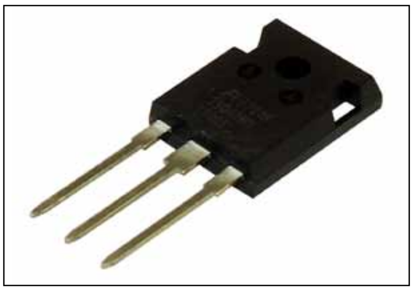
FGW75XS120

http://www.fujielectric.com/products/semiconductor/
Discrete IGBT

Discrete IGBT (XS-series)
1200V / 75A

Features
Pb-free lead terminal; RoHS compliant
Halogen-free molding compound

Applications
Uninterrupted Power Supply, PV Power Conditioner,
Inverter welding machine



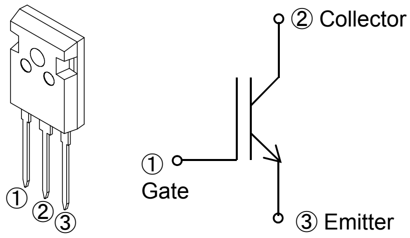
Maximum Ratings and Characteristics

● Absolute Maximum Ratings at T_{vj} = 25 °C (unless otherwise specified)

Parameter	Symbol	Value	Unit	Remarks
Collector-Emitter Voltage	V_{CES}	1200	V	
Gate-Emitter Voltage	V_{GES}	± 20	V	
Transient Gate-Emitter Voltage		± 30		t_p < 1 µs
DC Collector Current	$I_{C@25}$	117	A	T_C = 25 °C
	$I_{C@100}$	75	A	T_C = 100 °C
Pulsed Collector Current	I_{CP}	300	A	Note *1
Max. Power Dissipation	P_{tot}	649	W	T_C = 25 °C
Operating Junction Temperature	T_{vj}	-40 ~ +175	°C	
Storage Temperature	T_{stg}	-55 ~ +175	°C	

Note *1 : Pulse width limited by $T_{vj\,max}$.

Equivalent circuit



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● Electrical Characteristics at T_{vj} = 25 °C (unless otherwise specified)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
Zero Gate Voltage Collector Current	I_{CES}	V_{CE} = 1200 V, V_{GE} = 0 V	T_{vj} = 25 °C	-	-	250	µA
			T_{vj} = 175 °C	-	-	2	mA
Gate-Emitter Leakage Current	I_{GES}	V_{CE} = 0 V, V_{GE} = ± 20 V		-	-	200	nA
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	V_{CE} = 20 V, I_C = 75 mA		4.9	5.5	6.1	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	V_{GE} = 15 V, I_C = 75 A	T_{vj} = 25 °C	-	1.6	1.9	V
			T_{vj} = 125 °C	-	2.05	-	
			T_{vj} = 175 °C	-	2.15	-	
Input Capacitance	C_{ies}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		-	8400	-	pF
Output Capacitance	C_{oes}			-	114	-	
Reverse Transfer Capacitance	C_{res}			-	68	-	
Gate Charge	Q_G	V_{CC} = 600 V, I_C = 75 A, V_{GE} = 15 V		-	500	-	nC
Turn-On Delay Time	$t_{d(on)}$	T_{vj}= 25 °C, V_{CC} = 600 V, I_C = 75 A, V_{GE} = 15 V, R_G = 10 Ω, Energy loss include “tail” and FWD reverse recovery.		-	72	-	ns
Rise Time	t_r			-	60	-	
Turn-Off Delay Time	$t_{d(off)}$			-	450	-	
Fall Time	t_f			-	58	-	
Turn-On Energy	E_{on}			-	4.4	-	mJ
Turn-Off Energy	E_{off}			-	3	-	
Turn-On Delay Time	$t_{d(on)}$	T_{vj} = 175 °C, V_{CC} = 600 V, I_C = 75 A, V_{GE} = 15 V, R_G = 10 Ω, Energy loss include “tail” and FWD reverse recovery.		-	78	-	ns
Rise Time	t_r			-	58	-	
Turn-Off Delay Time	$t_{d(off)}$			-	500	-	
Fall Time	t_f			-	108	-	
Turn-On Energy	E_{on}			-	5.6	-	mJ
Turn-Off Energy	E_{off}			-	4.6	-	

● Thermal Resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance, Junction-Ambient	$R_{th(j-a)}$	-	-	50	°C/W
Thermal Resistance, Junction to Case	$R_{th(j-c)\_IGBT}$	-	-	0.231	°C/W

