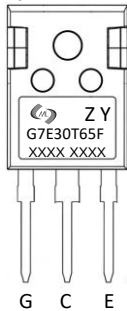


Features

- IGBT CHIP(Trench+Field Stop technology)
- Low Vcesat(typ) 1.6V@IC=30A
- Maximum junction temperature 175°C
- Low gate charge Qg
- RoHS compliant

Application

- DC-AC inverters
- Motion/servo control
- UPS systems



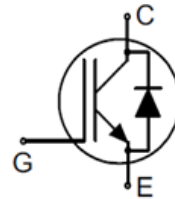
G7E30T65F : Device code
 XXXXXXXX : Code

Product Summary

V_{CE}	$I_C (T_J=100^\circ\text{C})$	$V_{CE(sat)}$
650V	30A	1.6V



TO-247 top view



Schematic diagram



Halogen-Free

Marking and pin assignment

Absolute Maximum Ratings (TC=25 °C unless otherwise noted)				
Symbol	Parameter		Rating	Unit
Common Ratings (TC=25 °C Unless Otherwise Noted)				
IGBT , Inverter				
V _{CES}	Collector Emitter Voltage	T _J =25 °C	650	V
V _{GES}	Gate Emitter Voltage		±30	V
I _C	DC Collector Current	Tc=25 °C	60	A
		Tc=100 °C, T _{Jmax} =175 °C	30	A
I _{CRM}	Pulsed Collector Current, Limited by T _{vJmax}	tp=1ms	120	A
P _D	Power Dissipation	Tc=25 °C	235	W
		Tc=100 °C	117	W
Diode , Inverter				
V _{RRM}	Repetitive Reverse Voltage	T _J =25 °C	650	V
I _F	Forward current,DC	Tc=25 °C	60	A
		T _J =100 °C	30	A
T _J , T _{stg}	Operating Junction and Storage Temperature Range		-55 to +175	°C

Ordering Information (Example)					
Type	Package	Marking	Minimum Package(pcs)	Inner Box Quantity(pcs)	Outer Carton Quantity(pcs)
MGA30T65F7	TO-247	G7E30T65F	30	270	2,160

IGBT, Inverter

Electrical Characteristics (TC=25°C unless otherwise noted)								
Symbol	Parameter	Condition	Min	Typ	Max	Unit		
Static Electrical Characteristics @ TC= 25°C (unless otherwise stated)								
V _{GE(th)}	Gate Emitter Threshold Voltage	V _{CE} =V _{GE} , I _C =0.25mA	5.0	5.7	6.5	V		
V _{CE(sat)}	Collector - Emitter Saturation Voltage	I _C =30A, V _{GE} =15V, T _J =25°C	--	1.6	2.1	V		
		I _C =30A, V _{GE} =15V, T _J =150°C	--	1.94	--	V		
I _{CES}	Collector Leakage Current	V _{CE} =650V, V _{GE} =0V, T _J =25°C	--	--	500	nA		
I _{GES}	Gate Leakage Current	V _{CE} =0V,V _{GE} =20V, T _J =25°C	--	--	500	nA		
Dynamic Electrical Characteristics @ TJ = 25°C (unless otherwise stated)								
Q _g	Gate Charge	V _{CE} =520V, I _C =30A , V _{GE} =15V		--	83.7	--	nC	
Q _{ge}	Gate to Emitter Charge			--	25.3	--	nC	
Q _{gc}	Gate to Collector Charge			--	34.2	--	nC	
C _{ies}	Input Capacitance	V _{CE} =25V, V _{GE} =0V, f =1MHz		--	1562	--	pF	
C _{oes}	Output Capacitance			--	81	--	pF	
C _{res}	Reverse Transfer Capacitance			--	17	--	pF	
t _{d(on)}	Turn-on Delay Time	V _{CC} =400V,I _C =30A R _{G(on)} =10Ω,R _{G(off)} =10Ω V _{GE} =15V, Inductive Load	T _J =25°C	--	37.5	--	ns	
			T _J =150°C	--	38	--	ns	
t _r	Turn-on Rise Time		T _J =25°C	--	63.3	--	ns	
			T _J =150°C	--	63.4	--	ns	
t _{d(off)}	Turn-Off Delay Time		T _J =25°C	--	94.4	--	ns	
			T _J =150°C	--	104.9	--	ns	
t _f	Turn-Off Fall Time		T _J =25°C	--	32.9	--	ns	
			T _J =150°C	--	37.7	--	ns	
E _{on}	Turn on Energy		T _J =25°C		1.1		mJ	
			T _J =150°C	--	1.39	--	mJ	
E _{off}	Turn off Energy		T _J =25°C	--	0.27	--	mJ	
			T _J =150°C	--	0.34	--	mJ	

