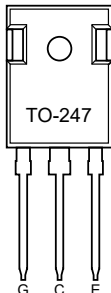
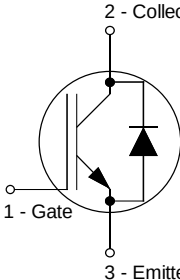


650V 75A Trench and Field Stop IGBT

Product Information

Features	Package Marking and Ordering Information	
◆ Advanced Field Stop technology ◆ Low Switching Power Loss ◆ Low Switching Surge and Noise ◆ Low EMI ◆ T_J 175°C	◆ Product Name:	KJG75N65P
	◆ Marking:	KJG75N65P
	◆ Package:	TO-247
	◆ Quantity:	300 pcs
	 TO-247 G C E  2 - Collector 1 - Gate 3 - Emitter	
Applications		
◆ Industrial UPS ◆ Welding Machine ◆ Solar Converters ◆ Energy Storage ◆ EV Charger		

Maximum Rated Values ($T_{vj}=25^{\circ}\text{C}$, unless otherwise specified)

Parameter	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CES}	650	V
Gate-Emitter Voltage	V_{GE}	± 20	V
Transient Gate-Emitter Voltage ($t_p \leq 10 \mu\text{s}$, $D < 0.01$)		± 30	
DC Collector Current, $T_C=25^{\circ}\text{C}$ (Limited by T_J max)	I_C	115	A
DC Collector Current, $T_C=100^{\circ}\text{C}$ (Limited by T_J max)		75	
Pulsed collector current (T_p limited by T_J max) ^[1]	I_{Cpuls}	300	
Diode Forward Current, $T_C=25^{\circ}\text{C}$ (T_p limited by T_J max)	I_F	115	
Diode Forward Current, $T_C=100^{\circ}\text{C}$ (T_p limited by T_J max)		75	
Turn-Off Safe Operating Area $V_{CE} \leq 650 \text{ V}$, $T_{vj} \leq 175^{\circ}\text{C}$, $t_p = 1 \mu\text{s}$	-	300	
IGBT Max. Power Dissipation	P_{D_IGBT}	420	W
FWD Max. Power Dissipation	P_{D_FRD}	375	
Operating Junction Temperature	T_{vj}	-40 to 175	$^{\circ}\text{C}$
Storage Temperature	T_{stg}	-55 to 175	

Thermal Characteristics

Parameter	Symbol	Min	Typ	Max	Unit
Thermal Resistance, Junction-Ambient	R_{thJA}	-	-	50	$^{\circ}\text{C/W}$
IGBT Thermal Resistance, Junction-Case	R_{thJC}	-	-	0.35	
Diode Thermal Resistance, Junction-Case	R_{thJCD}	-	-	0.4	

