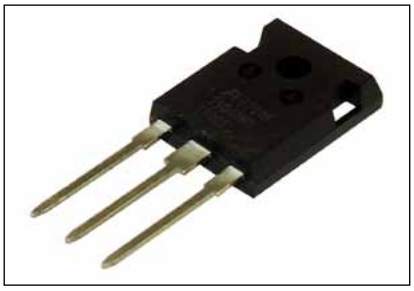
FGW75XS65

Discrete IGBT (High-Speed XS-series)
650V / 75A

Features
Low power loss
Low switching surge and noise
High reliability, high ruggedness (RBSOA, SCSOA etc.)

Applications
Uninterruptible power supply
PV Power coditionner
Inverter welding machine



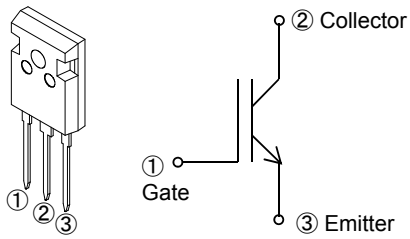
Maximum Ratings and Characteristics

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

Parameter	Symbol	Value	Unit	Remarks
Collector-Emitter Voltage	V_{CES}	650	V	
Gate-Emitter Voltage	V_{GES}	± 20	V	
Transient Gate-Emitter Voltage		± 30		t_p < 1 µs
DC Collector Current	$I_{C@25}$	115	A	T_C = 25 °C
	$I_{C@100}$	75	A	T_C = 100 °C
Pulsed Collector Current	I_{CP}	300	A	Note *1
Turn-Off Safe Operating Area	-	300	A	V_{CE} ≤ 650 V T_{vj} ≤ 175 °C
Max. Power Dissipation	P_{tot}	437	W	Tc = 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} = 650 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		3.4	4.0	4.6	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	V_{GE} = 15 V, I_C = 75 A	T_{vj} = 25 °C	1.0	1.35	1.7	V
			T_{vj} = 125 °C	-	1.5	-	
			T_{vj} = 175 °C	-	1.6	-	
Input Capacitance	C_{ies}	V_{CE} = 25 V		2970	5940	8910	pF
Output Capacitance	C_{oes}	V_{GE} = 0 V		67	134	201	
Reverse Transfer Capacitance	C_{res}	f = 1 MHz		30	60	90	
Gate Charge	Q_G	V_{CC} = 520 V, I_C = 75 A, V_{GE} = 15 V		150	300	450	nC
Turn-On Delay Time	$t_{d(on)}$	T_{vj} = 25 °C, V_{CC} = 400 V, I_C = 37.5 A, V_{GE} = 15 V, R_G = 10 Ω, Energy loss include “tail” and FWD reverse recovery.		22	44	66	ns
Rise Time	t_r			29	58	87	
Turn-Off Delay Time	$t_{d(off)}$			170	340	510	
Fall Time	t_f			14	28	42	
Turn-On Energy	E_{on}			0.65	1.3	1.95	mJ
Turn-Off Energy	E_{off}			0.47	0.94	1.41	
Turn-On Delay Time	$t_{d(on)}$	T_{vj} = 150 °C, V_{CC} = 400 V, I_C = 37.5 A, V_{GE} = 15 V, R_G = 10 Ω, Energy loss include “tail” and FWD reverse recovery.		22	44	66	ns
Rise Time	t_r			27	54	81	
Turn-Off Delay Time	$t_{d(off)}$			190	380	570	
Fall Time	t_f			23	46	69	
Turn-On Energy	E_{on}			0.8	1.6	2.4	mJ
Turn-Off Energy	E_{off}			0.5	1	1.5	

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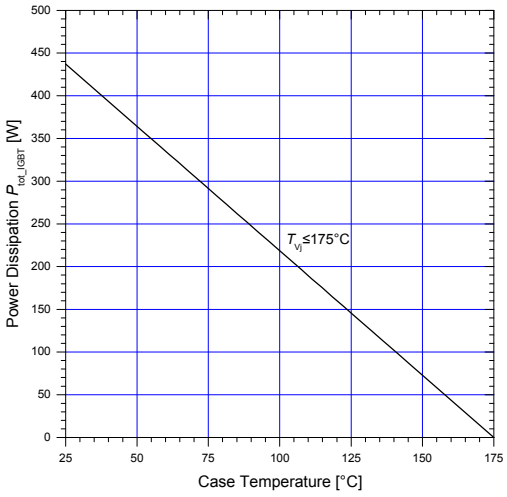
SEPTEMBER 2018

