$R_{th(j-c)}$	Diode			0.17	

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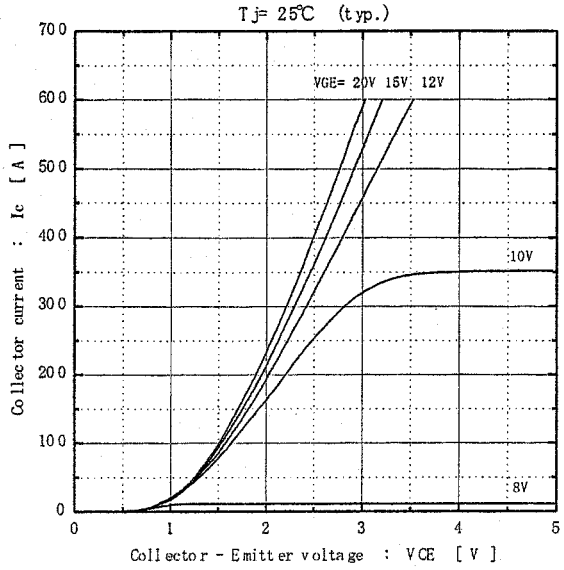
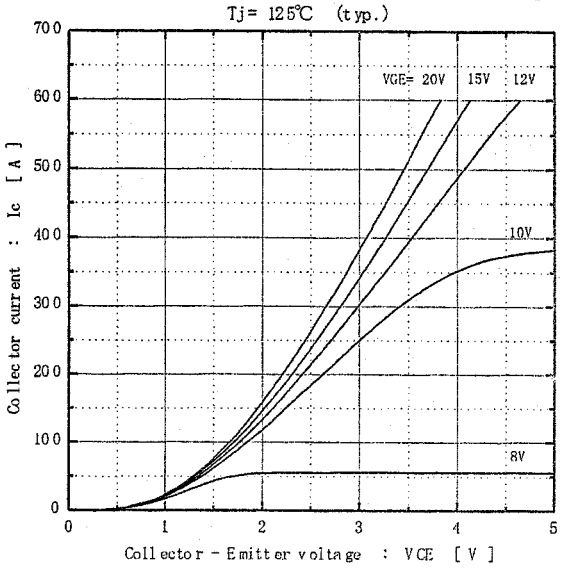
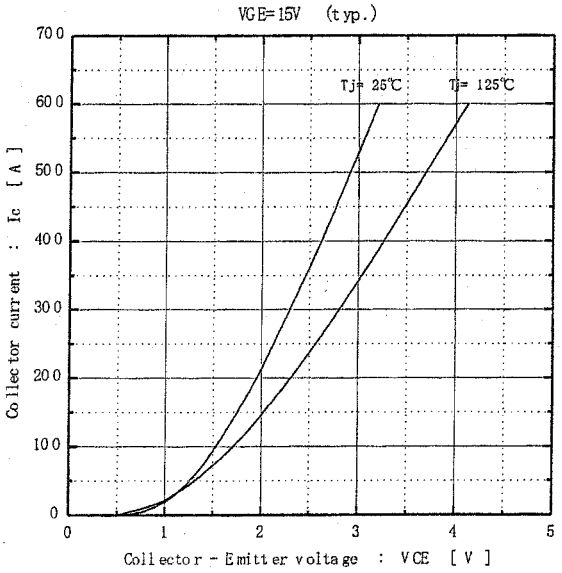
Collector current vs. Collector-Emiiter voltage
Tj= 25℃ (typ.)



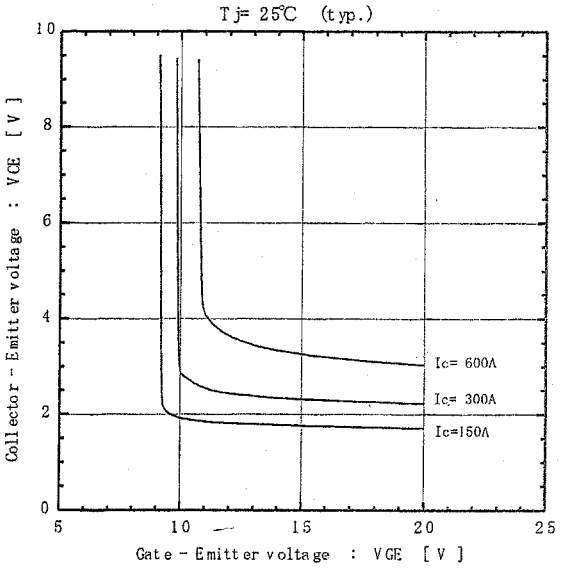
Collector current vs. Collector-Emiiter voltage
Tj= 125℃ (typ.)



