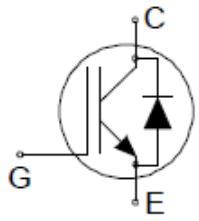
上海贝岭
SHANGHAI BELLING

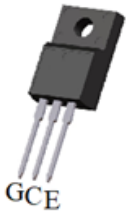
BLG15T65FUA

IGBT

1. Description

BLG15T65FUA is obtained by advanced Trench Field Stop (T-FS) technology which is characteristic with low $V_{CE(sat)}$, optimized switching performance and low gate charge Q_g. The IGBT is suitable device for BLDC, UPS, and high switching frequency applications.





TO220F

KEY CHARACTERISTICS

Parameter	Value	Unit
V_{CES}	650	V
I_C	15	A
$V_{CE(sat).typ}$	1.55	V

FEATURES

- Fast Switching
- Low $V_{CE(sat)}$
- Positive temperature coefficient
- Fast recovery anti-parallel diode
- RoHS product
- UL Certificate number(s): UL-US-2586456-0

APPLICATIONS

- BLDC
- UPS
- Motor drives
- Portable power

ORDERING INFORMATION

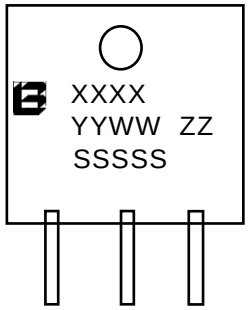
Device Marking	Ordering Codes	Package	Product Code	Packing
G15T65FUA	BLG15T65FUA-AD	TO220F	BLG15T65FUA	Tube

BLG15T65FUA-AD

(2) Package type

(1) Chip name

(1) BLG15T65FUA: 650V 15A
(2) AD:TO220F



XXXX：Device Marking

YYWW：Year & Week

ZZ：Assembly Code

SSSSS：Lot Code

2. ABSOLUTE RATINGS

Symbol	Parameter	TO220F	Units
V_{CES}	Collector-Emitter Voltage	650	V
I_C	Collector Current @T_C=25°C	30 (1)	A
	Collector Current @T_C=100°C	15 (1)	A
I_{CM}	Pulsed Collector Current, tp limited by T_{Jmax}	60	A
I_F	Diode Continuous Forward Current @T_C=25°C	15 (1)	A
	Diode Continuous Forward Current @T_C=100°C	7.5 (1)	A
I_{FM}	Diode Maximum Forward Current, limited by T_{Jmax}	30	A
V_{GES}	Gate-Emitter Voltage	±30	V
t_{SC}	Short circuit withstand time VGE=15V, VCC≤400V, Allowed number of short circuits<1000,Times between short circuits: ≥ 1.0s,T_J ≤ 150°C	3.0	μs
P_D	Power Dissipation @T_C=25°C	28	W
Viso	Insulation voltage withstand	3000	V
T_{VJ}	Operating Junction Temperature Range	-40 to 150	℃
T_{stg}	Storage Temperature Range	-55 to 150	℃
T_L	Maximum Temperature for Soldering	260	℃

1. Limited by maximum junction temperature.

3. Thermal characteristics

Symbol	Parameter	TO220F	Units
$R_{\theta JC}$	Junction-to-Case (IGBT)	4.4	℃/W
$R_{\theta JC}$	Junction-to-Case (Diode)	3.9	℃/W
$R_{\theta JA}$	Junction-to-Ambient	78	℃/W

4. Electrical Characteristics

at T_C = 25°C, unless otherwise specified

Static Characteristics

Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
V_{CES}	Collector-Emitter Breakdown Voltage	V_{GE} = 0V, I_C = 250μA	650	--	--	V

$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	V_{GE} = 15V, I_C = 15A T_J=25℃ T_J=100℃ T_J=150℃	-- -- --	1.55 1.75 1.95	1.95 -- --	V
$V_{GE(TH)}$	Gate Threshold Voltage	V_{CE} = V_{GE},I_C = 1mA	4.4	5.2	5.9	V
V_F	Diode Forward Voltage	I_F=8A T_J=25℃ T_J=100℃ T_J=150℃	-- -- --	2.00 1.70 1.60	2.60 -- --	V
I_{CES}	Collector-Emitter Leakage Current	V_{CE} = 650V, V_{GE} = 0V	--	--	15	μA
$I_{GES(F)}$	Gate-Emitter Forward Leakage Current	V_{GE} = +30V	--	--	200	nA
$I_{GES(R)}$	Gate-Emitter Reverse Leakage Current	V_{GE} = -30V	--	--	-200	nA
Pulse width tp≤300μs, δ≤2%						

Dynamic Characteristics

Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
C_{ies}	Input Capacitance	V_{GE}=0V V_{CE}=25V f =1.0MHz	--	905	--	pF
C_{oes}	Output Capacitance		--	41	--	
C_{res}	Reverse Transfer Capacitance		--	9	--	
Q_G	Gate charge	Vcc=520V I_{CE}=15A V_{GE}=15V	--	38	--	nC
Q_{GE}	Gate-emitter charge		--	12	--	
Q_{GC}	Gate-collector charge		--	12	--	
$I_{C(SC)}$	Short circuit collector current Max.1000 short circuits, Times between short circuits: ≥ 1.0s	V_{GE}=15.0V,V_{CC}≤400V， t_{SC}≤3us，T_J≤150℃		90		A

IGBT Switching Characteristics, at T_J=25℃

Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
$t_{d(on)}$	Turn-on Delay Time	I_C =15A V_{CE} = 400V V_{GE} = 15V R_G =5Ω T_J=25°C Inductive Load Energy losses include collector	--	10	--	ns
tr	Rise Time		--	15	--	
$t_{d(off)}$	Turn-Off Delay Time		--	234	--	
t_f	Fall Time		--	17	--	
E_{on}	Turn-On Switching Loss		--	0.25	--	mJ

