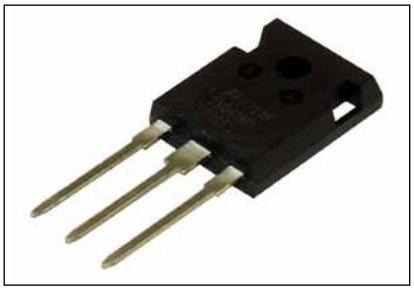
FGW85N60RB

Discrete IGBT

Reverse Blocking IGBT
600V / 85A

Features

Reverse blocking characteristic for 1 chip by Fuji's original technology.
High efficiency by applying to T-type 3 level inverter circuit.



Applications

Uninterruptible power supply
Power conditioner
Battery system

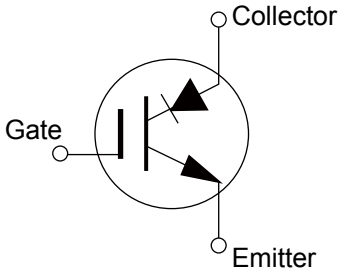
Maximum Ratings and Characteristics

● **Absolute Maximum Ratings at T_j=25°C (unless otherwise specified)**

Items	Symbols	Characteristics	Units	Remarks
Collector-Emitter Voltage	V_{CES}	600	V	
Repetitive Peak Reverse Voltage	V_{RRM}	600	V	
Gate-Emitter Voltage	V_{GES}	±20	V	
DC Collector Current	$I_{C@25}$	100	A	T_C=25°C,T_j=150°C Note *1
	$I_{C@100}$	85	A	T_C=100°C,T_j=150°C
Pulsed Collector Current	I_{CP}	170	A	Note *2
Turn-Off Safe Operating Area	-	170	A	V_{CE}≤600V,T_j≤150°C
Short Circuit Withstand Time	t_{SC}	10	μs	V_{CC}≤300V,V_{GE}=15V T_j≤150°C
IGBT Max. Power Dissipation	P_{D_IGBT}	600	W	T_C=25°C
Operating Junction Temperature	T_j	-40 ~ +150	°C	
Storage Temperature	T_{stg}	-55 ~ +150	°C	

Note *1 : Current value limited by bonding wire.
Note *2 : Pulse width limited by Tjmax.