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Characteristics (Representative)

Figure 1. IGBT Power Dissipation vs T_c
$T_{vj} \leq 175°C$

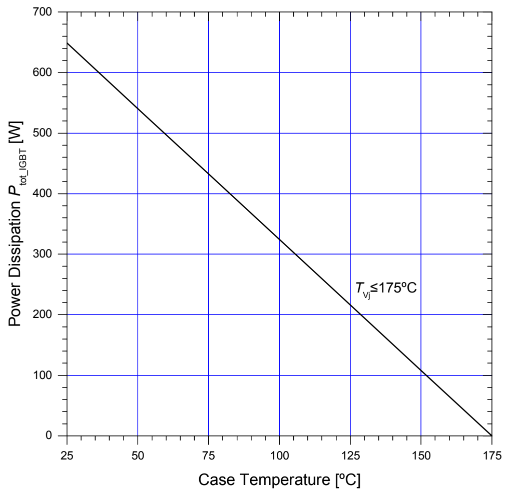


Figure 2. DC Collector Current vs T_c
$V_{GE} \geq +15$ V, $T_{vj} \leq 175°C$

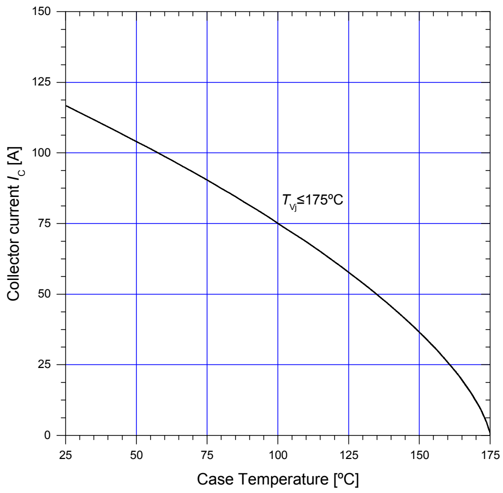


Figure 3. Typical output characteristics
$T_{vj} = 25°C$

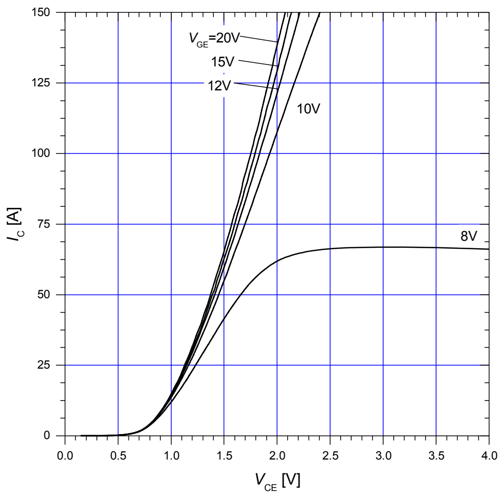


Figure 4. Typical output characteristics
$T_{vj} = 175°C$

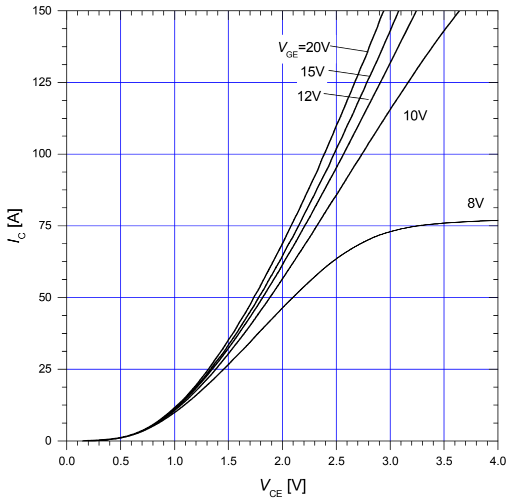


Figure 5. Typical transfer characteristics
$V_{CE} = 20$ V