E_{off}	Turn-Off Switching Loss	current tail and diode reverse recovery	--	0.20	--	
E_{ts}	Total Switching Loss		--	0.45	--	

IGBT Switching Characteristics, at T_J=150℃

Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
$t_{d(on)}$	Turn-on Delay Time	I_C =15A V_{CE} = 400V V_{GE} = 15V R_G =5Ω T_J=150°C Inductive Load Energy losses include collector current tail and diode reverse recovery	--	11	--	ns
tr	Rise Time		--	13	--	
$t_{d(off)}$	Turn-Off Delay Time		--	259	--	
t_f	Fall Time		--	66	--	
E_{on}	Turn-On Switching Loss		--	0.39	--	mJ
E_{off}	Turn-Off Switching Loss		--	0.27	--	
E_{ts}	Total Switching Loss		--	0.66	--	

Diode Characteristics, at T_J=25℃

Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
T_{rr}	Reverse Recovery Time	I_F=8A, di/dt=200A/μs, T_J=25°C	--	68	--	ns
Q_{rr}	Reverse Recovery Charge		--	198	--	nC
I_{rrm}	Reverse Recovery Current		--	5.0	--	A
T_{rr}	Reverse Recovery Time	I_F=15A, di/dt=200A/μs, T_J=25°C	--	72	--	ns
Q_{rr}	Reverse Recovery Charge		--	214	--	nC
I_{rrm}	Reverse Recovery Current		--	5.2	--	A

Diode Characteristics, at T_J=150℃

Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
T_{rr}	Reverse Recovery Time	I_F=8A, di/dt=200A/μs, T_J=150°C	--	161	--	ns
Q_{rr}	Reverse Recovery Charge		--	609	--	nC
I_{rrm}	Reverse Recovery Current		--	7.0	--	A
T_{rr}	Reverse Recovery Time	I_F=15A, di/dt=200A/μs, T_J=150°C	--	221	--	ns
Q_{rr}	Reverse Recovery Charge		--	866	--	nC
I_{rrm}	Reverse Recovery Current		--	7.8	--	A

