FUJI ELECTRIC

6MBI 15GS-060

6-Pack IGBT
600 V
15 A

IGBT MODULE (Single-in-Line)

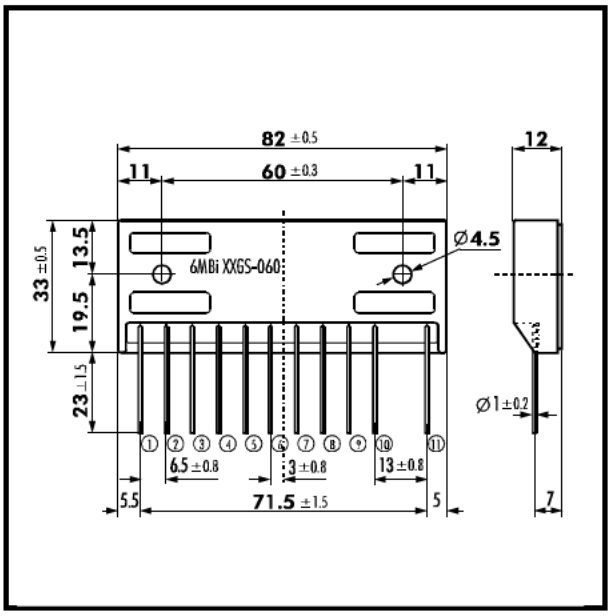
■ Features

- *Square RBSOA*
- *Low Saturation Voltage*
- *Improved FWD Characteristic*
- *Minimized Internal Stray Inductance*

■ Applications

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

■ Outline Drawing



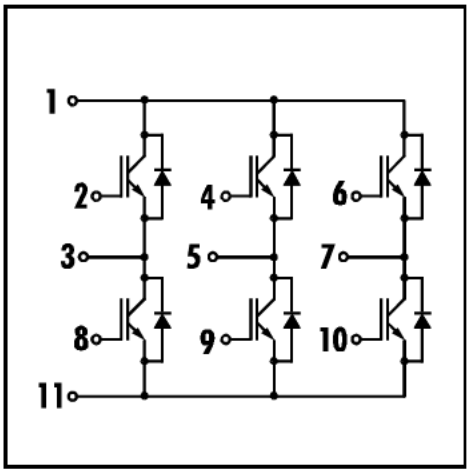
■ Maximum Ratings and Characteristics

• Absolute Maximum Ratings (T_c=25°C)

Items		Symbols	Ratings	Units
Collector-Emitter Voltage		V_{CES}	600	V
Gate -Emitter Voltage		V_{GES}	± 20	V
Collector Current	Continuous	I_C	15	A
	1ms	$I_{C\ PULSE}$	30	
	Continuous	$-I_C$	15	
	1ms	$-I_{C\ PULSE}$	30	
Max. Power Dissipation		P_C	60	W
Operating Temperature		T_j	+150	°C
Storage Temperature		T_{stg}	-40 ~ +125	°C
Isolation Voltage	A.C. 1min.	V_{is}	2000	V
Screw Torque		Mounting *1	1.7	Nm

Note: *1:Recommendable Value; 1.3 ~ 1.7 Nm (M4)

■ Equivalent Circuit



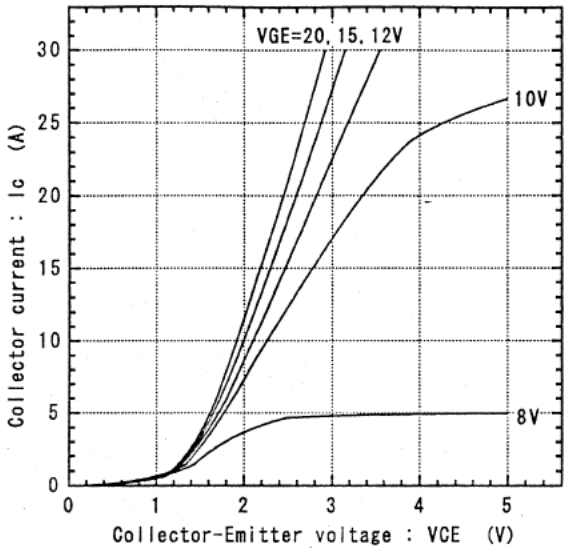
• Electrical Characteristics (at T_j=25°C)