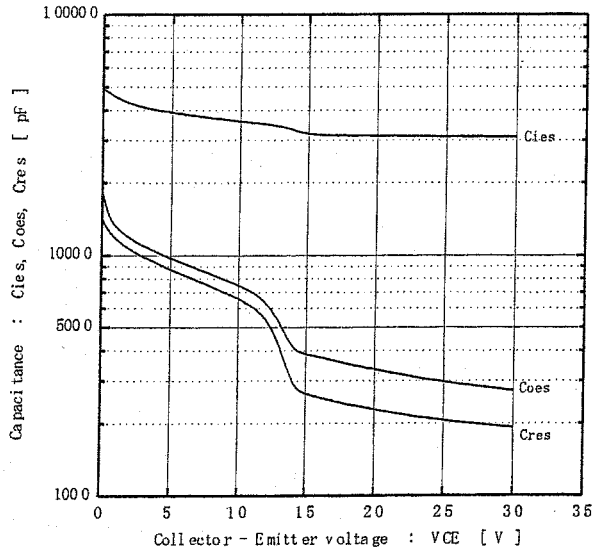
Collector current vs. Collector-Emiiter voltage
VGE=15V (typ.)



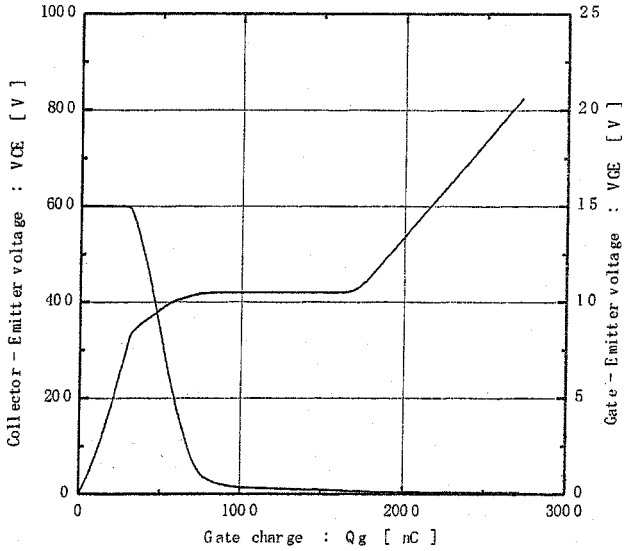
Collector-Emiiter voltage vs. Gate-Emitter voltage
Tj= 25℃ (typ.)