5. Characteristics Curves

Figure 1. Forward Bias Safe Operating Area for TO220F

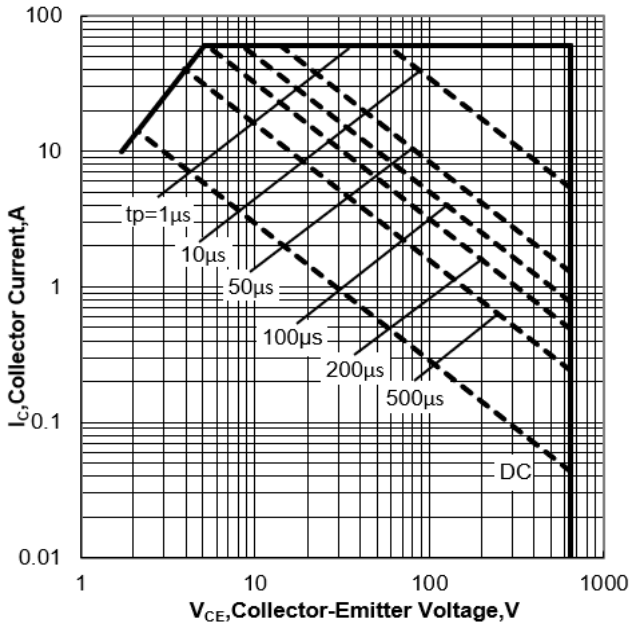


Figure 2. Power Dissipation vs Case Temperature for TO220F

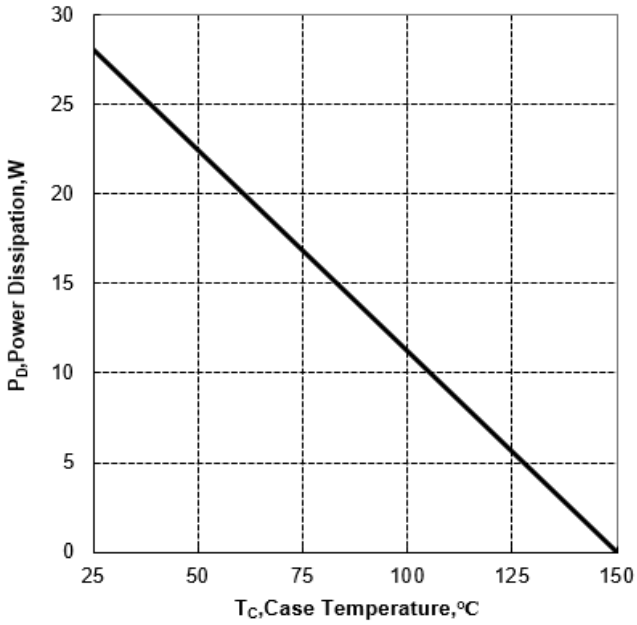


Figure 3. Collector Current vs Case Temperature for TO220F

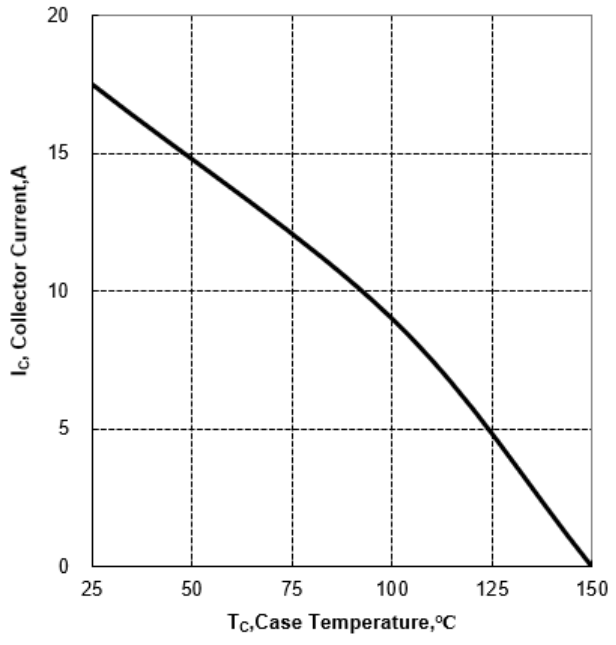


Figure 4. Typical Transfer Characteristics

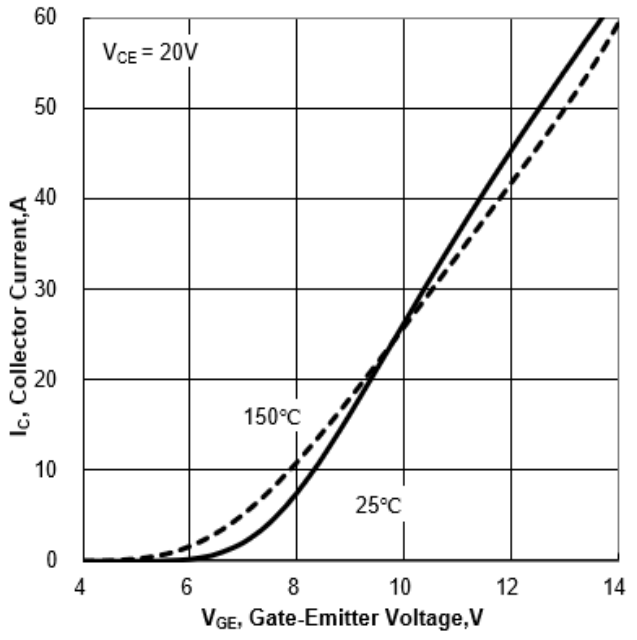


Figure 5. Output Characteristics(T_J=25℃)

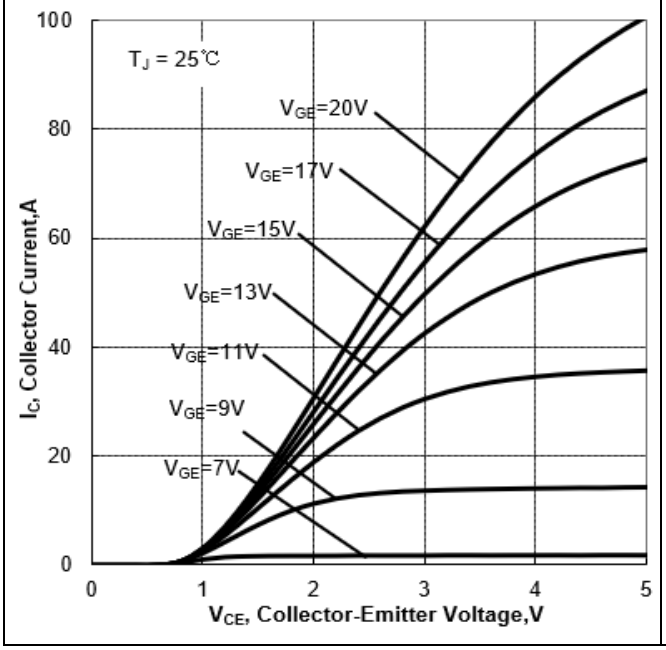


Figure 6. Output Characteristics(T_J=150℃)

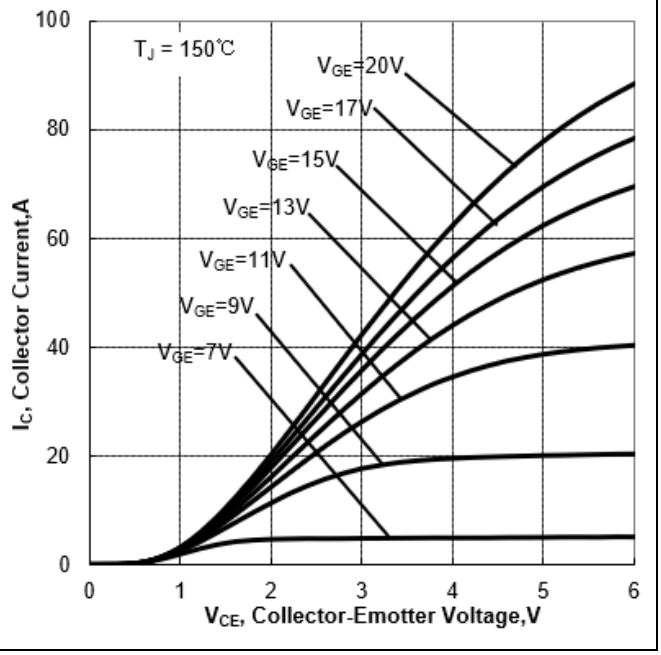


Figure 7. Collector-Emitter Saturation Voltage vs Junction Temperature(V_{GE}=15V)