Items	Symbols	Test Conditions	Min.	Typ.	Max.	Units
Zero Gate Voltage Collector Current	I_{CES}	V_{GE}=0V V_{CE}=600V			1.0	mA
Gate-Emitter Leackage Current	I_{GES}	V_{CE}=0V V_{GE}=± 20V			100	nA
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	V_{GE}=20V I_C=15mA	5.5		8.5	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	V_{GE}=15V I_C=15A			2.8	V
Input capacitance	C_{ies}	V_{GE}=0V		975		pF
Output capacitance	C_{oes}	V_{CE}=10V		225		
Reverse Transfer capacitance	C_{res}	f=1MHz		54		
Turn-on Time	t_{ON}	V_{CC}=300V			1.2	µs
	t_r	I_C=15A			1.0	
Turn-off Time	t_{OFF}	V_{GE}=± 15V			1.0	
	t_f	R_G=150Ω			0.35	
Diode Forward On-Voltage	V_F	I_F=15A V_{GE}=0V			3.0	V
Reverse Recovery Time	t_{rr}	I_F=15A			300	ns

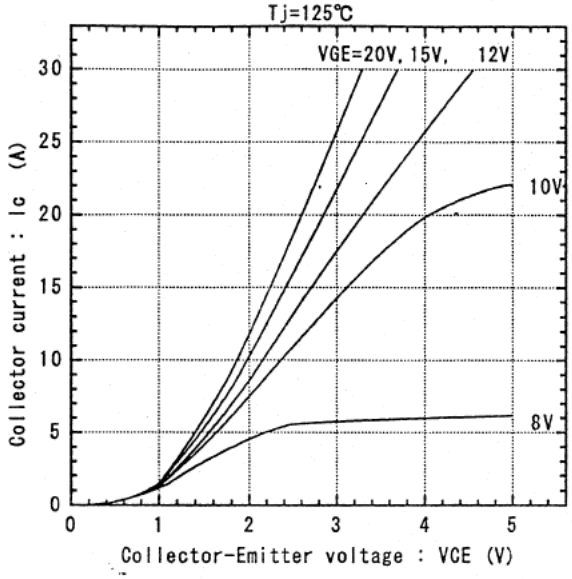
• Thermal Characteristics

Items	Symbols	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance	$R_{th(j-c)}$	IGBT			2.08	°C/W
	$R_{th(j-c)}$	Diode			3.00	
	$R_{th(c-f)}$	With Thermal Compound		0.06		

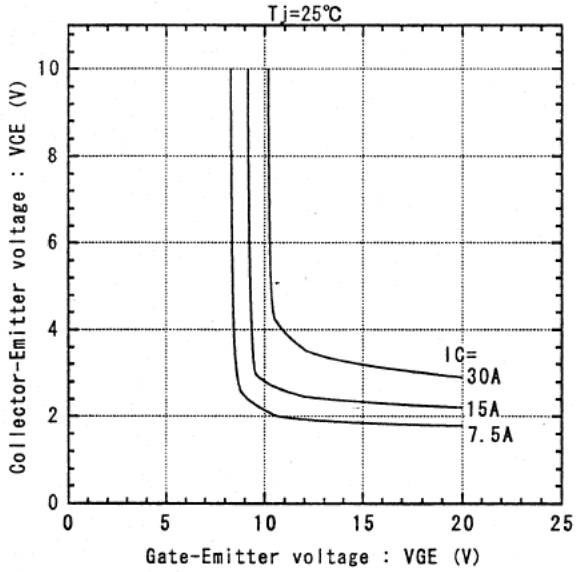
Collector-Emitter voltage vs. Collector current
Tj=25℃