Capacitance vs. Collector-Emiiter voltage (typ.)
VGE=0V, f= 1MHz, Tj= 25℃



Dynamic Gate charge (typ.)
Vcc=600V, Ic=300A, Tj= 25℃



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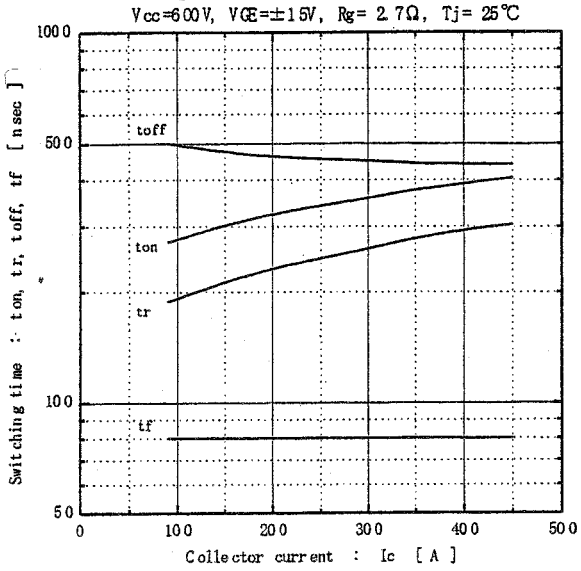
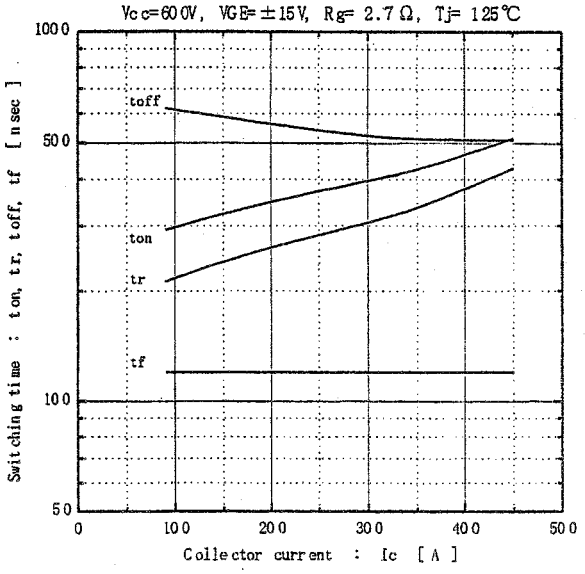
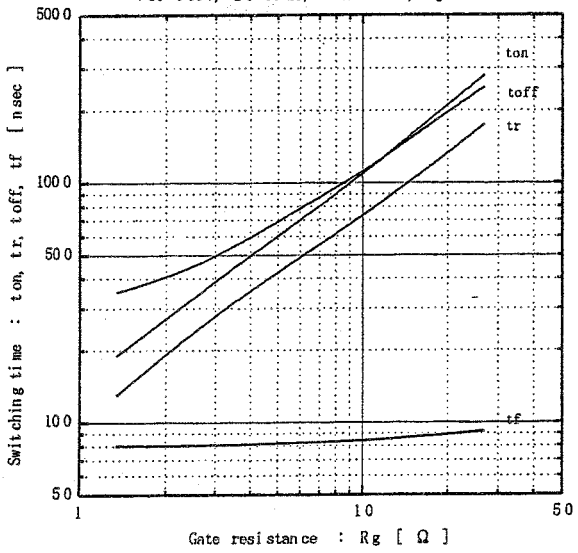
Switching time vs. Collector current (typ.)
Vcc=600V, VGE=±15V, Rg= 2.7Ω, Tj= 25℃



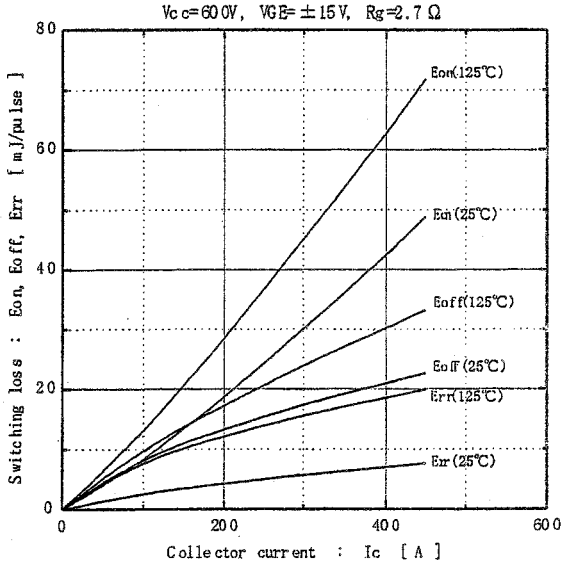
Switching time vs. Collector current (typ.)
Vcc=600V, VGE=±15V, Rg= 2.7Ω, Tj= 125℃



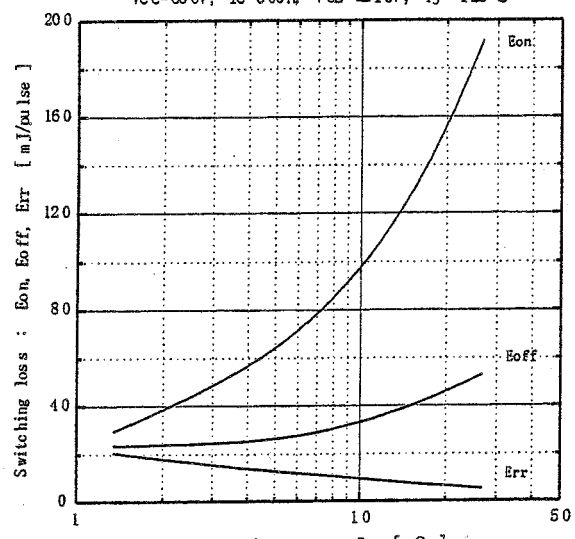
Switching time vs. Gate resistance (typ.)
Vcc=600V, Ic=300A, VGE=±15V, Tj= 25℃



