FUJI ELECTRIC

1MBI 600PX-140

1-Pack IGBT
1400 V
600 A

IGBT MODULE

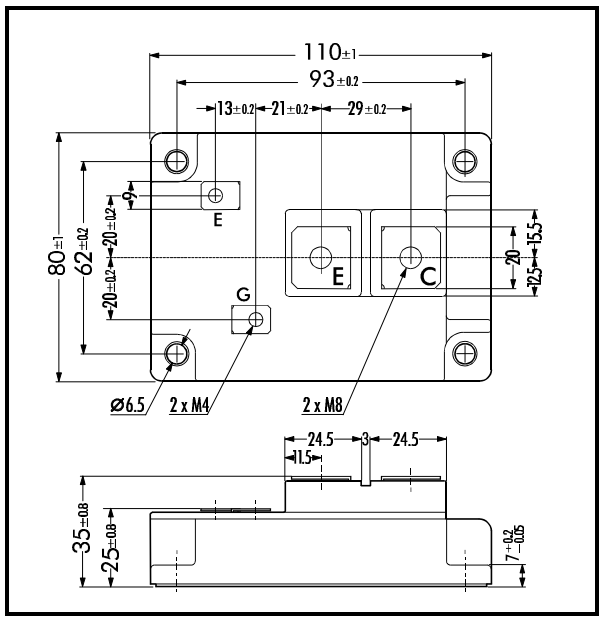
■ Features

- *Square RBSOA*
- *Low Saturation Voltage*
- *Less Total Power Dissipation*
- *Improved FWD Characteristic*
- *Minimized Internal Stray Inductance*

■ Applications

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

■ Outline Drawing



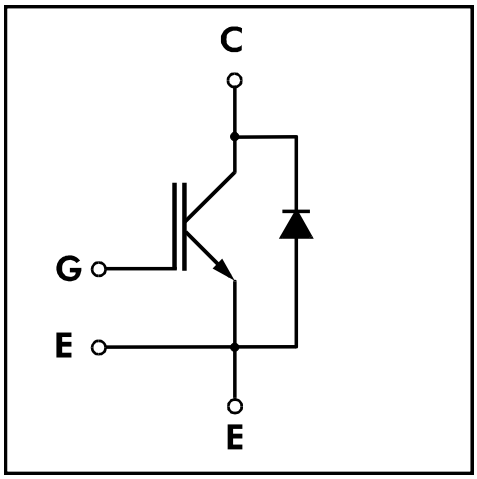
■ Maximum Ratings and Characteristics

• Absolute Maximum Ratings (T_c=25°C)

Items		Symbols	Ratings	Units
Collector-Emitter Voltage		V_{CES}	1400	V
Gate -Emitter Voltage		V_{GES}	± 20	V
Collector Current	Continuous (25°C / 80°C)	I_C	800 / 600	A
	1ms (25°C / 80°C)	$I_{C\ PULSE}$	1600 / 1200	
	Continuous	$-I_C$	600	
	1ms	$-I_{C\ PULSE}$	1200	
Max. Power Dissipation		P_C	4100	W
Operating Temperature		T_j	+150	°C
Storage Temperature		T_{stg}	-40 ~ +125	°C
Isolation Voltage	A.C. 1min.	V_{is}	2500	V
Screw Torque		Mounting *1	4.5	Nm
		Terminals *2	11.0	
		Terminals *3	1.7	

Note: *1:Recommendable Value; 4.0 ± 0.5 Nm (M6)
*2:Recommendable Value; 10.0 ± 1.0 Nm (M8)
*3:Recommendable Value; 1.5 ± 0.2 Nm (M4)

■ Equivalent Circuit



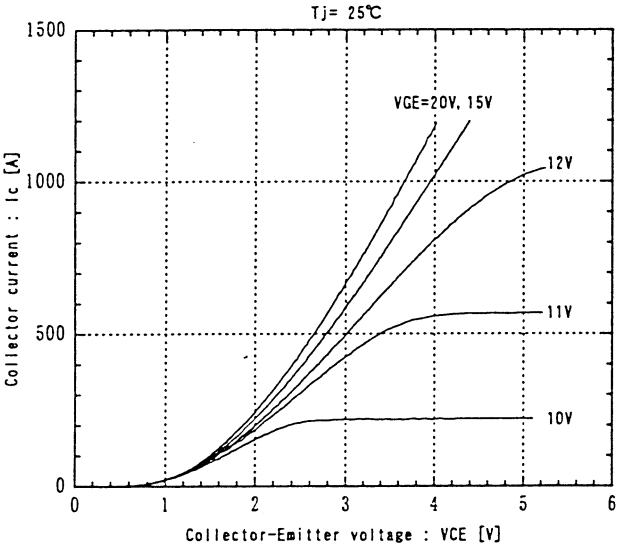
• Electrical Characteristics (at T_j=25°C)