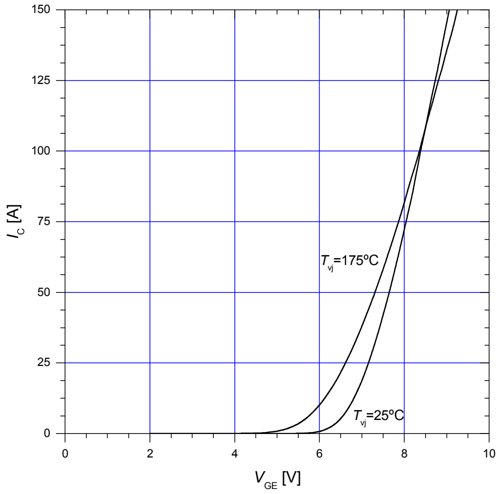


Figure 6. Gate threshold voltage
$I_C = 75$ mA, $V_{CE} = 20$ V

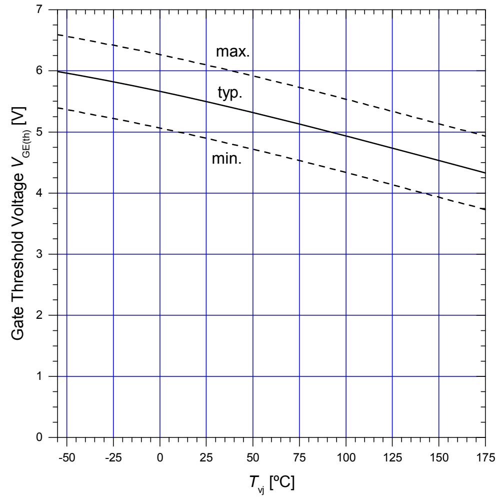


Figure 7. Typical capacitance
V_{GE} = 0 V, f = 1 MHz

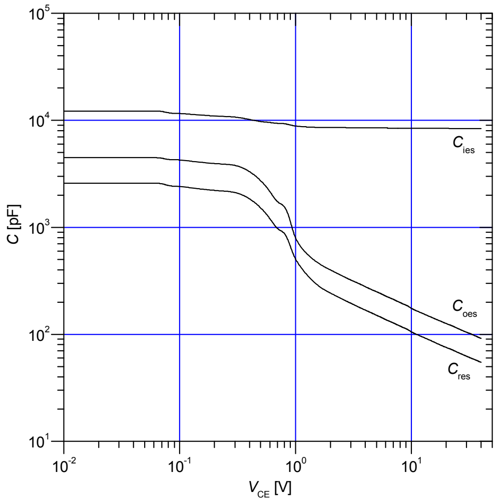


Figure 8. Typical gate charge
I_C = 75 A, V_{CC} = 600 V, T_{vj} = 25ºC

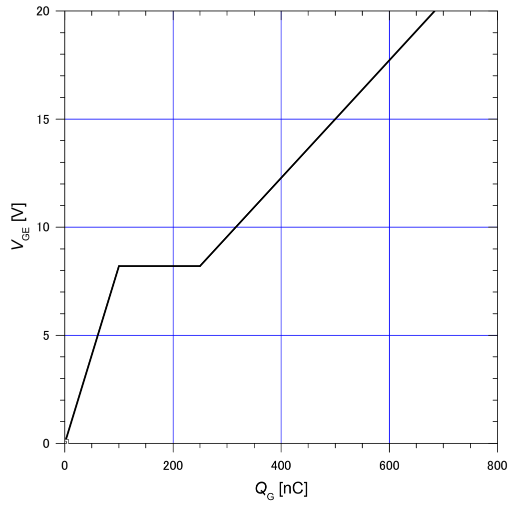


Figure 9. Typical switching times vs. I_C
V_{CC} = 600 V, V_{GE} = 15 V, R_G = 10 Ω, T_{vj} = 175ºC

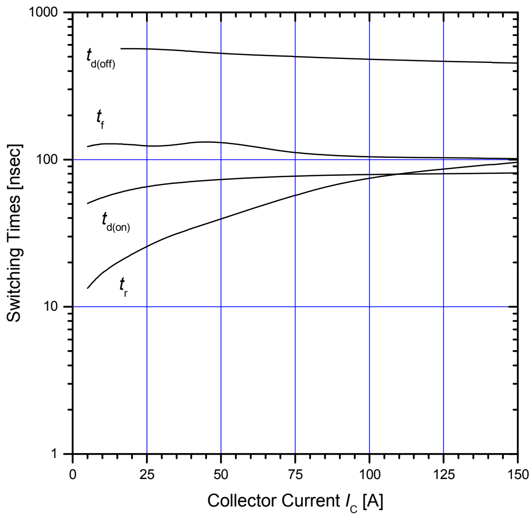


Figure 10. Typical switching times vs. R_G
V_{CC} = 600 V, V_{GE} = 15 V, I_C = 75 A, T_{vj} = 175ºC