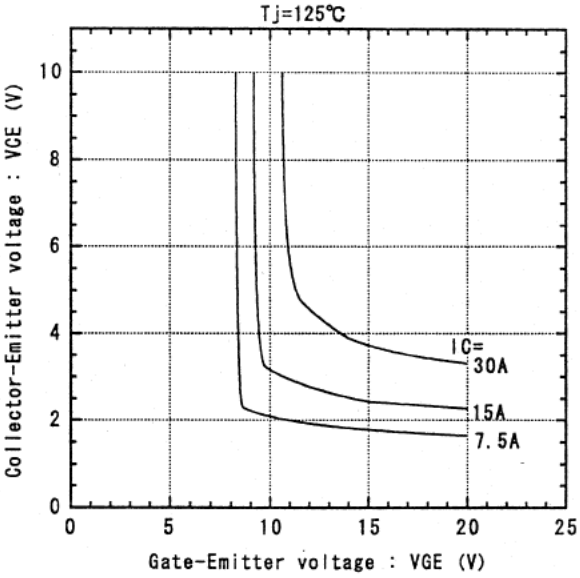
Collector-Emitter voltage vs. Collector current
Tj=125℃



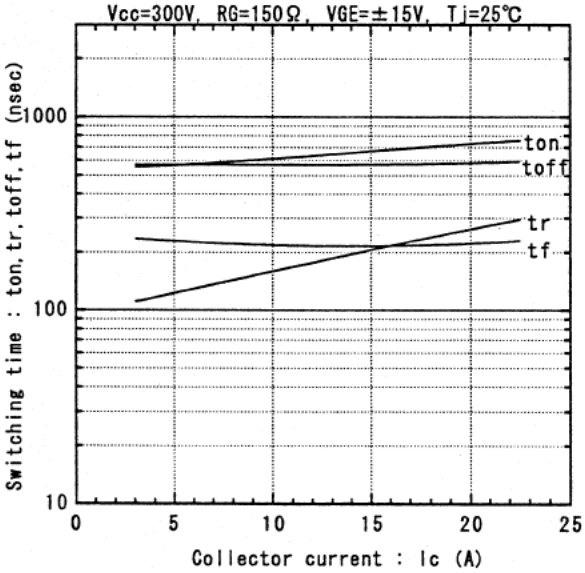
Collector-Emitter vs. Gate-Emitter voltage
Tj=25℃



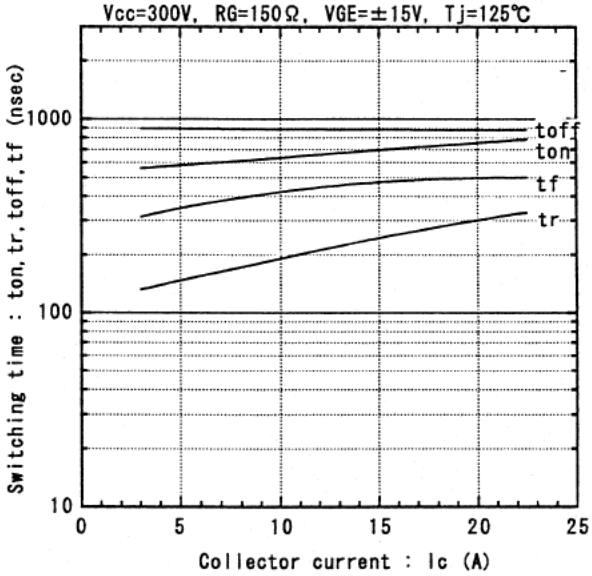
Collector-Emitter vs. Gate-Emitter voltage
Tj=125℃