Items	Symbols	Test Conditions	Min.	Typ.	Max.	Units
Zero Gate Voltage Collector Current	I_{CES}	V_{GE}=0V V_{CE}=1400V			2.0	mA
Gate-Emitter Leackage Current	I_{GES}	V_{CE}=0V V_{GE}=± 20V			± 0.5	µA
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	V_{GE}=20V I_C=600mA	6.0	8.0	9.0	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	V_{GE}=15V I_C=600A		2.85	3.2	V
Input capacitance	C_{ies}	V_{GE}=0V		60		nF
Output capacitance	C_{oes}	V_{CE}=10V		9		
Reverse Transfer capacitance	C_{res}	f=1MHz		4		
Turn-on Time	t_{ON}	V_{CC}=600V		0.75	1.20	µs
	t_r	I_C=600A		0.02	0.60	
Turn-off Time	t_{OFF}	V_{GE}=± 15V		0.65	1.00	
	t_f	R_G=2.0Ω		0.01	0.30	
Diode Forward On-Voltage	V_F	I_F=600A V_{GE}=0V			3.4	V
Reverse Recovery Time	t_{rr}	I_F=600A, V_{GE}=-15V			350	ns

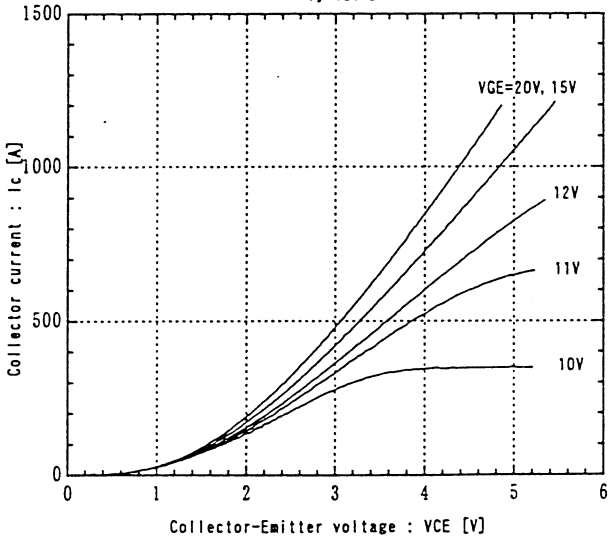
• Thermal Characteristics

Items	Symbols	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance	$R_{th(j-c)}$	IGBT			0.03	°C/W
	$R_{th(j-c)}$	Diode			0.06	
	$R_{th(c-f)}$	With Thermal Compound		0.0063		

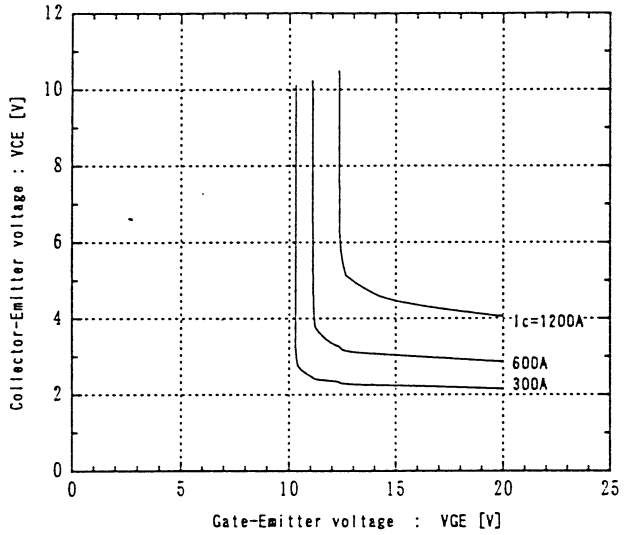
Collector current vs. Collector-Emitter voltage
Tj= 25℃