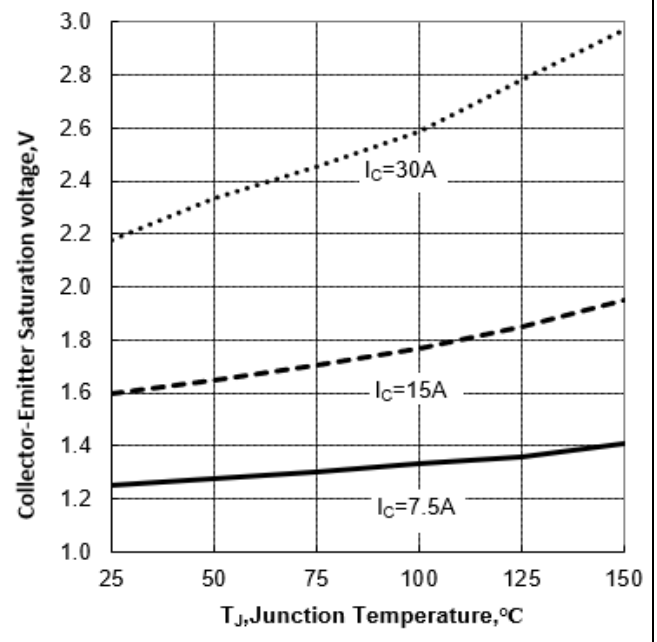


Figure 8. Typical Gate-Emitter Threshold Voltage vs Junction Temperature

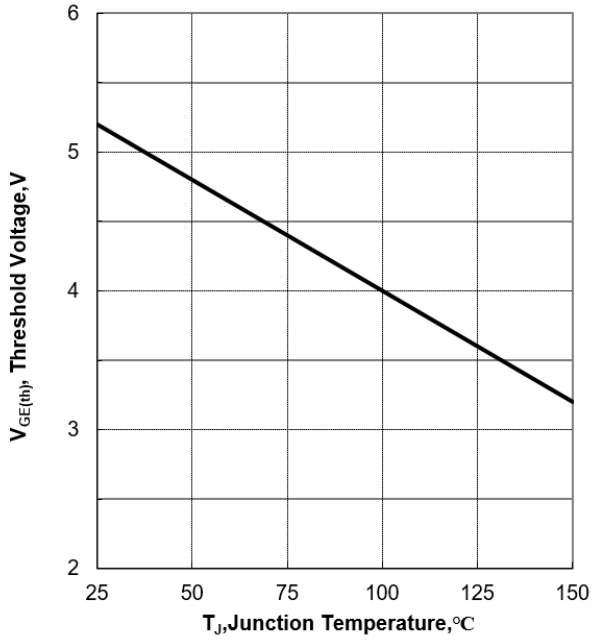


Figure 9. Typical Diode Forward Current vs Forward Voltage

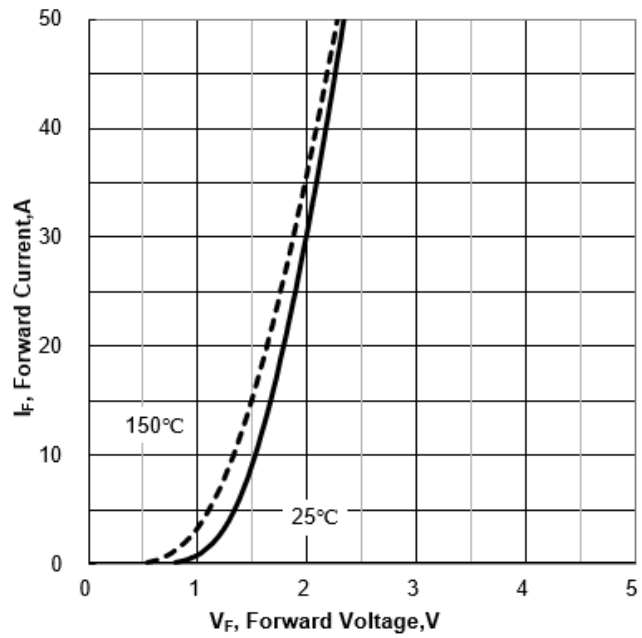


Figure 10. Typical Switching Times vs Gate Resistor(T_J=25℃,V_{CE}=400V,V_{GE}=15/0V,Ic=15A)

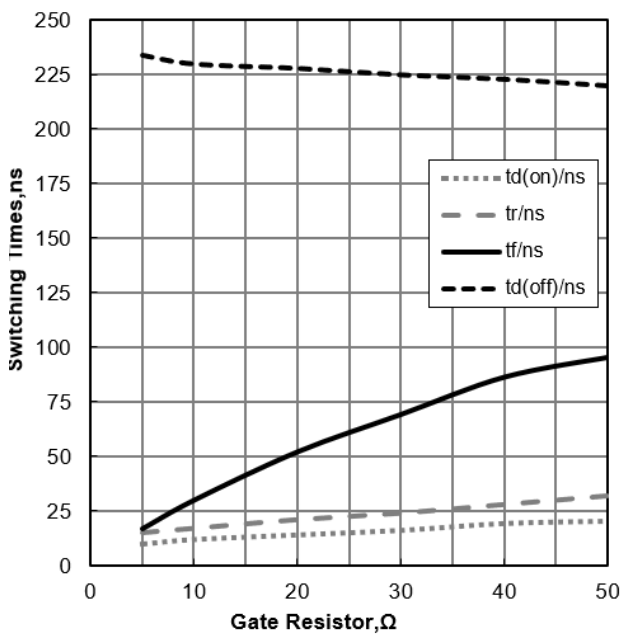


Figure 11. Typical Switching Energy vs Gate Resistor (T_J=25℃, V_{CE}=400V, V_{GE}=15/0V)

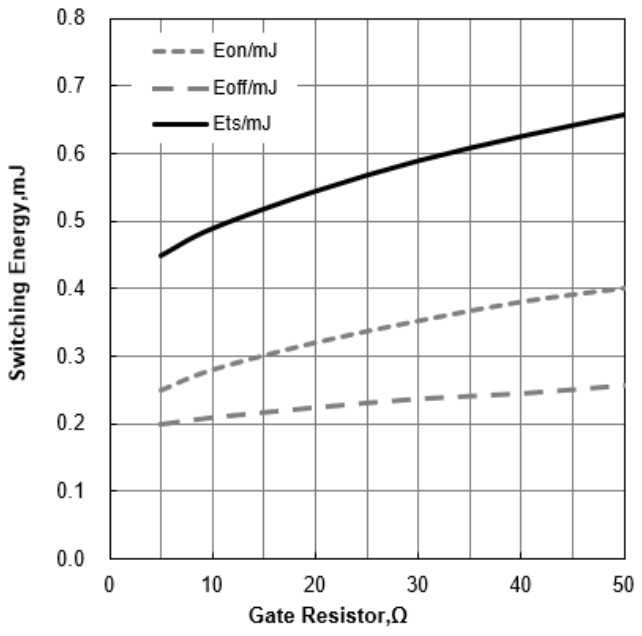


Figure 12. Typical Switching Times vs Junction Temperature(V_{CE}=400V,V_{GE}=15/0V,Ic=15A)