Electrical Characteristics (T_{VJ}=25°C, unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit	
Static Characteristics							
Collector-Emitter Breakdown Voltage	V _{(BR)CES}	V _{GE} =0 V, I _C =0.50 mA	650	-	-	V	
C-E Leakage Current	I _{CES}	V _{CE} =650 V, V _{GE} =0 V	-	-	200	μA	
G-E Leakage Current	I _{GES}	V _{CE} =0 V, V _{GE} =±20 V	-	-	±200	nA	
G-E Threshold Voltage	V _{GE(th)}	I _C =250 μA, V _{CE} =V _{GE}	5.0	5.8	6.6	V	
Collector-Emitter Saturation Voltage	V _{CE(sat)}	V _{GE} =15 V, I _C =75 A				V	
		T _{VJ} =25°C	-	1.80	2.25		
		T _{VJ} =175°C	-	2.50	-		
Diode Forward Voltage	V _F	V _{GE} =0 V, I _F =75 A					
		T _{vj} =25°C	-	1.5	3.0		
		T _{vj} =175°C	-	1.3	-		
Dynamic Characteristics							
Input Capacitance	C _{ies}	V _{CE} =25 V, V _{GE} =0 V, f=1 MHz	-	9600	-	pF	
Output Capacitance	C _{oes}		-	310	-		
Reverse Transfer Capacitance	C _{res}		-	100	-		
Gate Charge	Q _G	V _{CC} =520 V, I _C =75 A, V _{GE} =15 V	-	330	-	nC	
IGBT Switching Characteristics							
Turn-on Delay Time	t _{d(on)}	T _J =25°C, V _{CC} =400 V, I _C =75 A, V _{GE} =15 V, R _G =10 Ω, Inductive load	-	80	-	ns	
Rise Time	t _r		-	33	-		
Turn-off Delay Time	t _{d(off)}		-	150	-		
Fall Time	t _f		-	85	-		
Turn-on Energy	E _{on}	Inductive load	-	1.25	-	mJ	
Turn-off Energy	E _{off}		-	0.97	-		
Total Switching Energy	E _{ts}		-	2.22	-		
Turn-on Delay Time	t _{d(on)}	T _J =175°C, V _{CC} =400 V, I _C =75 A, V _{GE} =15 V, R _G =10 Ω, Inductive load	-	74	-	ns	
Rise Time	t _r		-	34	-		
Turn-off Delay Time	t _{d(off)}		-	160	-		
Fall Time	t _f		-	110	-		
Turn-on Energy	E _{on}		Inductive load	-	1.60	-	mJ
Turn-off Energy	E _{off}			-	1.30	-	
Total Switching Energy	E _{ts}			-	2.90	-	
Diode Characteristics							
Diode Reverse Recovery Time	t _{rr}	T _J =25°C, V _R =400 V, I _F =75 A, di _F /dt=500 A/μs	-	107	-	ns	
Diode Reverse Recovery Charge	Q _{rr}		-	1.1	-	μC	
Diode Peak Reverse Recovery Current	I _{rrm}		-	17.1	-	A	
Diode Reverse Recovery Time	t _{rr}	T _J =175°C, V _R =400 V, I _F =75 A, di _F /dt=500 A/μs	-	194	-	ns	
Diode Reverse Recovery Charge	Q _{rr}		-	5.2	-	μC	
Diode Peak Reverse Recovery Current	I _{rrm}		-	49.3	-	A	

Typical Electrical and Thermal Characteristics

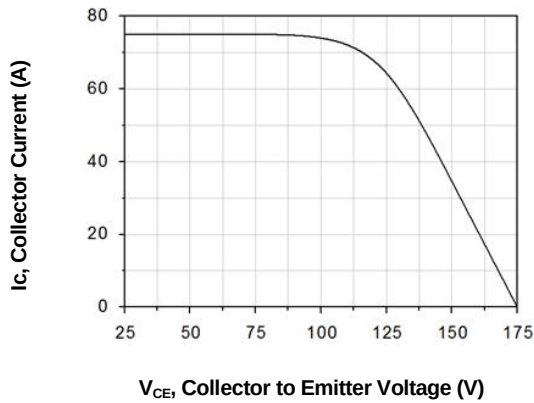


Figure 1. Collector current vs. case temperature ($V_{GE} \leq 15V$, $T_{vj} \leq 175^\circ C$)

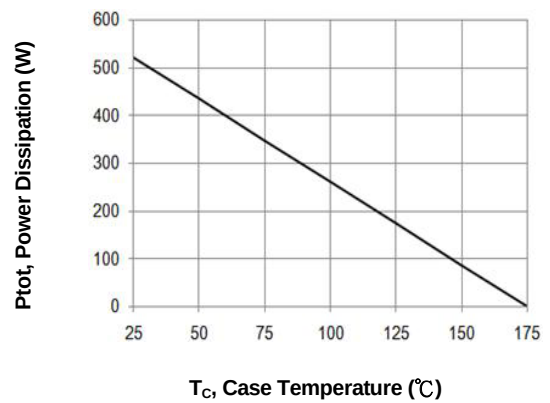


Figure 2. Power dissipation vs. case temperature ($T_{vj} \leq 175^\circ C$)