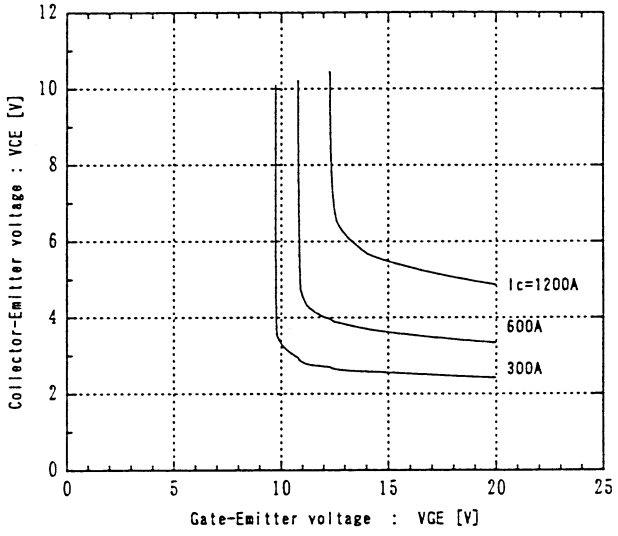
Collector current vs. Collector-Emitter voltage
Tj=125℃



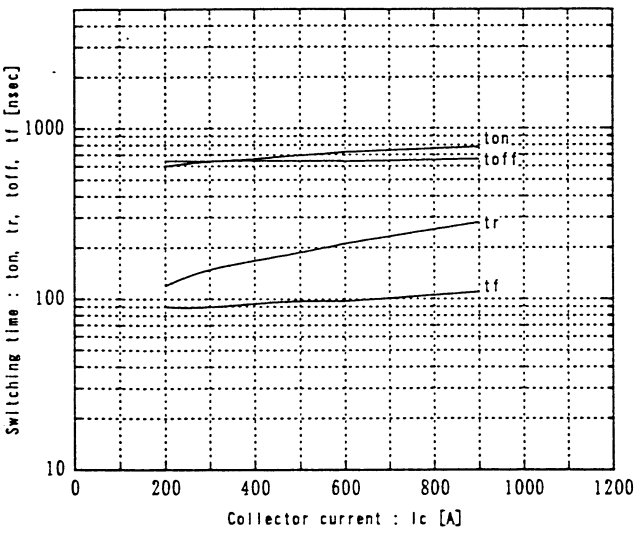
Gate-Emitter voltage vs. Collector-Emitter voltage
Tj=25°C



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



Switching time vs. Collector current
Vcc=600V, RG=2.0Ω, VGE±15V, Tj=25°C



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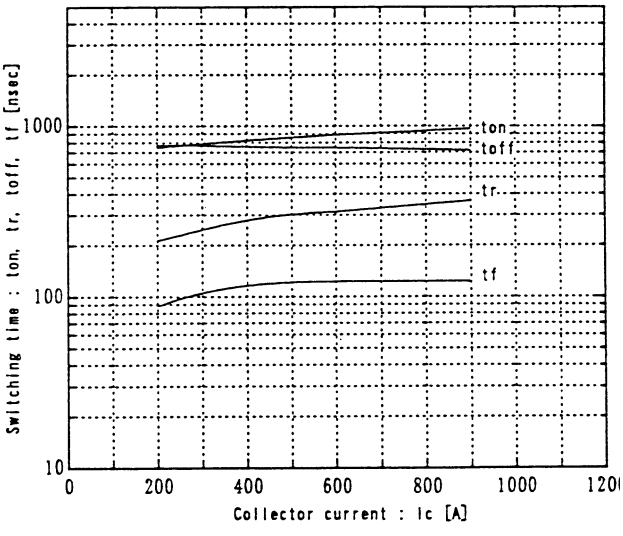
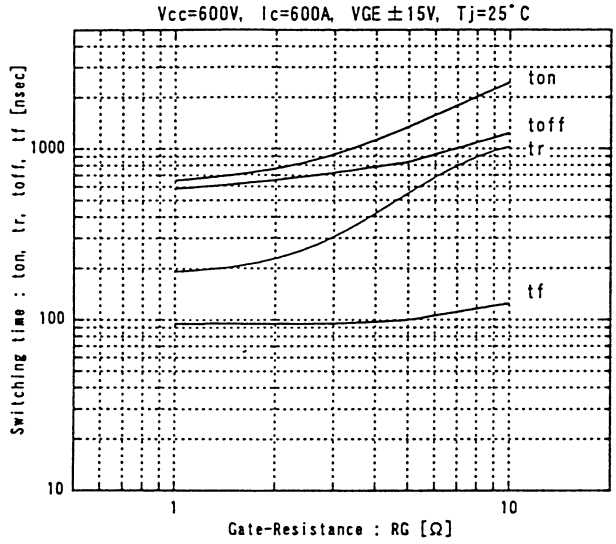
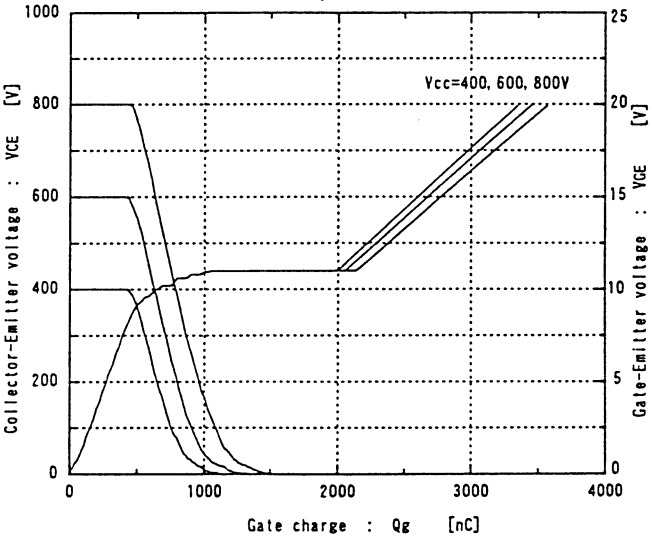