Equivalent circuit



● **Electrical characteristics at T_j= 25°C (unless otherwise specified)**

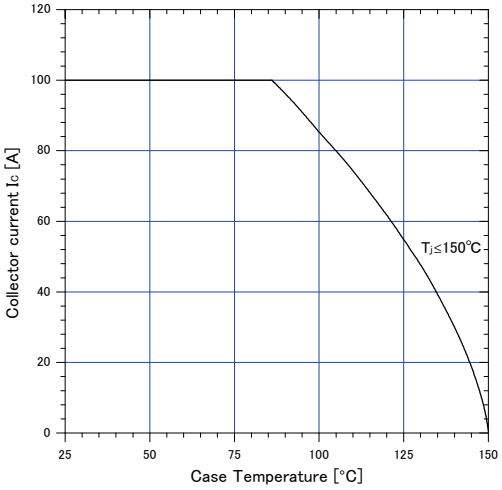
Description	Symbols	Conditions		Characteristics min.	typ.	max.	Units
Collector-Emitter Breakdown Voltage	$V_{(BR)CES}$	I_C = 1mA, V_{GE} = 0V		600	-	-	V
Zero Gate Voltage Collector Current	I_{CES}	V_{CE} = 600V, V_{GE} = 0V	T_j=25°C	-	-	250	μA
			T_j=150°C	-	-	10	mA
Gate-Emitter Leakage Current	I_{GES}	V_{CE} = 0V, V_{GE} = ±20V		-	-	200	nA
Gate-Emitter Threshold Voltage	$V_{GE\ (th)}$	V_{CE} = +20V, I_C = 85mA		5.5	6.5	7.5	V
Collector-Emitter Saturation Voltage	$V_{CE\ (sat)}$	V_{GE} = +15V, I_C = 85A	T_j=25°C	-	2.45	2.80	V
			T_j=150°C	-	2.95	-	
Input Capacitance	C_{ies}	V_{CE}=10V		-	5100	-	pF
Output Capacitance	C_{oes}	V_{GE}=0V		-	1150	-	
Reverse Transfer Capacitance	C_{res}	f=1MHz		-	740	-	
Gate Charge	Q_G	V_{CC} = 400V I_C = 85A V_{GE} = 15V		-	300	-	nC
Turn-On Delay Time	$t_{d(on)}$	T_j = 25°C		-	35	-	ns
Rise Time	t_r	V_{CC} = 400V		-	85	-	
Turn-Off Delay Time	$t_{d(off)}$	I_C = 85A		-	175	-	
Fall Time	t_f	V_{GE} = ±15V		-	64	-	
Turn-On Energy	E_{on}	R_G = 10Ω		-	4.7	-	mJ
Turn-Off Energy	E_{off}	L = 500μH Energy loss include “tail” and FWD (FDRW30S120J) reverse recovery.		-	2.4	-	
Turn-On Delay Time	$t_{d(on)}$	T_j = 150°C		-	30	-	ns
Rise Time	t_r	V_{CC} = 400V		-	125	-	
Turn-Off Delay Time	$t_{d(off)}$	I_C = 85A		-	185	-	
Fall Time	t_f	V_{GE} = ±15V		-	66	-	
Turn-On Energy	E_{on}	R_G = 10Ω		-	6.0	-	mJ
Turn-Off Energy	E_{off}	L = 500μH Energy loss include “tail” and FWD (FDRW30S120J) reverse recovery.		-	3.0	-	
Reverse Recovery Time	t_{rr}	V_{CC} = 400V I_C = 85A V_{GE} = ±15V R_G = 30Ω L = 500μH	T_j=25°C	-	165	-	ns
			T_j=150°C	-	330	-	

● Thermal Resistance

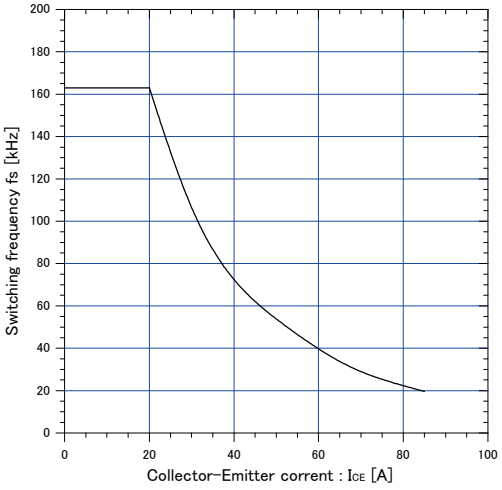
Description	Symbols	min.	typ.	max.	Units
Thermal Resistance, Junction-Ambient	$R_{th(j-a)}$	-	-	50	°C/W
Thermal Resistance, Junction to Case	$R_{th(j-c)}$	-	-	0.208	

■ Characteristics (Representative)

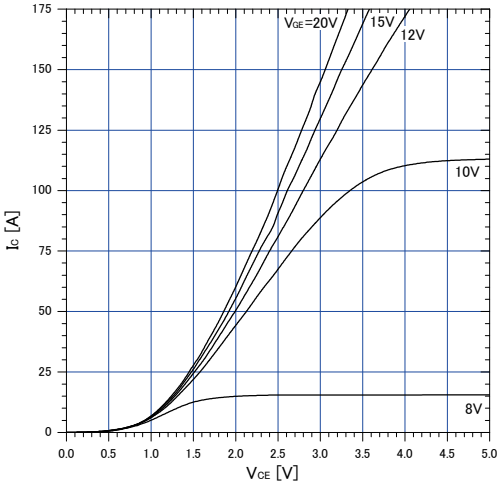
Graph.1
DC Collector Current vs T_C
V_{GE}≥+15V, T_j≤150°C