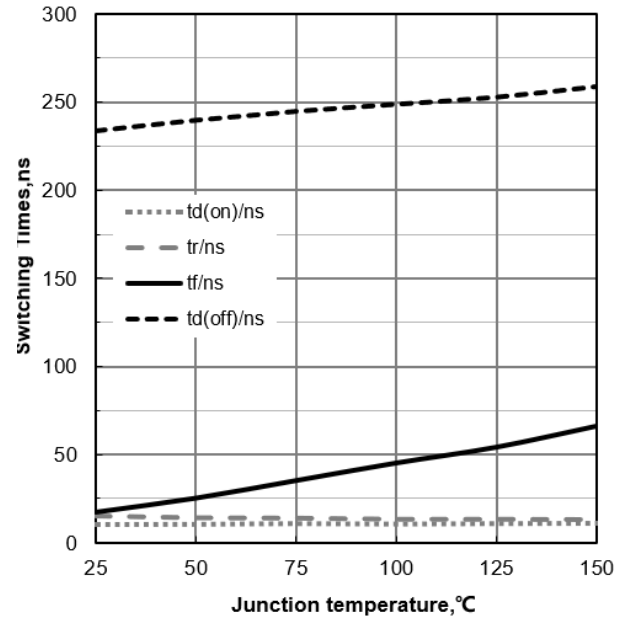


Figure 13. Typical Switching Energy vs Junction Temperature(V_{CE}=400V,V_{GE}=15/0V,Ic=15A)

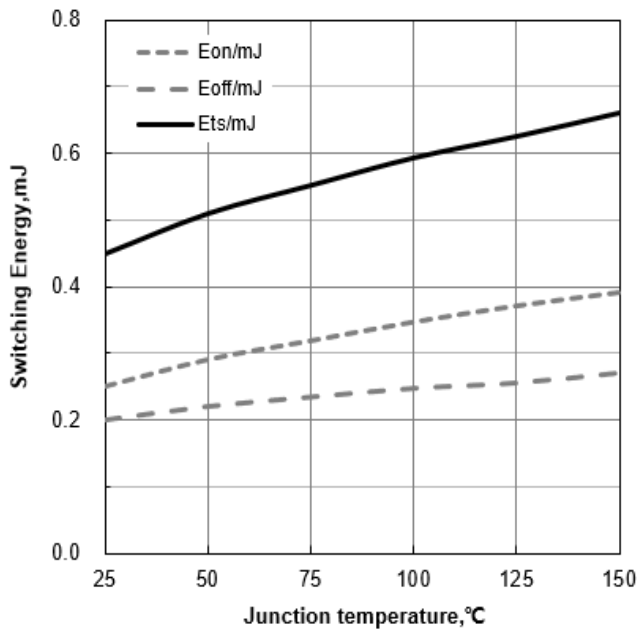


Figure 14. Typical Switching Times vs Collector Current(T_J=25℃,V_{CE}=400V,V_{GE}=15/0V)

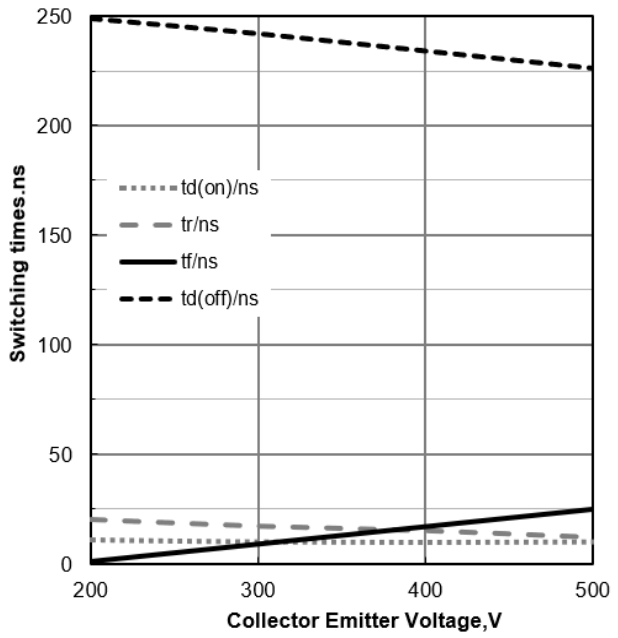


Figure 15. Typical Switching Energy vs Collector Current(T_J=25℃,V_{CE}=400V,V_{GE}=15/0V)

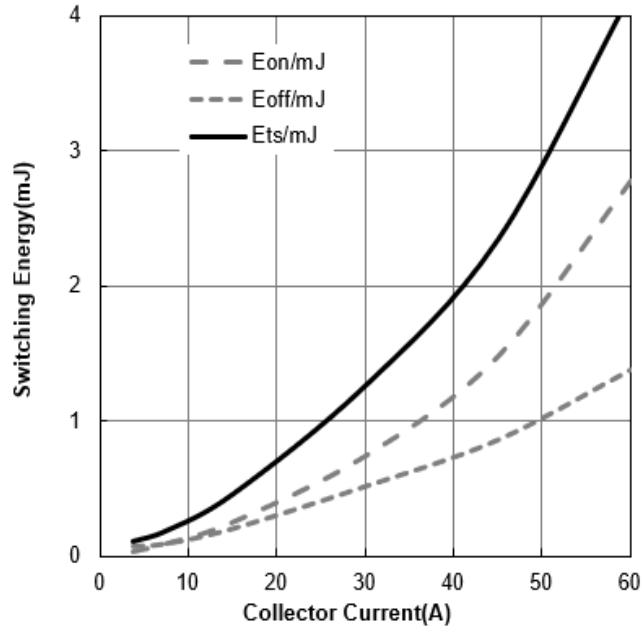


Figure 16. Typical Switching Times vs Collector Emitter Voltage (T_J=25℃,V_{GE}=15/0V, I_C=15A)