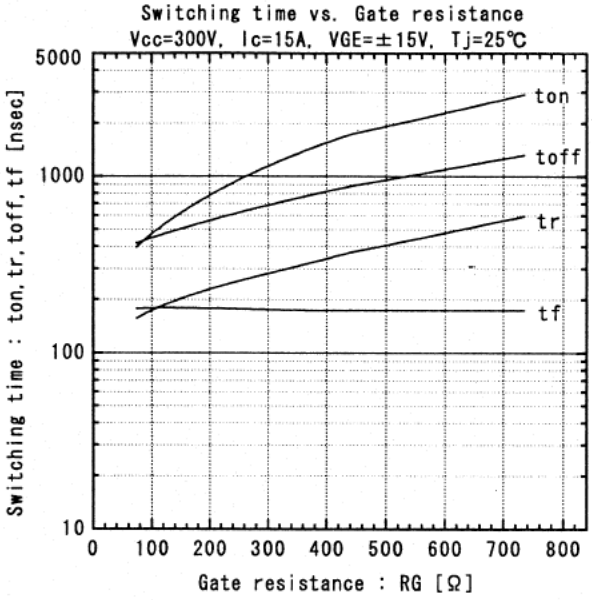


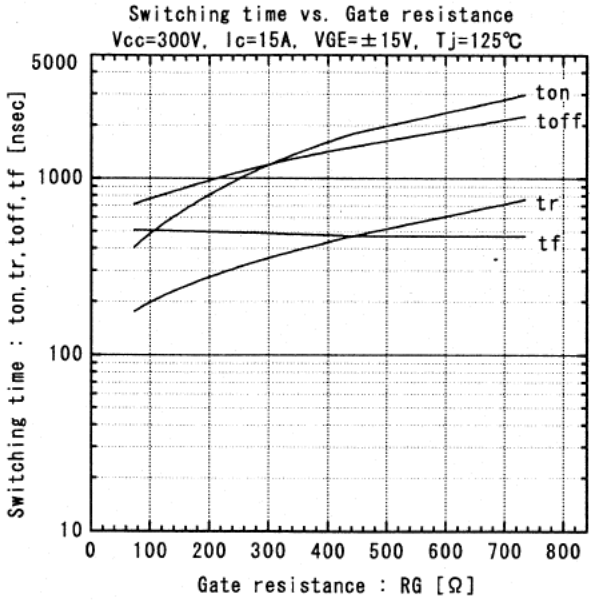
Switching time vs. Collector current
Vcc=300V, RG=150Ω, VGE=±15V, Tj=25℃

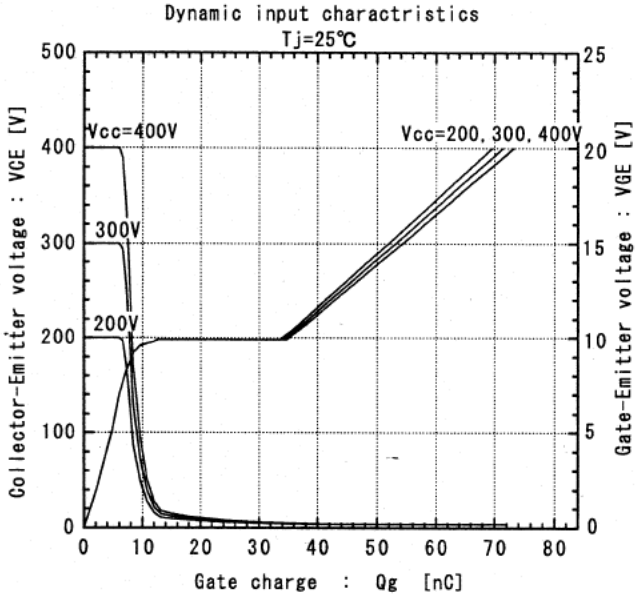


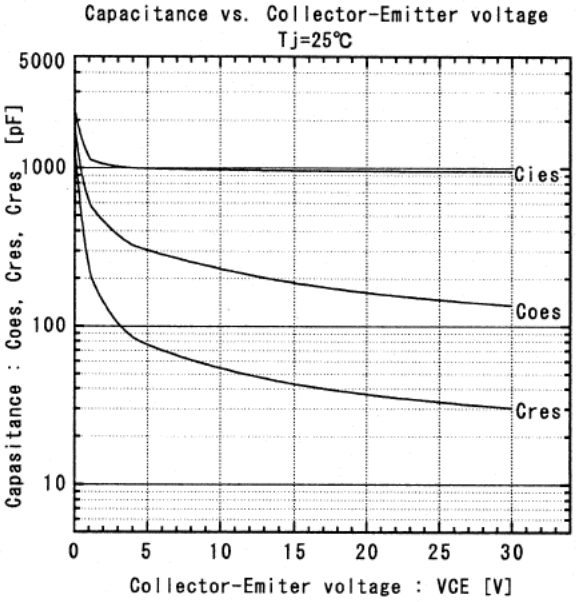
Switching time vs. Collector current
Vcc=300V, RG=150Ω, VGE=±15V, Tj=125℃