Diode, Inverter

Absolute Maximum Ratings (TC=25℃ unless otherwise noted)							
Symbol	Parameter			Min	Typ	Max	Unit
Common Ratings (TC=25℃ Unless Otherwise Noted)							
V _F	Forward Voltage	I _F =30A , V _{GE} =0V,	T _J =25°C	--	1.95	2.4	V
			T _J =150°C	--	1.75	--	V
t _{rr}	Reverse Recovery Time	I _F =30A , V _R =400V dI _F /dt=200A/μs	T _J =25°C	--	206.7	--	ns
			T _J =150°C	--	312.6	--	ns
I _{rrm}	Peak reverse recovery current		T _J =25°C	--	13.5	--	A
			T _J =150°C	--	20.8	--	A
Q _{rr}	Repetitive peak forward current		T _J =25°C	--	1270	--	nC
			T _J =150°C	--	3080	--	nC

Typical Operating Characteristics

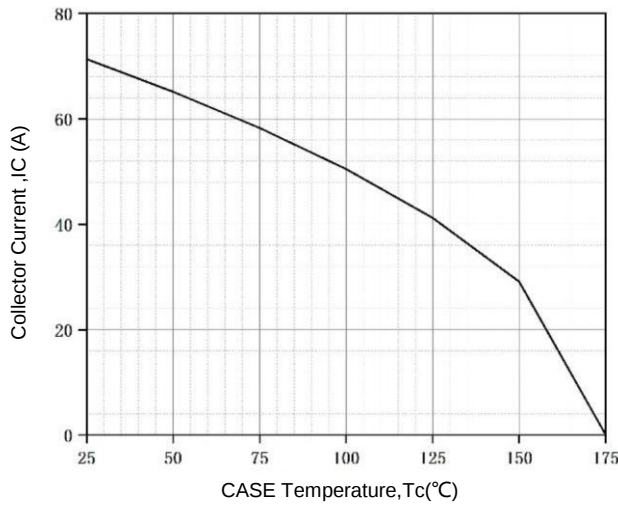


Figure 1. Collector current as a function of case temperature

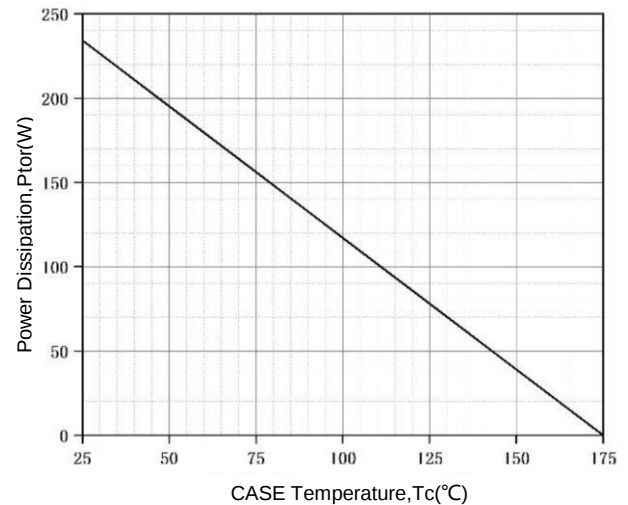


Figure 2. Power dissipation as a function of case temperature

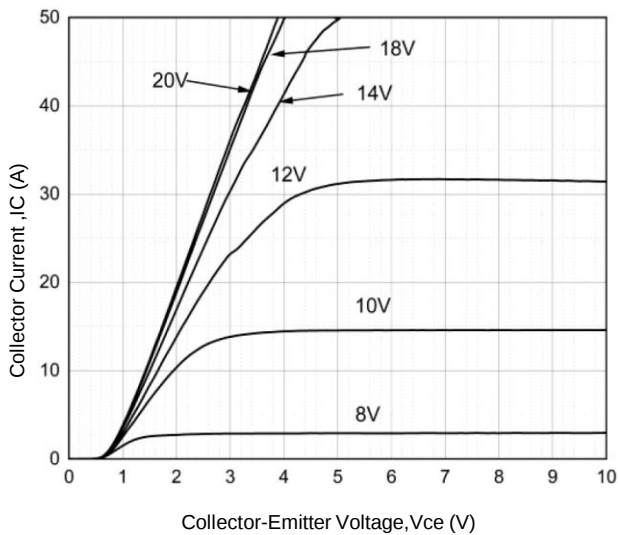


Figure 3. Typical output characteristic ($T_j=25^{\circ}\text{C}$)