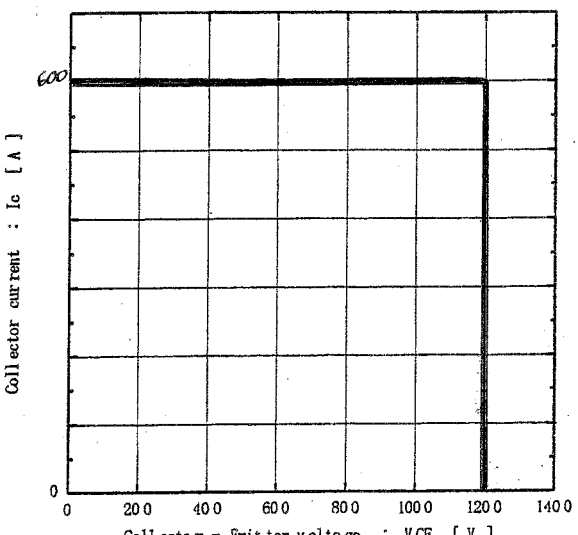
Switching loss vs. Collector current (typ.)
Vcc=600V, VGE=±15V, Rg=2.7Ω



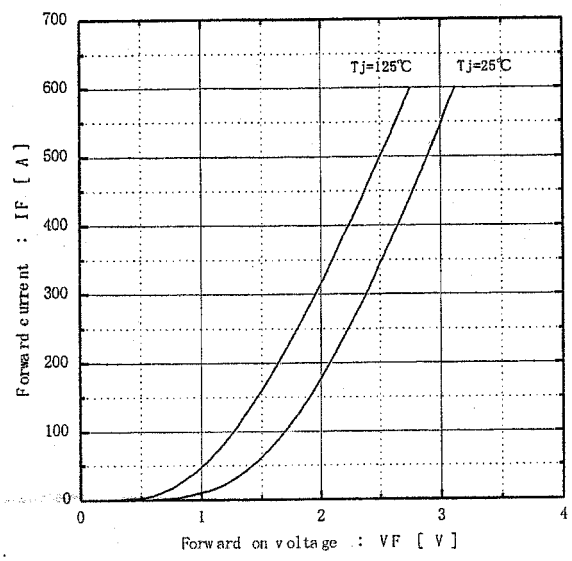
Switching loss vs. Gate resistance (typ.)
Vcc=600V, Ic=300A, VGE=±15V, Tj= 125℃



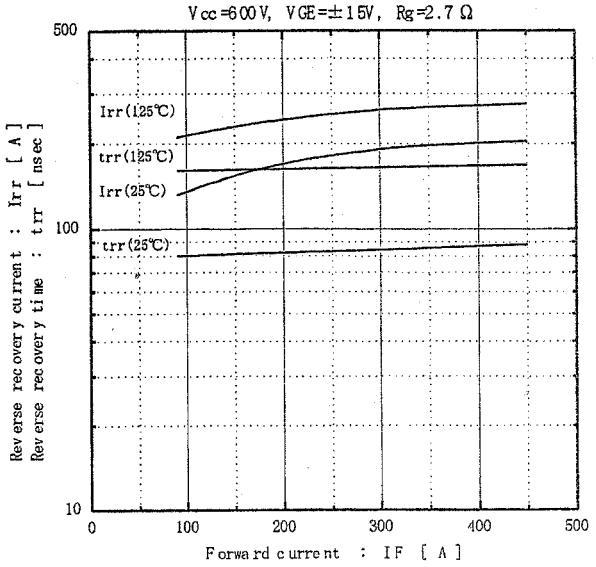
Reverse bias safe operating area
+VGE=15V, -VGE≦15V, Rg≧2.7Ω, Tj≦125℃



Forward current vs. Forward on voltage (typ.)



Reverse recovery characteristics (typ.)
Vcc=600V, VGE=±15V, Rg=2.7Ω



Transient thermal resistance