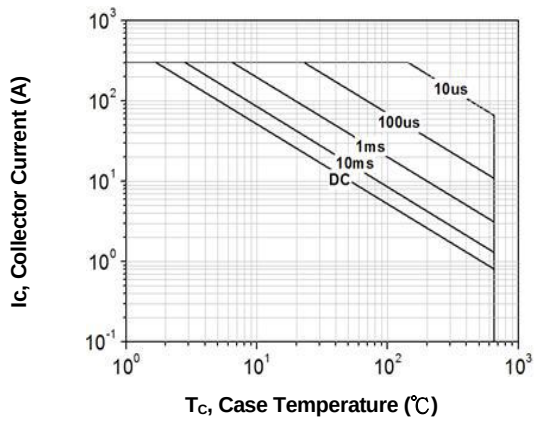


Figure 3. Forward bias safe operating area ($D=0$, $T_c=25^\circ C$, $T_{vj} \leq 175^\circ C$; $V_{GE}=15V$)

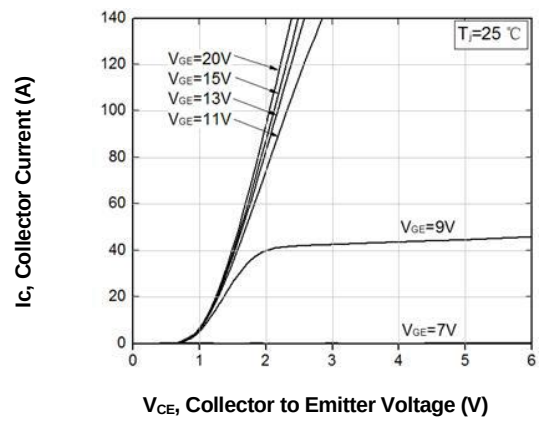


Figure 4. Typical output characteristic ($T_{vj}=25^\circ C$)

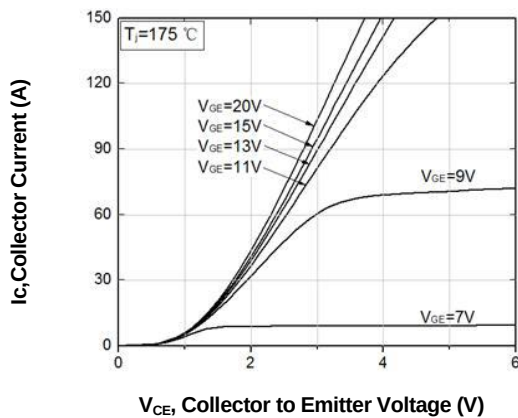


Figure 5. Typical output characteristic ($T_{vj}=175^\circ C$)

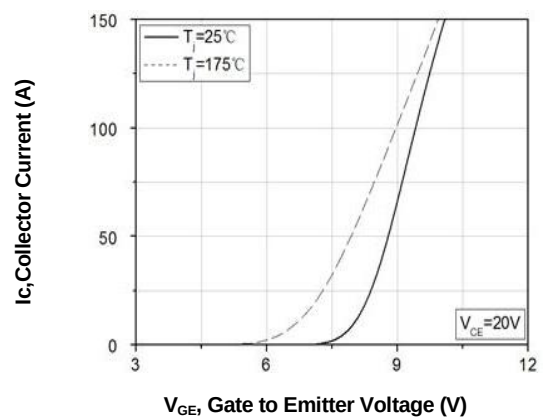


Figure 6. Typical transfer characteristic ($V_{CE}=20V$)

Typical Electrical and Thermal Characteristics (cont.)

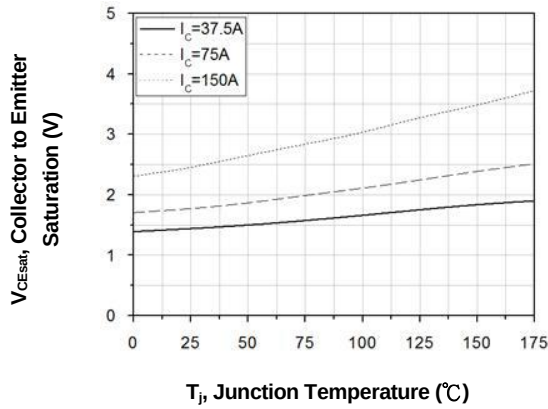


Figure 7. Typical collector-emitter saturation voltage vs. T_j ($V_{GE}=20V$)