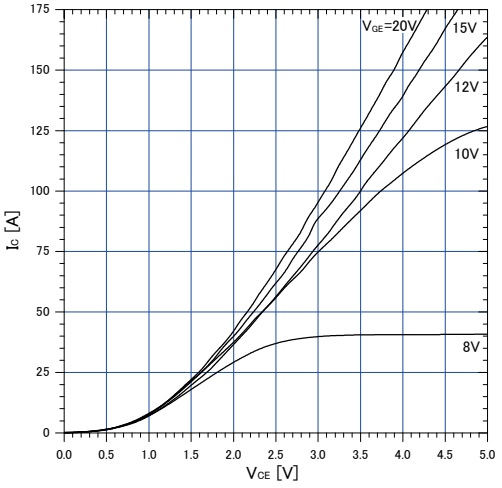
Graph.2
Collector Current vs. switching frequency
V_{GE}=+15V/-15V, T_C≤150°C, V_{CC}=400V,
D=0.5, R_G=10Ω, T_C=100°C



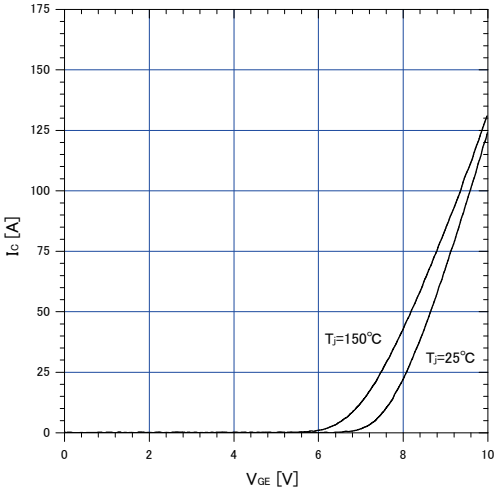
Graph.3
Typical Output Characteristics (V_{CE}-I_C)
T_j=25°C



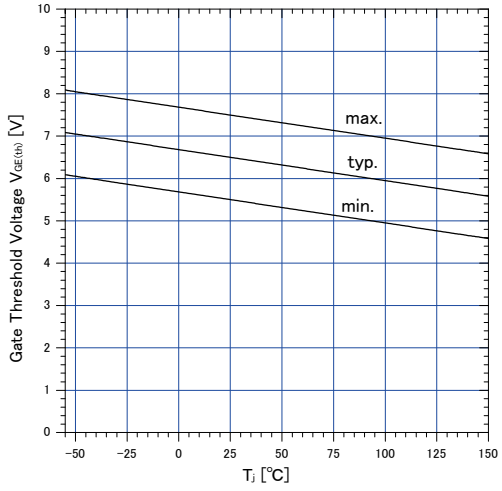
Graph.4
Typical Output Characteristics (V_{CE}-I_C)
T_j=150°C



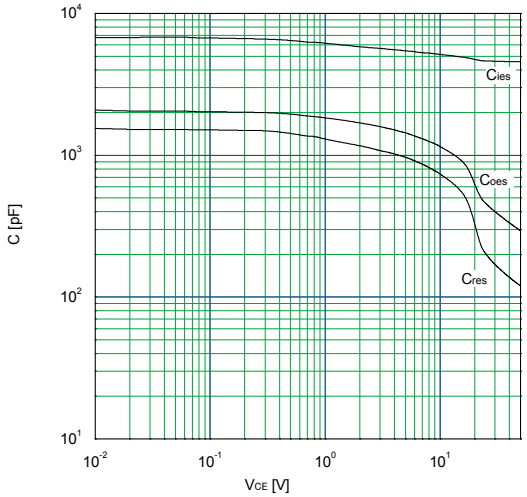
Graph.5
Typical Transfer Characteristics
V_{GE}=+15V