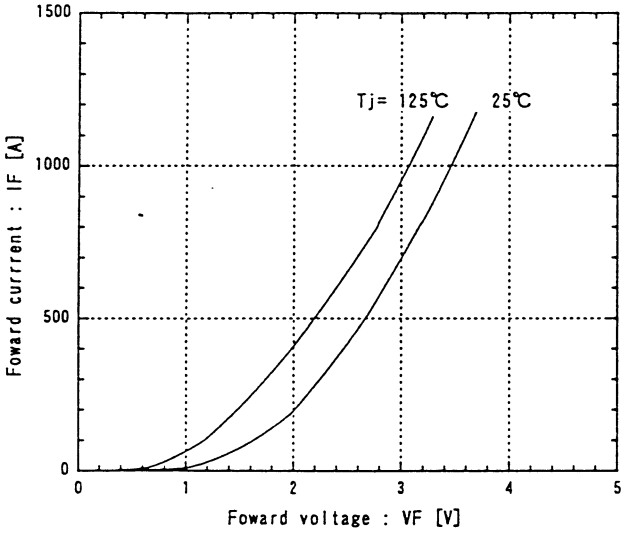
Switching time vs. Gate-Resistance
Vcc=600V, Ic=600A, VGE ±15V, Tj=25°C



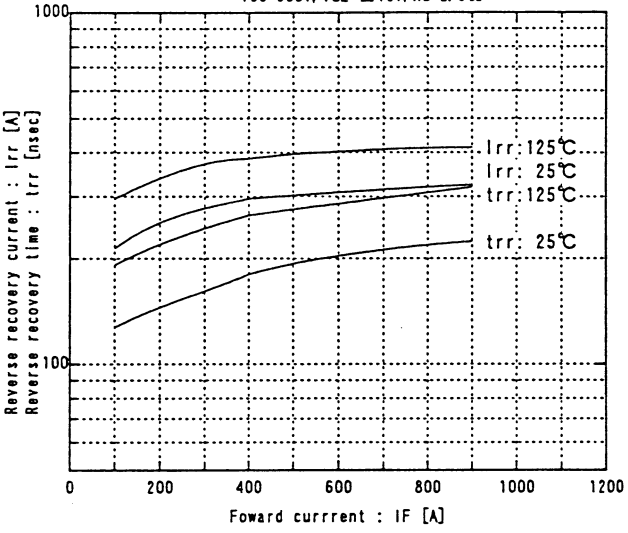
Dynamic input characteristics
Tj=25℃



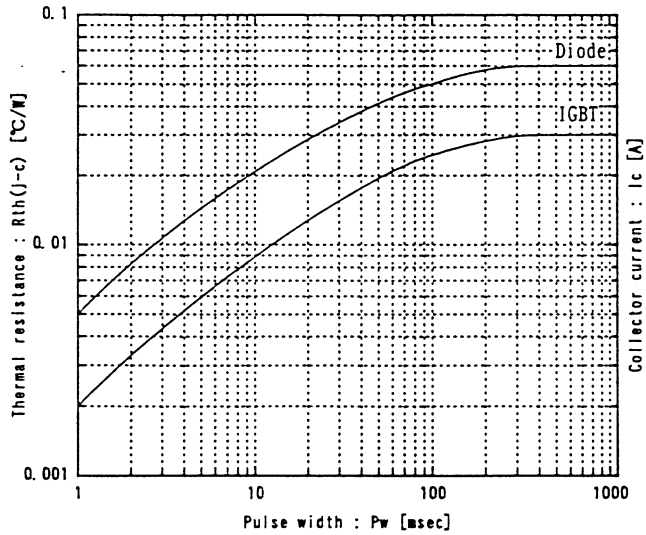
Foward currrent vs. Foward voltage
VGE=0V