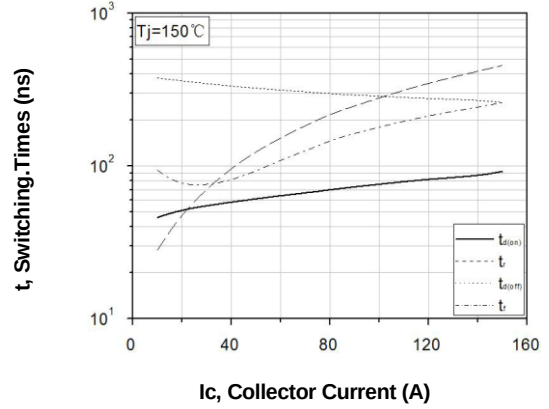


Figure 8. Typical switching times vs. collector current (Ind. load, $T_J=150^\circ C$, $V_{CE}=400V$, $V_{GE}=15/0V$, $R_g=12\Omega$)

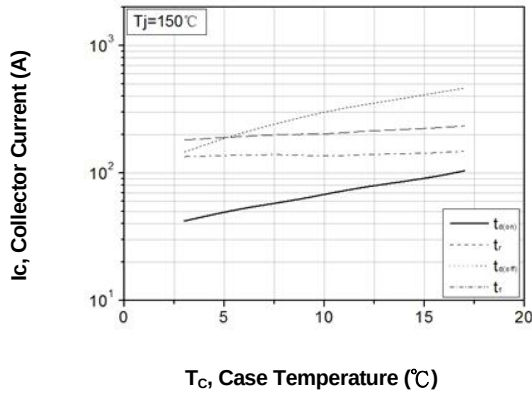


Figure 9. Typical switching times vs. gate resistor (Ind. Load, $T_J=150^\circ C$, $V_{CE}=400V$, $V_{GE}=15/0V$, $I_C=75A$)

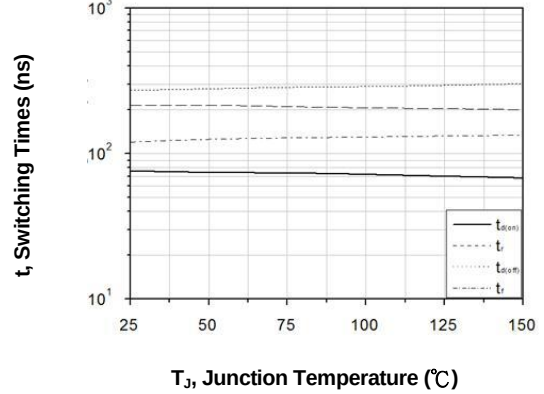


Figure 10. Typical switching times vs. T_j (Ind. Load, $V_{CE}=400V$, $V_{GE}=15/0V$, $I_C=75A$, $R_g=10\Omega$)

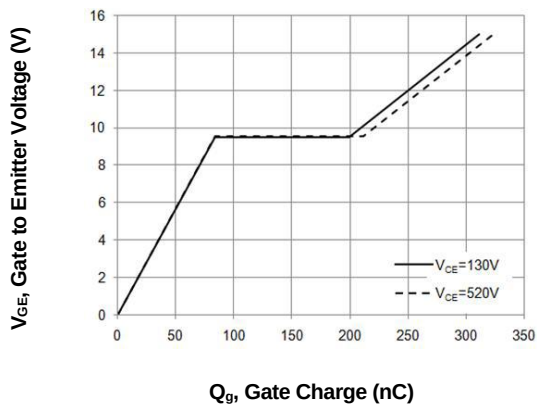


Figure 11. Typical gate charge ($I_C=75A$)

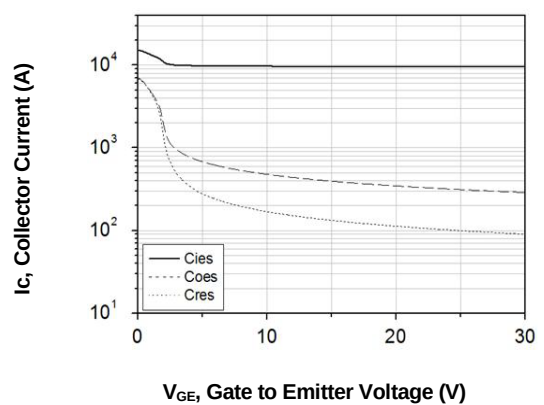


Figure 12. Typical capacitance vs. collector-emitter voltage ($V_{GE}=0V$, $f=1MHz$)

Typical Electrical and Thermal Characteristics (cont.)