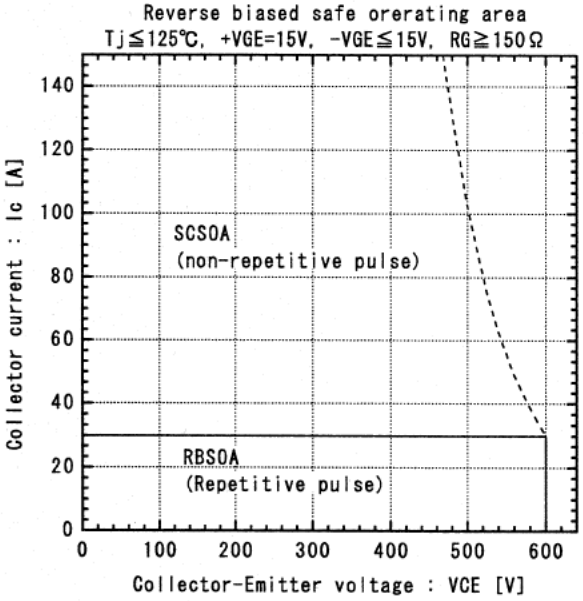


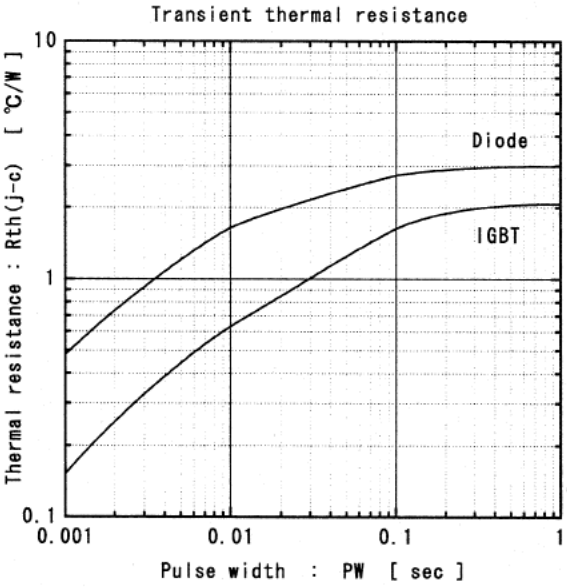

Switching time vs. Gate resistance
Vcc=300V, Ic=15A, VGE=±15V, Tj=25℃
Switching time : ton, tr, toff, tf [nsec]
Gate resistance : RG [Ω]
ton
toff
tr
tf

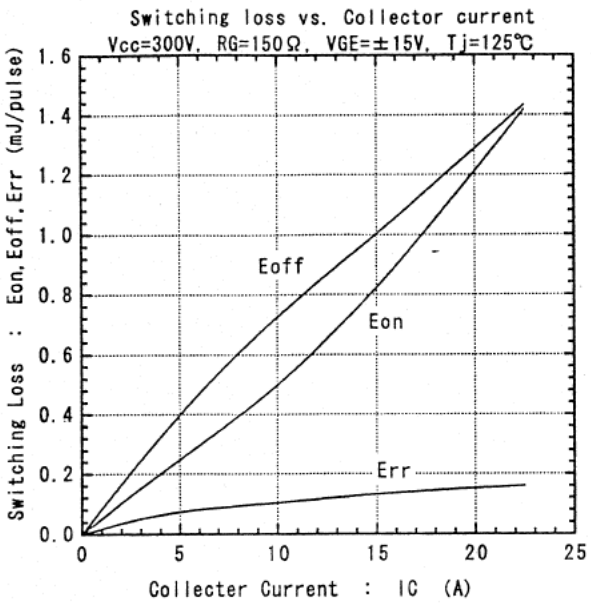

Switching time vs. Gate resistance
Vcc=300V, Ic=15A, VGE=±15V, Tj=125℃
Switching time : ton, tr, toff, tf [nsec]
Gate resistance : RG [Ω]
ton
toff
tr
tf