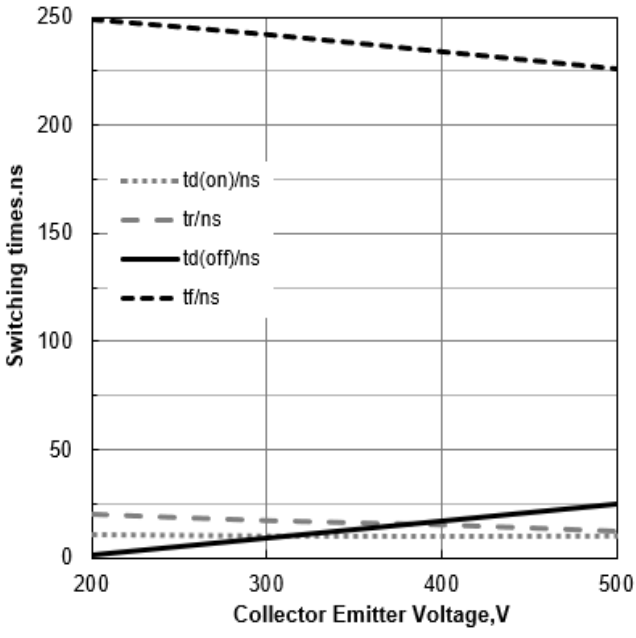


Figure 17. Typical Switching Energy vs Collector Emitter Voltage (T_J=25℃,V_{GE}=15/0V, I_C=15A)