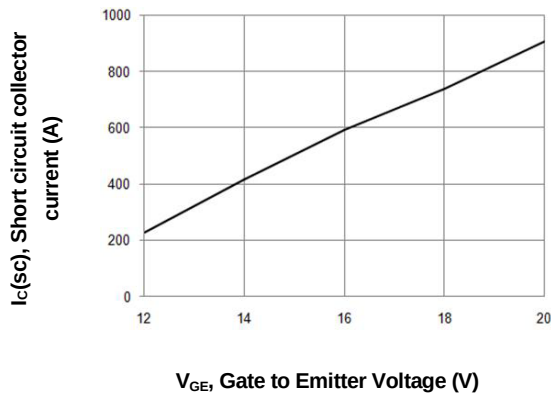


Figure 13. Typical short circuit collector current vs. gate-emitter voltage
($V_{CE} \leq 400V$ start at $T_{vj}=25^{\circ}C$)

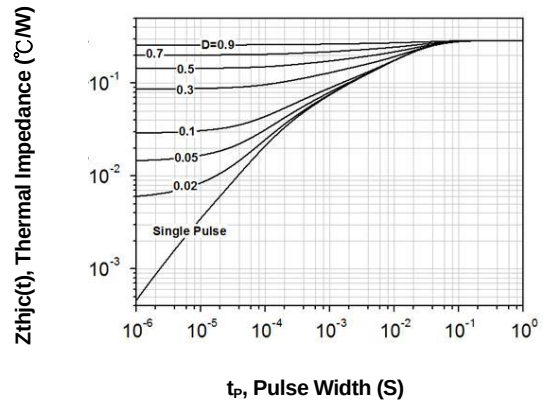


Figure 14. IGBT transient thermal impedance
($D=t_p/T$)

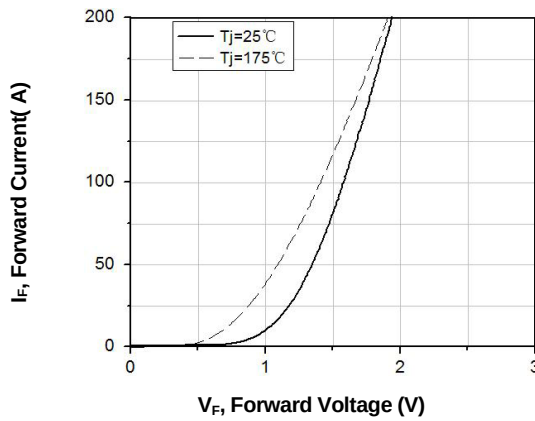


Figure 15. Typical diode forward current vs. forward voltage

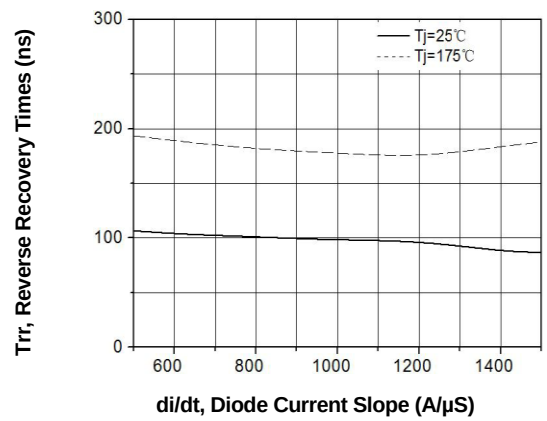


Figure 16. Typical reverse recovery time vs. diode current slope ($V_R=400V$)