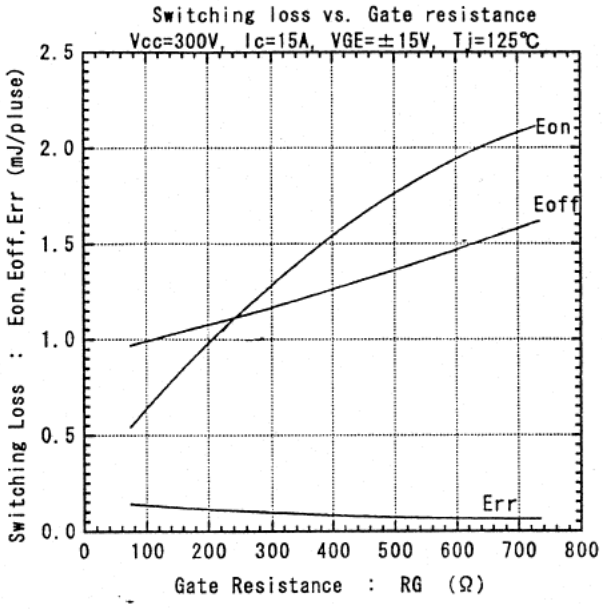

Dynamic input charactristics
Tj=25℃
Collector-Emitter voltage : VCE [V]
Gate-Emitter voltage : VGE [V]
Gate charge : Qg [nC]
Vcc=400V
300V
200V
Vcc=200, 300, 400V

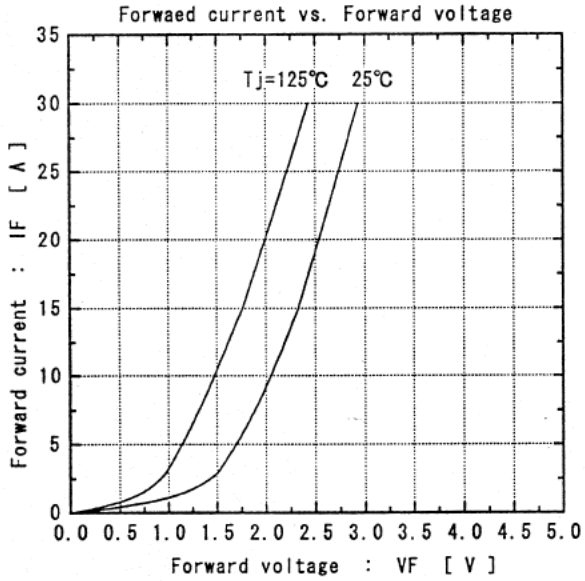

Capacitance vs. Collector-Emitter voltage
Tj=25℃
Capasitance : Coes, Cres, Cres [pF]
Collector-Emiter voltage : VCE [V]
Cies
Coes
Cres

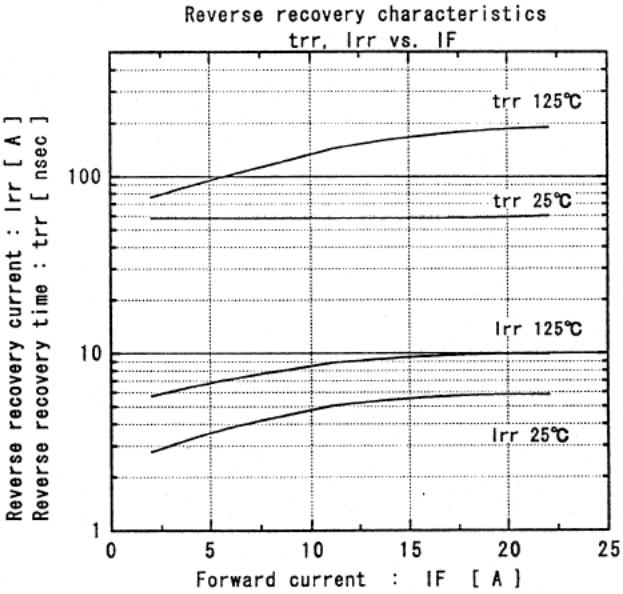

Reverse biased safe orerating area
Tj≦125℃, +VGE=15V, -VGE≦15V, RG≧150Ω
Collector current : Ic [A]
Collector-Emitter voltage : VCE [V]
SCSOA
(non-repetitive pulse)
RBSOA
(Repetitive pulse)


Transient thermal resistance
Thermal resistance : Rth(j-c) [℃/W]
Pulse width : PW [sec]
Diode
IGBT









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