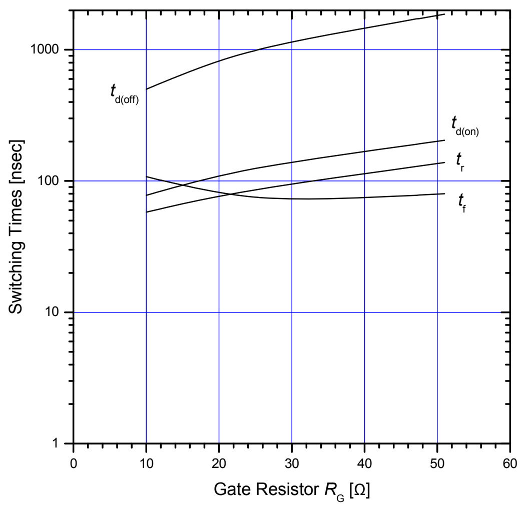


Figure 11. Typical switching losses vs. I_C
V_{CC} = 600 V, V_{GE} = 15 V, R_G = 10 Ω, T_{vj} = 175ºC

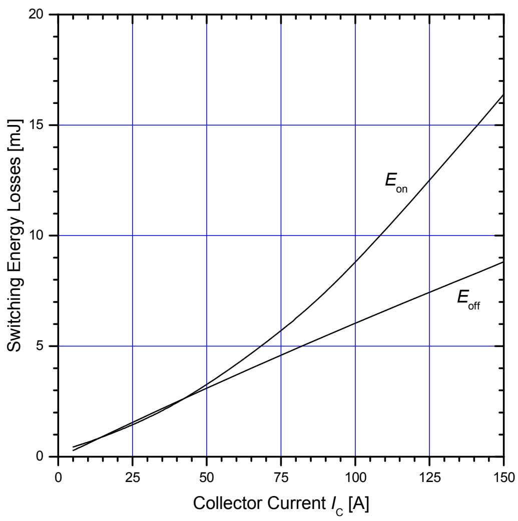


Figure 12. Typical switching losses vs. R_G
V_{CC} = 600 V, V_{GE} = 15 V, I_C = 75 A, T_{vj} = 175ºC

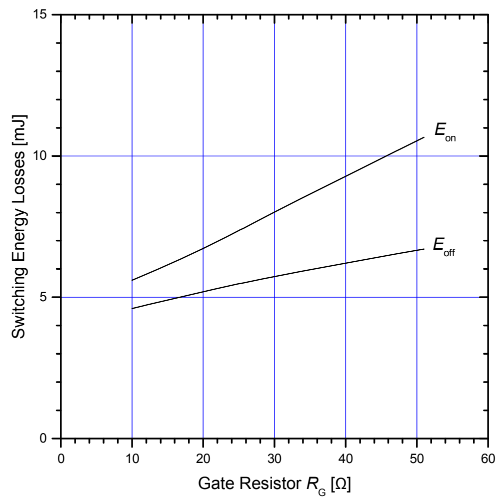


Figure 13. Reverse biased safe operating area
V_{GE} = +15 V / -0 V, R_G = 20 Ω, T_{vj} ≤ 175ºC