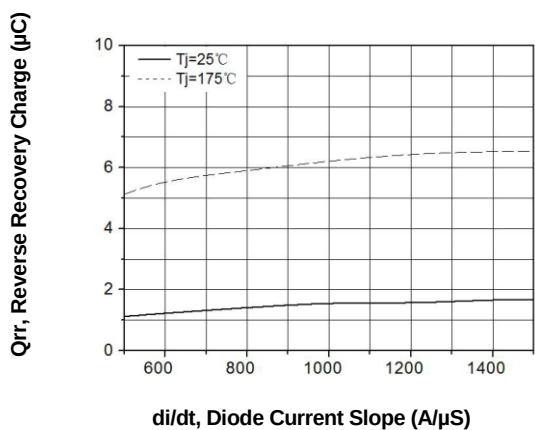


Figure 17. Typical reverse recovery charge vs. diode current slope ($V_R=400V$)

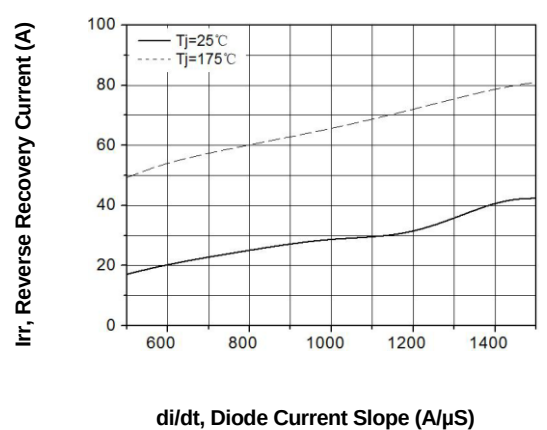
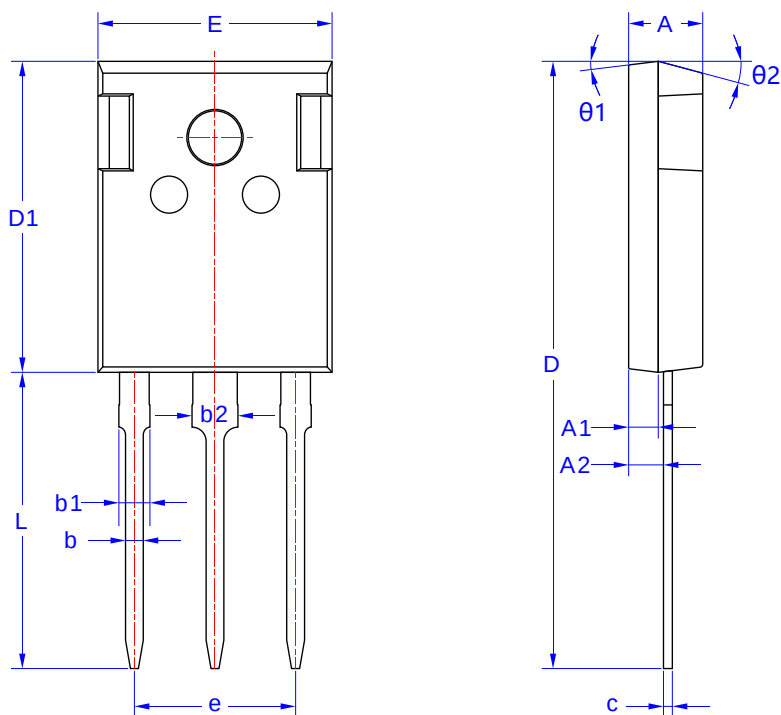


Figure 18. Typical reverse recovery current vs. diode current slope ($V_R=400V$)

Package Mechanical Data

TO-247 Package



Symbol	Dimensions in Millimeters		
	MIN.	NOM.	MAX.
A	4.90	5.00	5.10
A1	1.90	2.00	2.10
A2	2.25	2.35	2.45
b		1.20	
b1		2.10	
b2		3.10	
c		0.60	
D	40.00	41.00	42.00
D1	20.80	21.00	21.20
E	15.60	15.80	16.00
e		10.88	
L	19.80	20.00	20.20
θ1		7°	
θ2		15°	