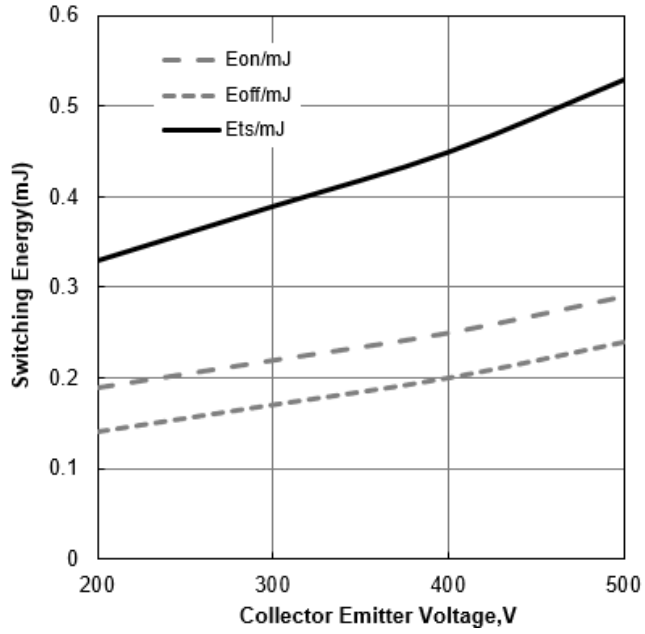


Figure 18. Gate Charge Characteristics

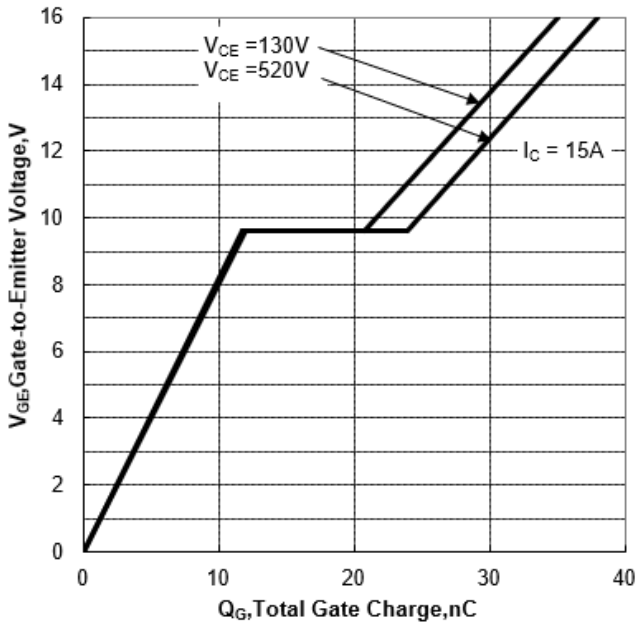


Figure 19. Typical Capacitance vs Collector-Emitter Voltage

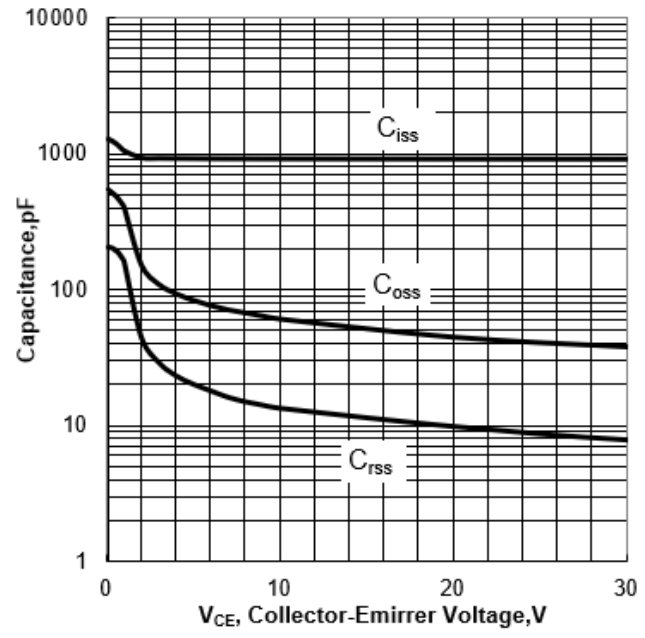


Figure 20. IGBT Transient Thermal Impedance vs Pulse Width for TO220F

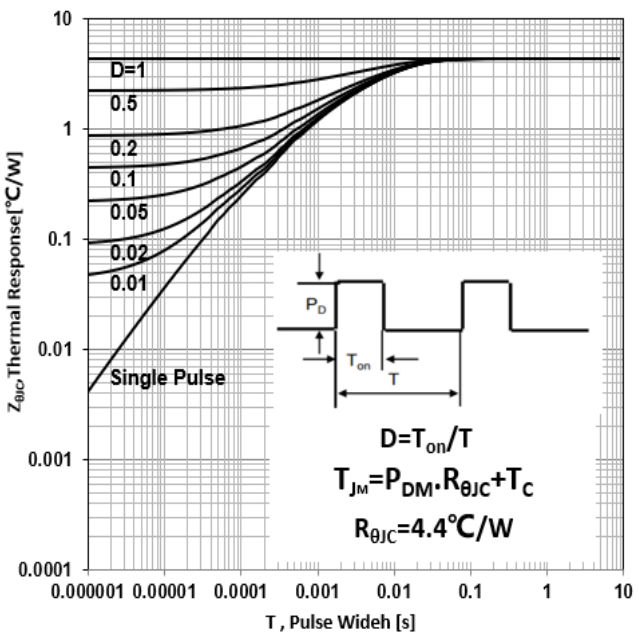
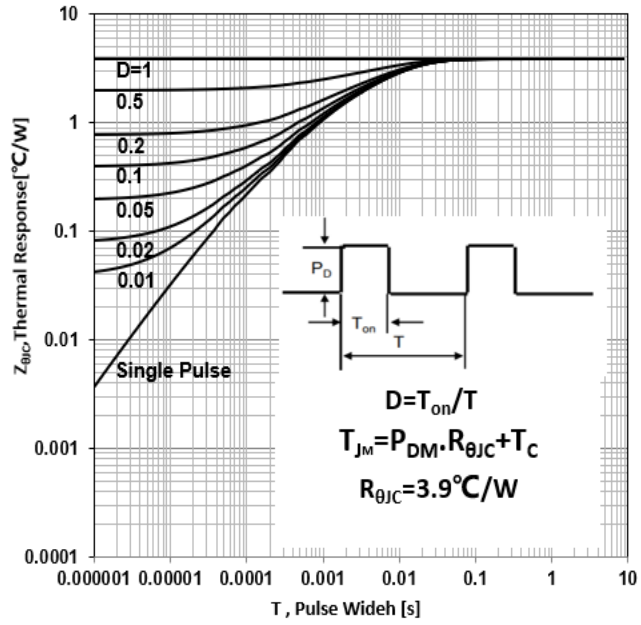