● Thermal Resistance

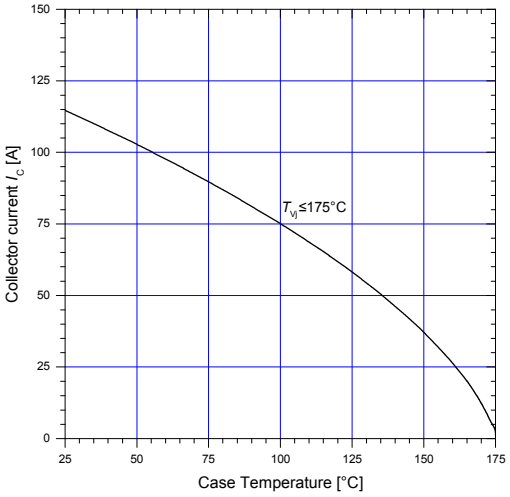
Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance, Junction-Ambient	$R_{th(j-a)}$	-	-	50	°C/W
Thermal Resistance, Junction to Case	$R_{th(j-c)}$	-	-	0.343	°C/W

Characteristics (Representative)

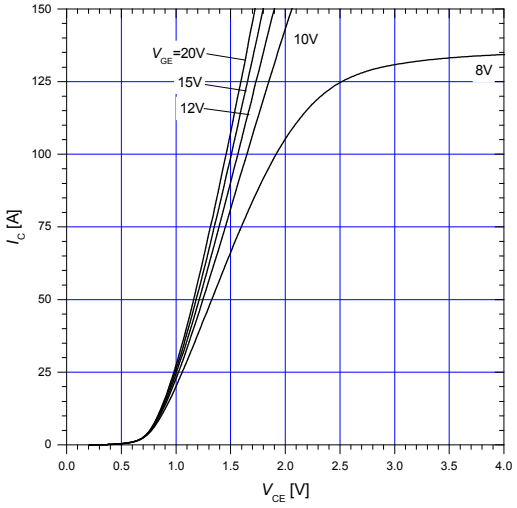
Graph 1
IGBT Power Dissipation vs T_c
T_{vj} ≤ 175°C



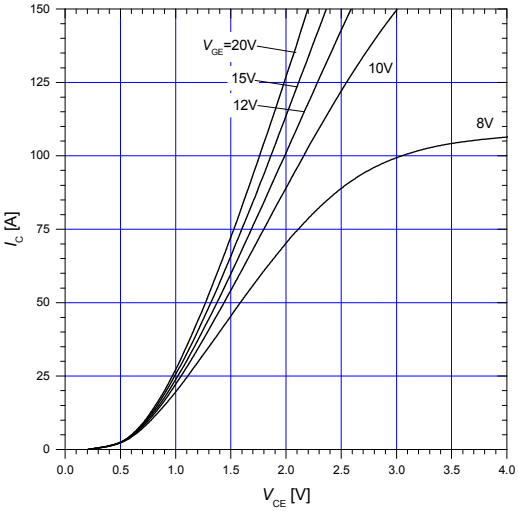
Graph 2
DC Collector Current vs T_c
V_{GE} ≥ +15 V, T_{vj} ≤ 175°C



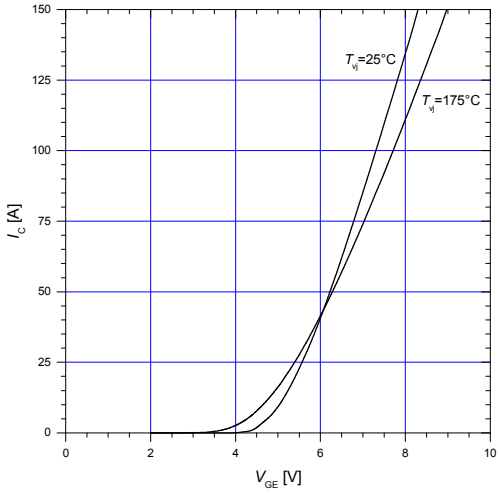
Graph 3
Typical output characteristics
T_{vj} = 25°C