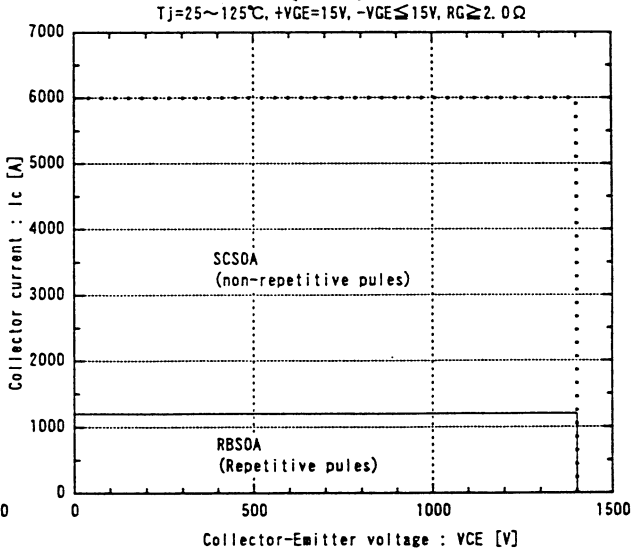
Reverse recovery characteristics(trr, Irr vs. IF)
Vcc=600V, VGE=±15V, RG=2.0Ω

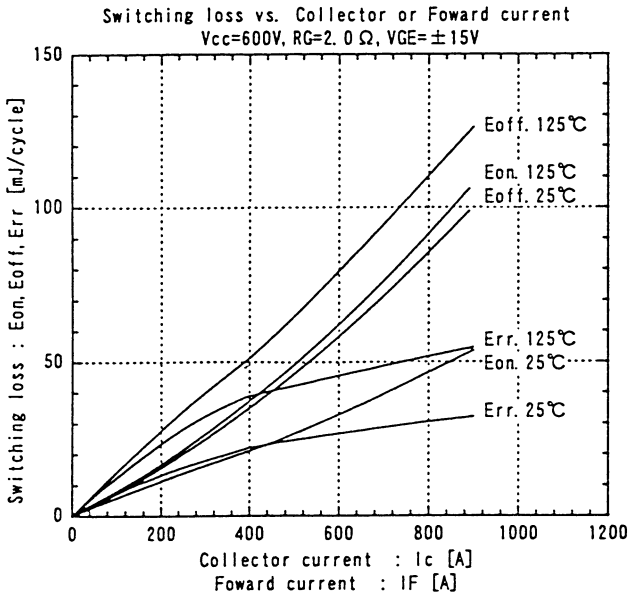


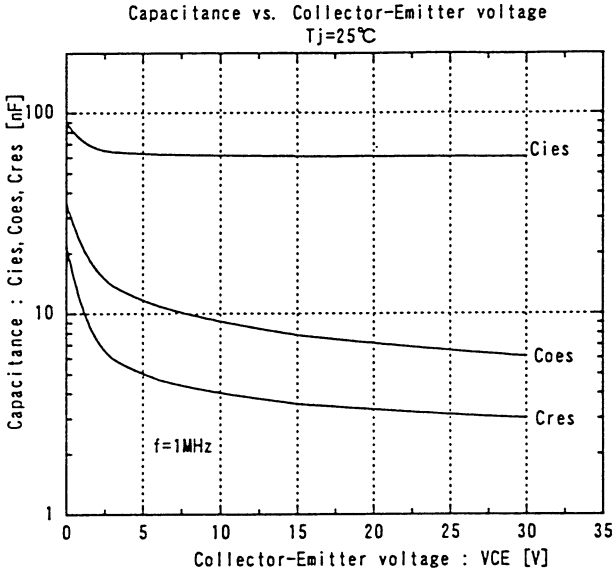
Transient thermal resistance



Reverse biased safty operating area
Tj=25～125℃, +VGE=15V, -VGE≦15V, RG≧2.0Ω




Switching loss vs. Collector or Foward current
Vcc=600V, RG=2.0Ω, VGE=±15V
Switching loss : Eon, Eoff, Err [mJ/cycle]
150
100
50
0
0
200
400
600
800
1000
1200
Collector current : Ic [A]
Foward current : IF [A]
Eoff. 125℃
Eon. 125℃
Eoff. 25℃
Err. 125℃
Eon. 25℃
Err. 25℃


Capacitance vs. Collector-Emitter voltage
Tj=25℃
Capacitance : Cies, Coes, Cres [nF]
100
10
1
0
5
10
15
20
25
30
35
Collector-Emitter voltage : VCE [V]
Cies
Coes
Cres
f=1MHz

For more information, contact:

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