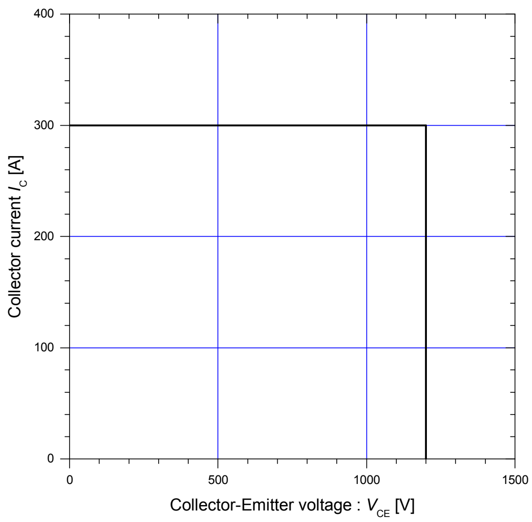
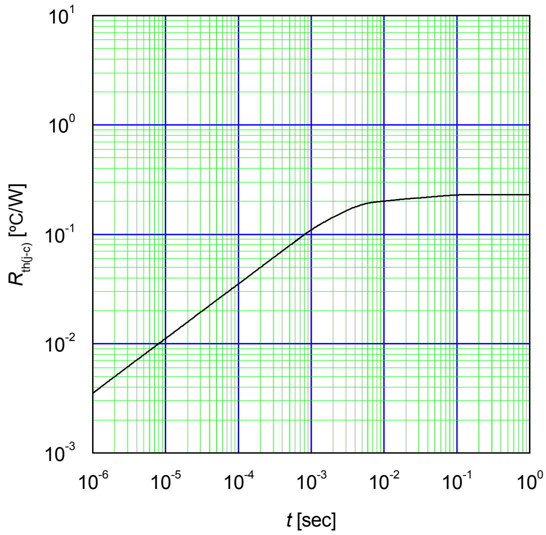
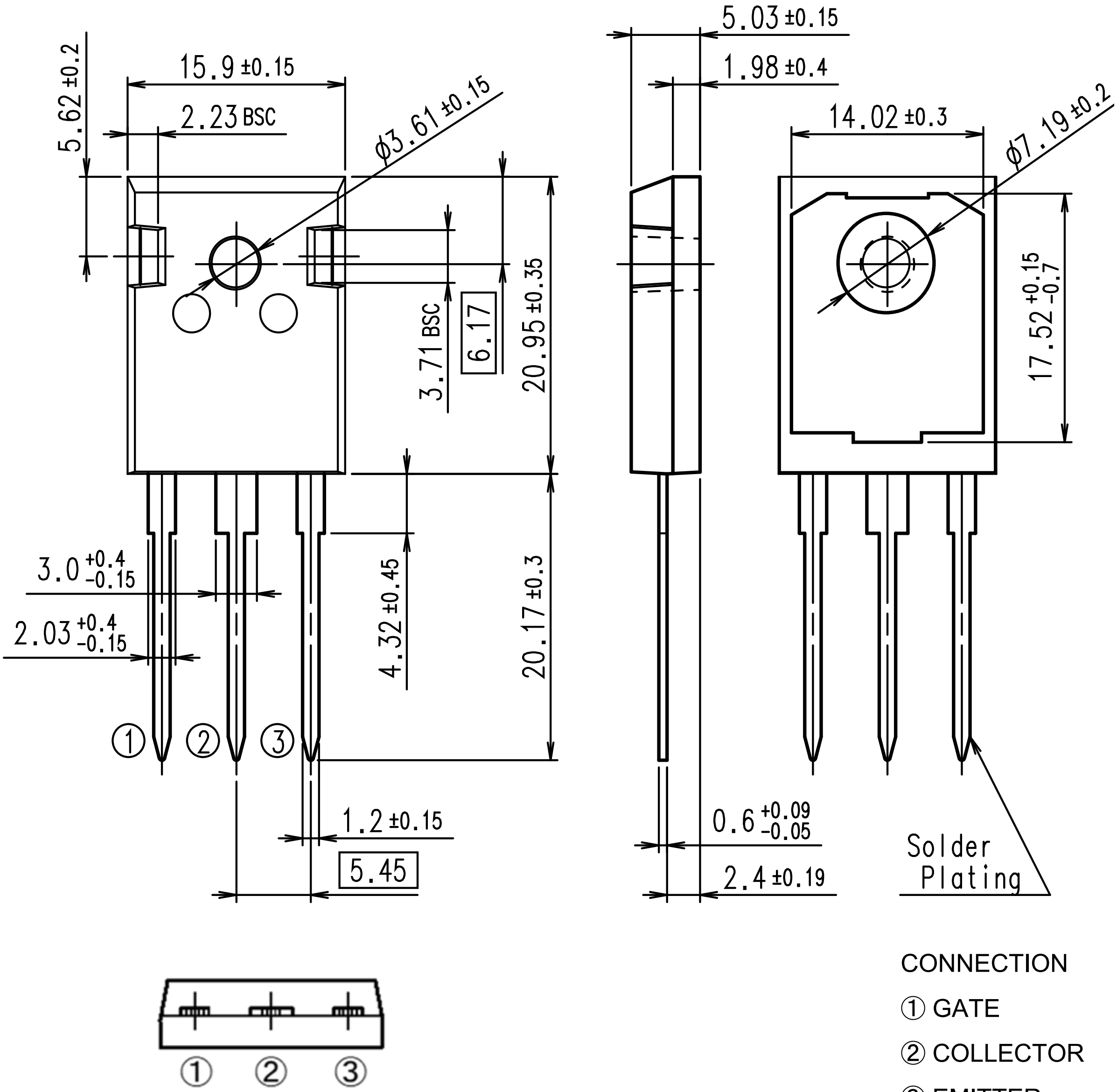


Figure 14. Transient Thermal Impedance of IGBT
D = 0



Outline Drawings, mm



CONNECTION

① GATE

② COLLECTOR

③ EMITTER

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