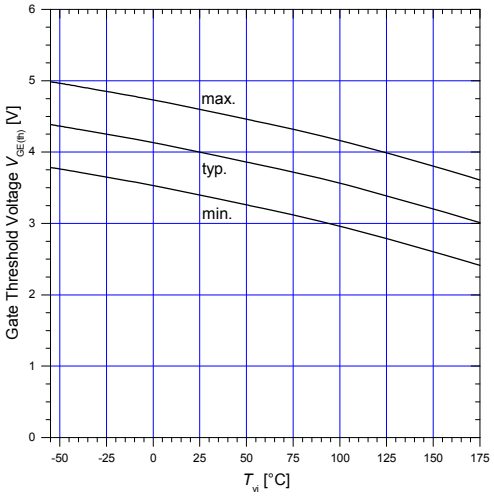
Graph 4
Typical output characteristics
T_{vj} = 175°C



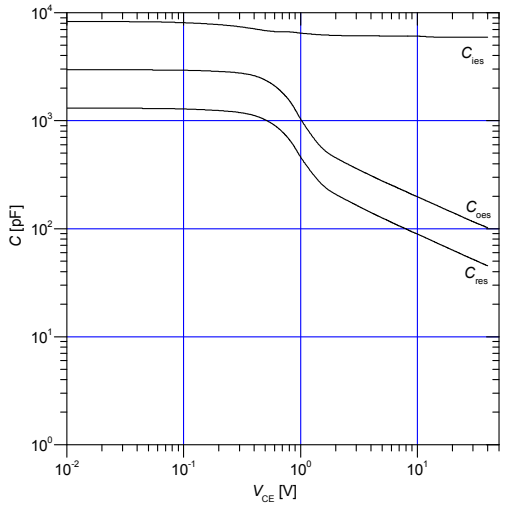
Graph 5
Typical transfer characteristics
V_{CE} = 20 V



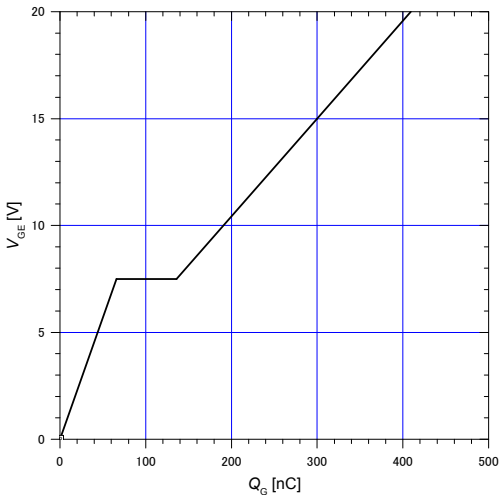
Graph 6
Gate threshold voltage
I_C = 75 mA, V_{CE} = 20 V



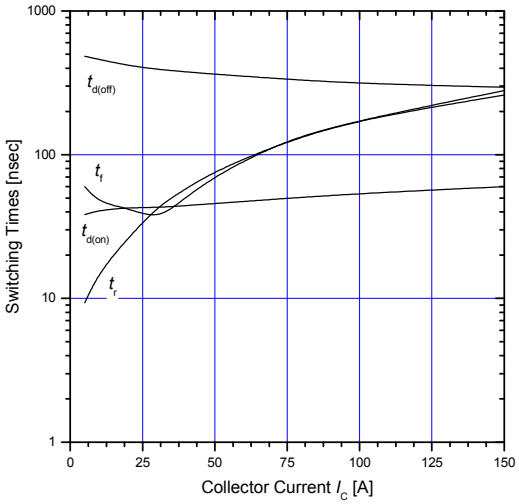
Graph 7
Typical capacitance
V_{GE} = 0 V, f = 1 MHz



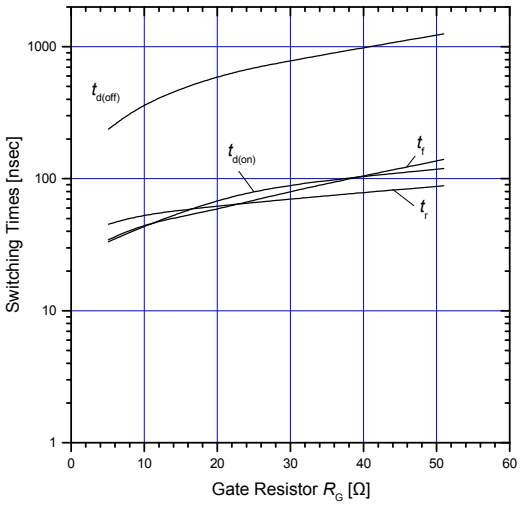
Graph 8
Typical gate charge
I_C = 75 A, V_{CC} = 520 V, T_{vj} = 25°C