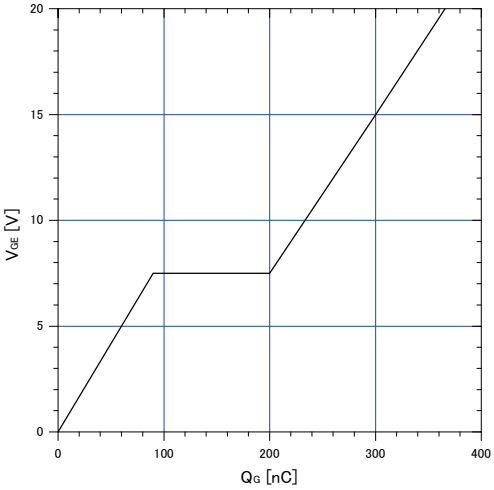
Graph.6
Gate Threshold Voltage vs. T_j
I_C=85mA, V_{CE}=20V



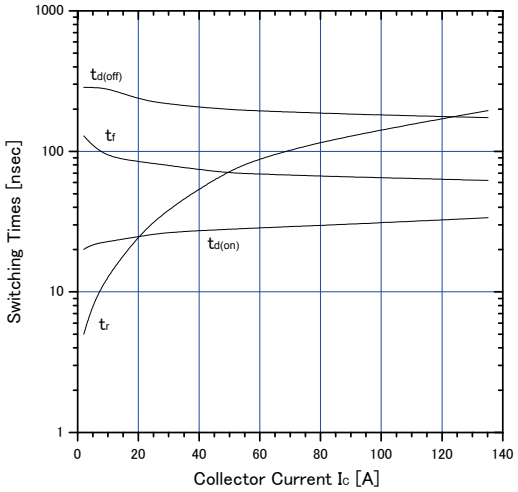
Graph.7
Typical Capacitance
V_{GE}=0V,f=1MHz,T_j=25°C



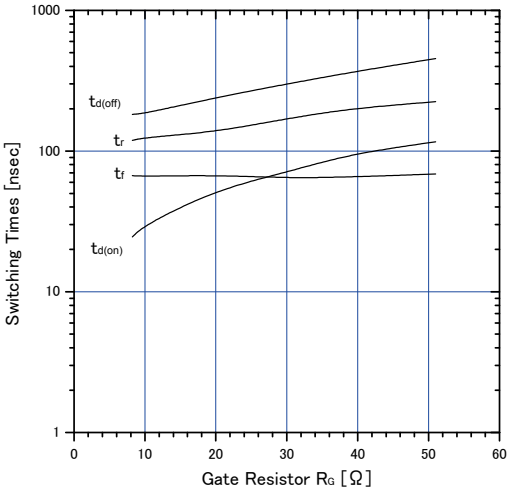
Graph.8
Typical Gate Charge
V_{CC}=400V,I_C=85A,T_j=25°C



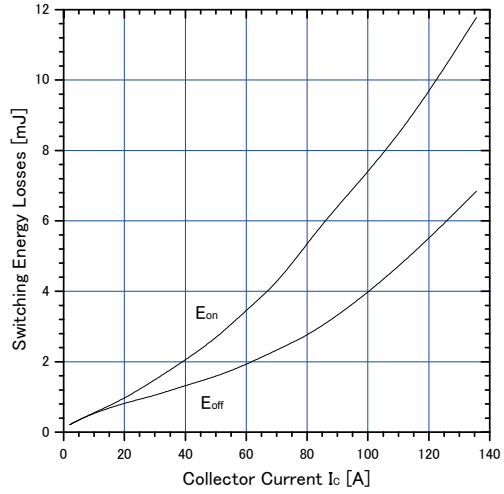
Graph.9
Typical switching time vs. I_C
T_j=150°C,V_{CC}=400V,L=500µH
V_{GE}=+15V/-15V,R_G=10Ω



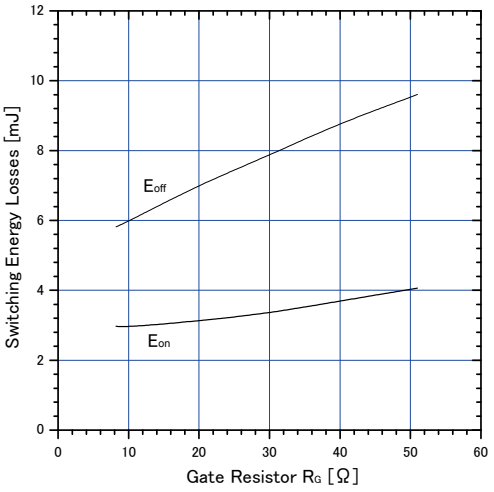
Graph.10
Typical switching time vs. R_G
T_j=150°C,V_{CC}=400V,I_C=85A,L=500µH
V_{GE}=+15/-15V