Figure 21. Diode Transient Thermal Impedance vs Pulse Width for TO220F



6. Test Circuit and Waveform

Figure 1. Inductive Switching Test Circuit

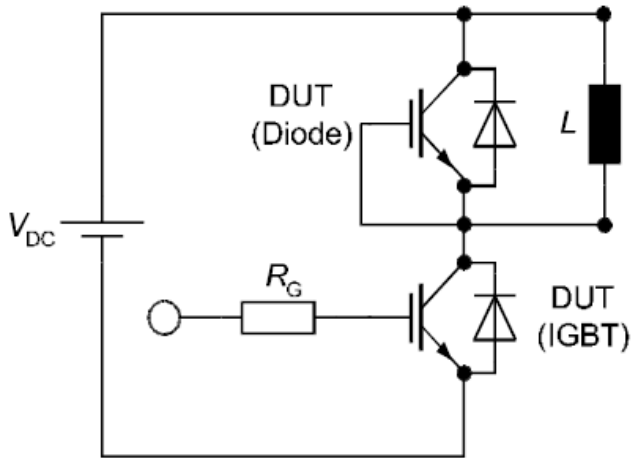


Figure 2. Definition of switching times

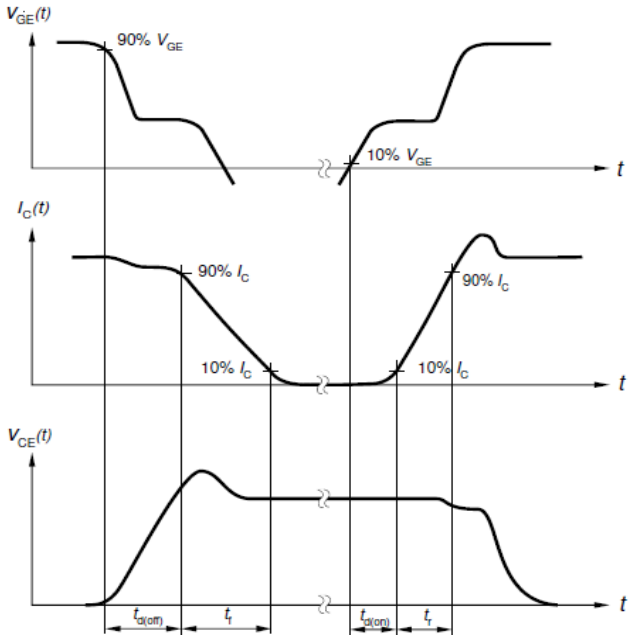


Figure 3. Definition of switching losses

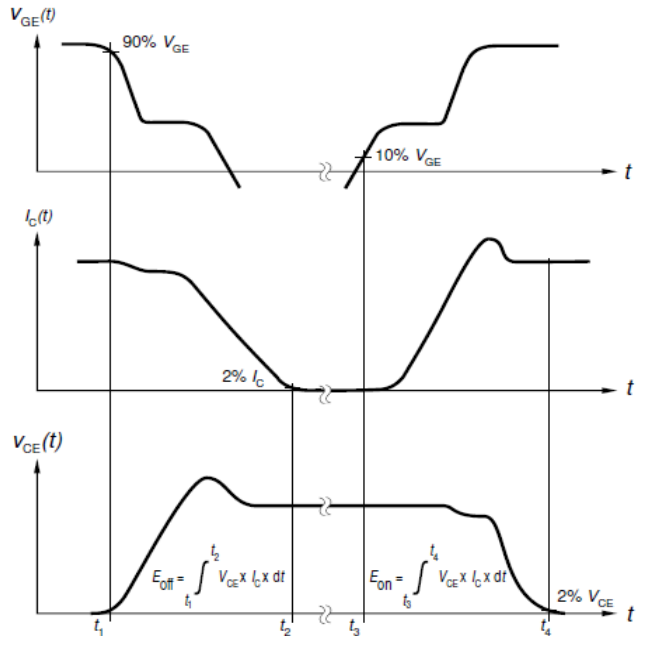
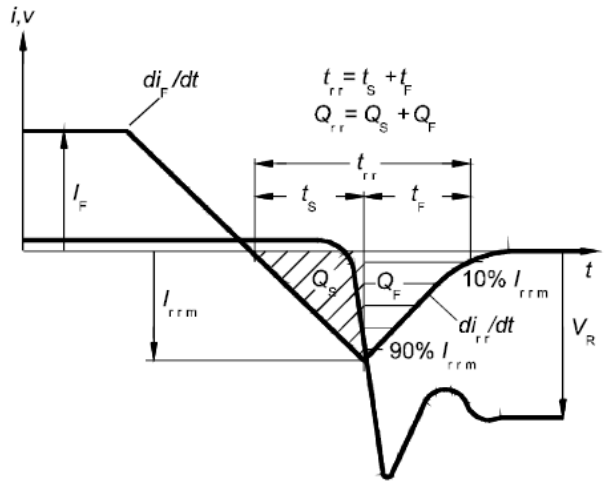
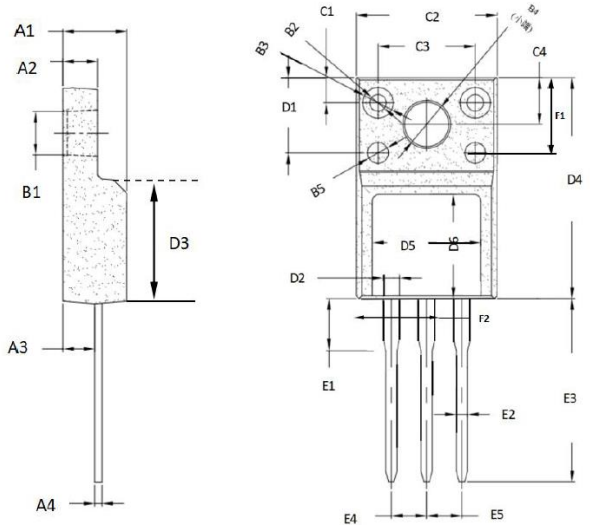


Figure 4. Definition of diode switching characteristics

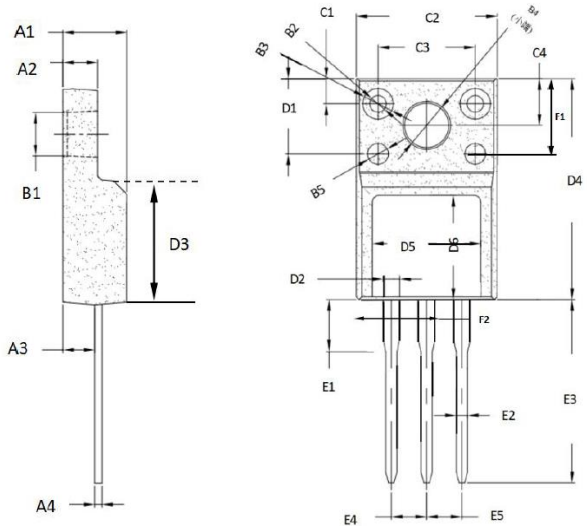


7. Package Description



TO220F Package

Items	Values(mm)	
	MIN	MAX
A1	4.55	4.75
A2	2.49	2.59
A3	2.25	2.45
A4	0.45	0.55
B1	3.13	3.23
B2	1.20	1.30
B3	2.15	2.25
B4	3.13	3.23
C1	1.70	1.80
C2	10.09	10.19
C3	6.95	7.10
C4	3.20	3.60
D1	5.30	5.50
D2	1.25	1.40
D3	9.00	9.38
D4	15.77	15.97
D5	7.77	7.97
D6	7.25	7.45



TO220F Package

Items	Values(mm)	
	MIN	MAX
E1	3.30	3.70
E2	0.75	0.85
E3	13.00	13.20
E4	2.44	2.64
F1	6.48	6.92
F2	6.18	6.42

NOTE:

1. Exceeding the maximum ratings of the device in performance may cause damage to the device, even the permanent failure, which may affect the dependability of the machine. Please do not exceed the absolute maximum ratings of the device when circuit designing.
2. When installing the heat sink, please pay attention to the torsional moment and the smoothness of the heat sink.
3. IGBTs is the device which is sensitive to the static electricity, it is necessary to protect the device from being damaged by the static electricity when using it.
4. Shanghai Belling reserves the right to make changes in this specification sheet and is subject to change without prior notice.

CONTACT:

上海贝岭股份有限公司

地址：上海市宜山路 810 号

邮编：200233

联系方式：https://www.belling.com.cn/contact.html

Revision History:

Revision	Date	Revision Date Subjects (major changes since last revision)
8.0	2023-11-17	(1)Product Code (2)CONTACT
9.0	2024-07-15	(1)Add a note
10.0	2025-03-25	(1)Add Low Operating Junction Temperature
11.0	2025-10-15	(1) Add UL Certificate number(s): UL-US-2586456-0 (2) Add Insulation voltage withstand
12.9	2025-11-11	(1) Update package dimensions