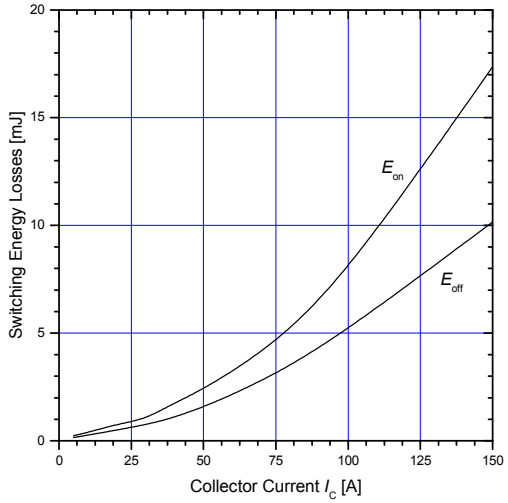
Graph 9
Typical switching times vs. I_C
V_{CC} = 400 V, V_{GE} = 15 V, R_G = 10 Ω, T_{vj} = 150°C



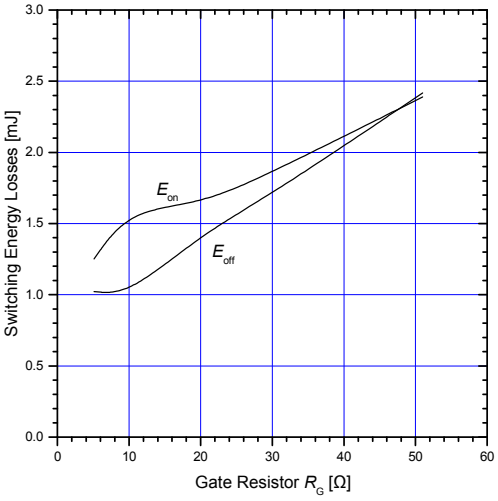
Graph 10
Typical switching times vs. R_G
V_{CC} = 400 V, V_{GE} = 15 V, I_C = 37.5 A, T_{vj} = 150°C



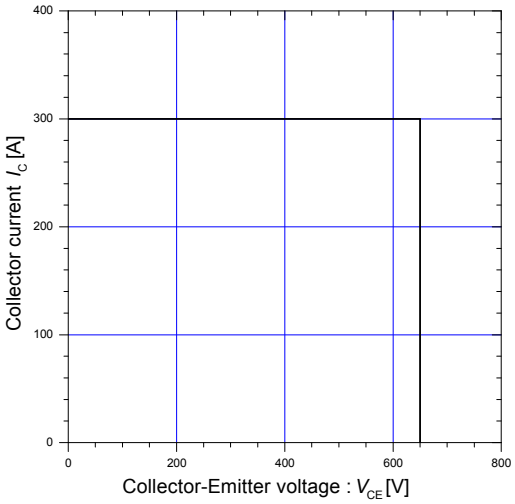
Graph 11
Typical switching losses vs. I_C
V_{CC} = 400 V, V_{GE} = 15 V, R_G = 10 Ω, T_{vj} = 150°C



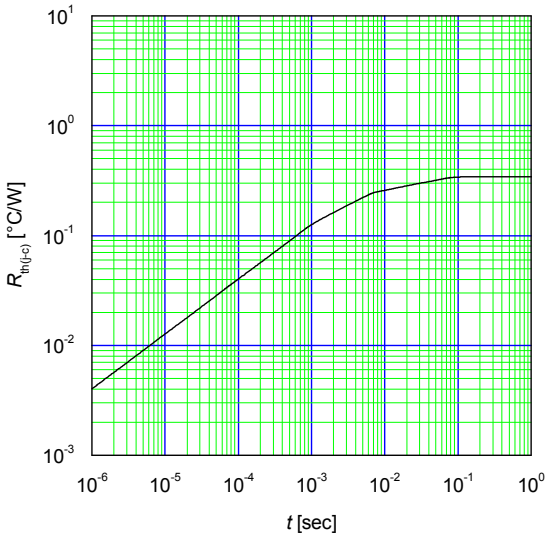
Graph 12
Typical switching losses vs. R_G
V_{CC} = 400 V, V_{GE} = 15 V, I_C = 37.5 A, T_{vj} = 150°C