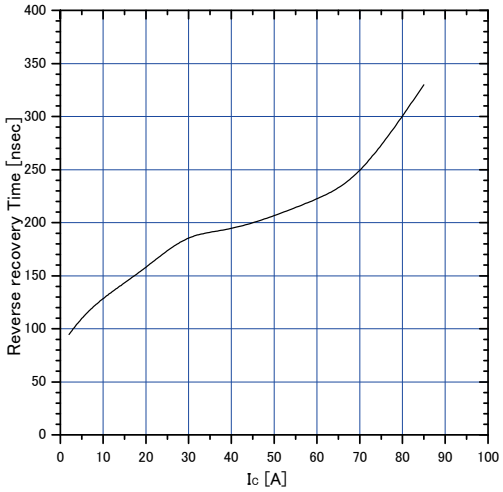
Graph.11
Typical switching losses vs. I_C
T_j=150°C,V_{CC}=400V,L=500µH
V_{GE}=+15V/-15V,R_G=10Ω



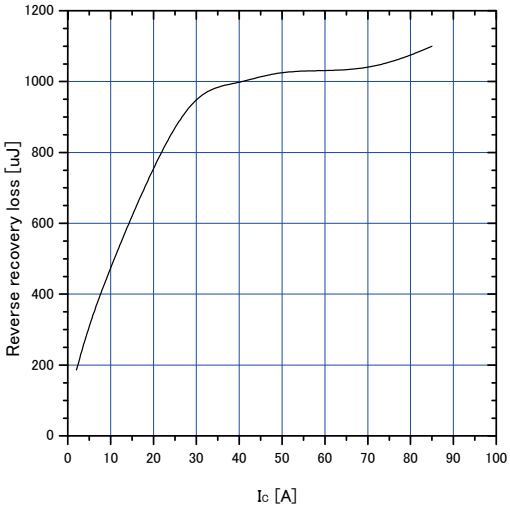
Graph.12
Typical switching losses vs. R_G
T_j=150°C,V_{CC}=400V,I_C=85A,L=500µH
V_{GE}=+15/-15V



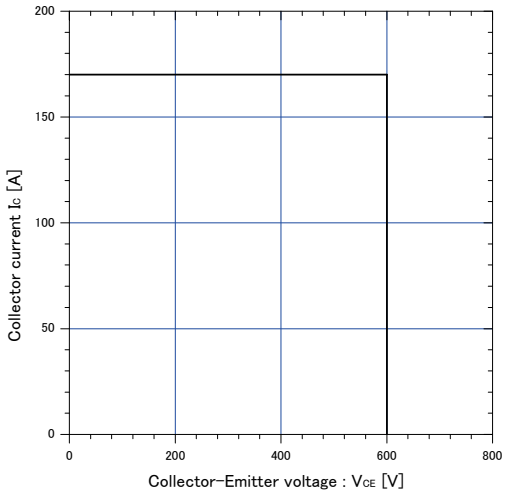
Graph.13
Typical reverse recovery time vs. I_C
T_j=150°C,V_{CC}=400V,L=500μH
V_{GE}=+15/-15V,R_G=30Ω