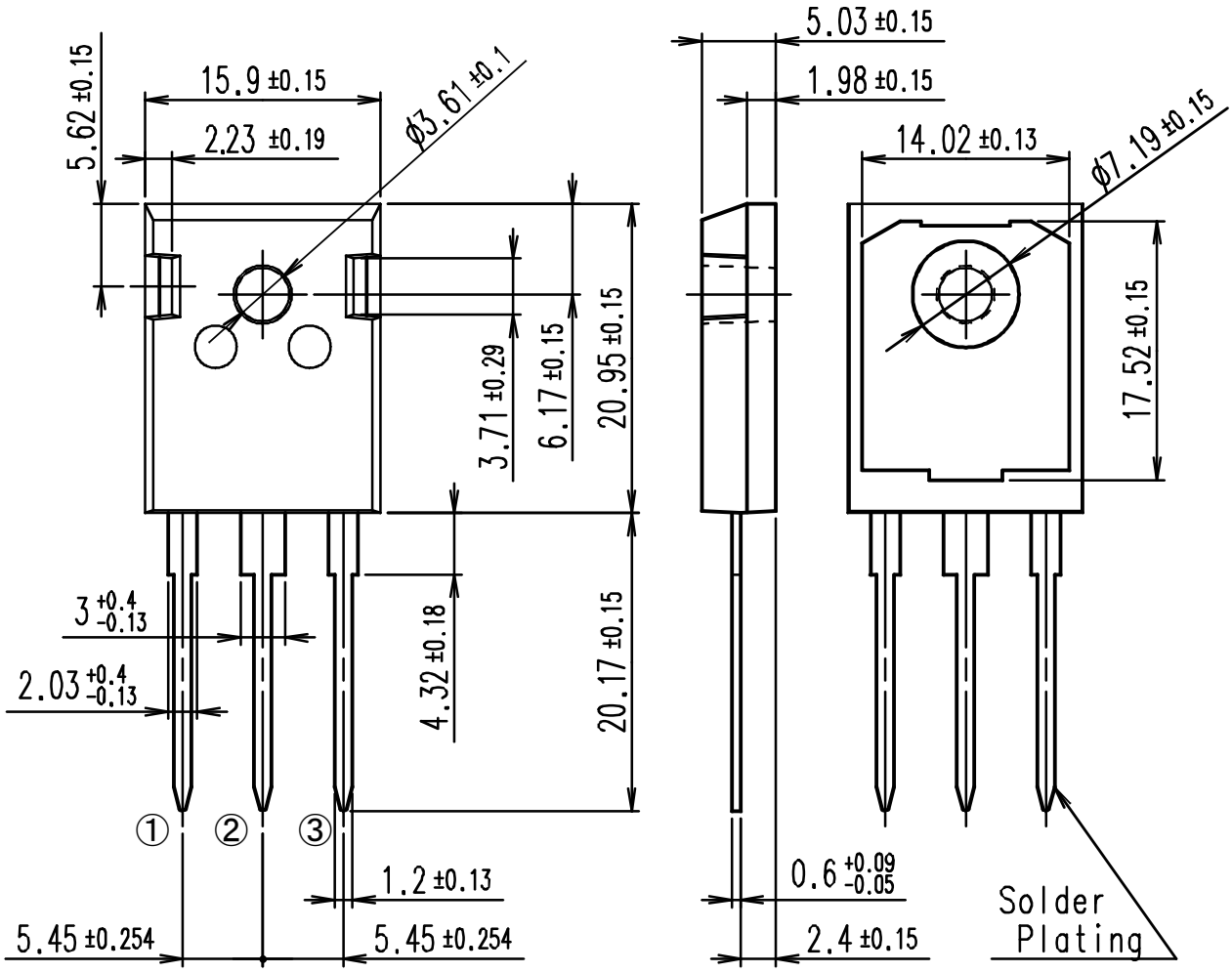
Graph 13
Reverse biased safe operating area
V_{GE} = 15 V / 0 V, R_G = 10 Ω, T_{vj} ≤ 175°C

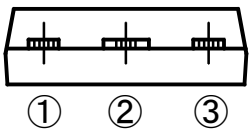


Graph 14
Transient Thermal Impedance
D = 0



Outline Drawings, mm





CONNECTION
① GATE
② COLLECTOR
③ EMITTER

DIMENSIONS ARE IN MILLIMETERS.

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