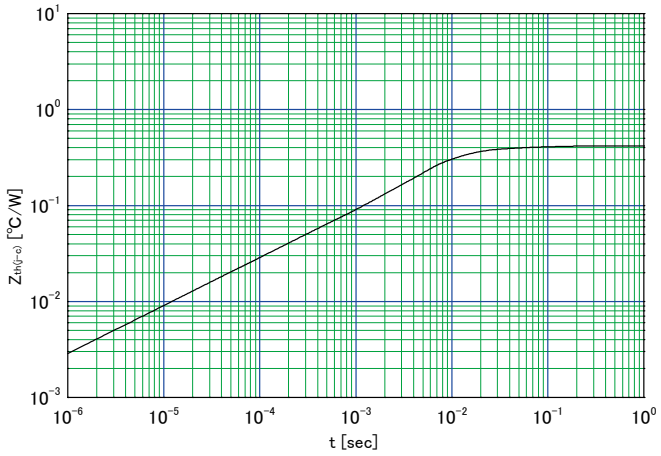
Graph.14
Typical reverse recovery loss vs. I_C
T_j=150°C,V_{CC}=400V,L=500μH
V_{GE}=+15/-15V,R_G=30Ω



Graph.15
Reverse biased Safe Operating Area
T_j ≤150°C,V_{GE}=+15V/0V,R_G=10Ω

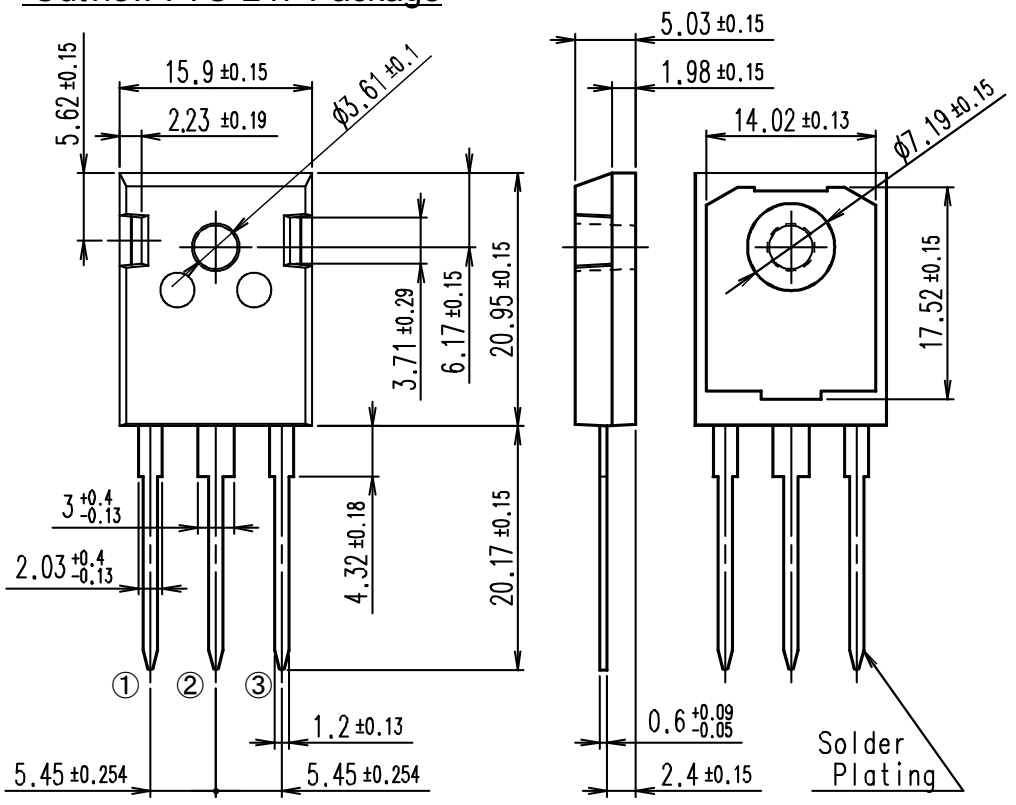


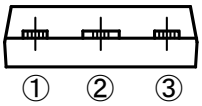
Graph.16
Transient thermal resistance



■ Outline Drawings, mm

Outview : TO-247 Package





CONNECTION
① GATE
② COLLECTOR
③ EMITTER

DIMENSIONS ARE IN MILLIMETERS.

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- Machine tools
- Audiovisual equipment
- Electrical home appliances
- Personal equipment
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- Safety devices
- Medical equipment

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