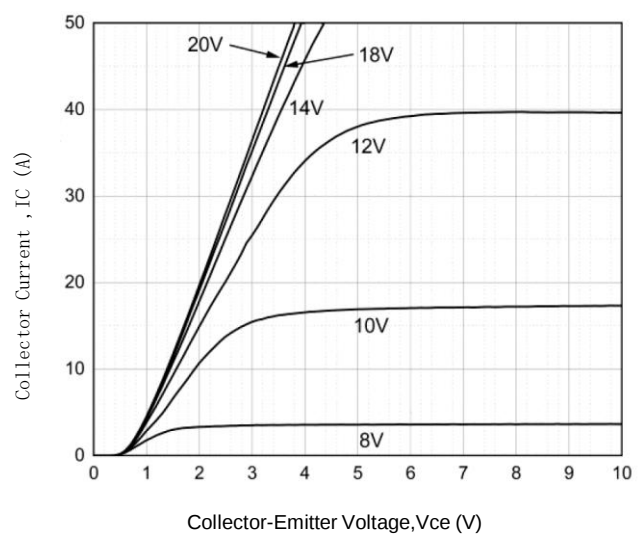


Figure 4. Typical output characteristic ($T_j=150^{\circ}\text{C}$)

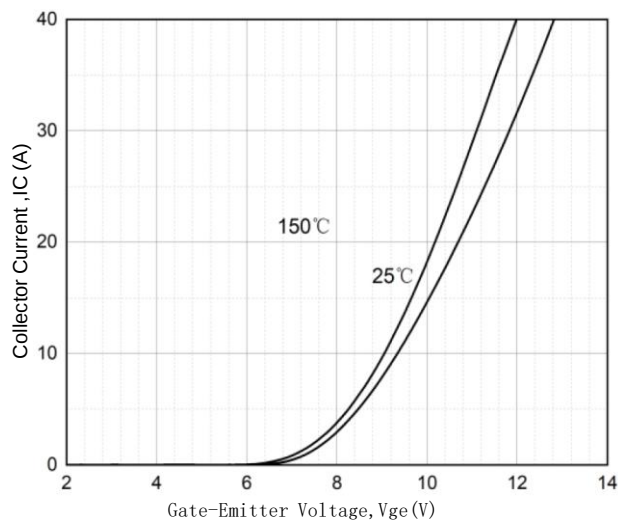


Figure 5. Typical transfer characteristic ($V_{ce}=10\text{V}$)

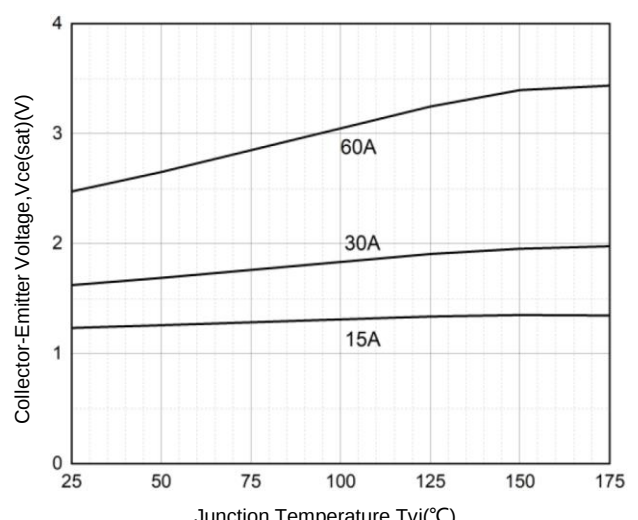


Figure 6. Typical collector-emitter saturation voltage as a function of junction temperature

Typical Operating Characteristics

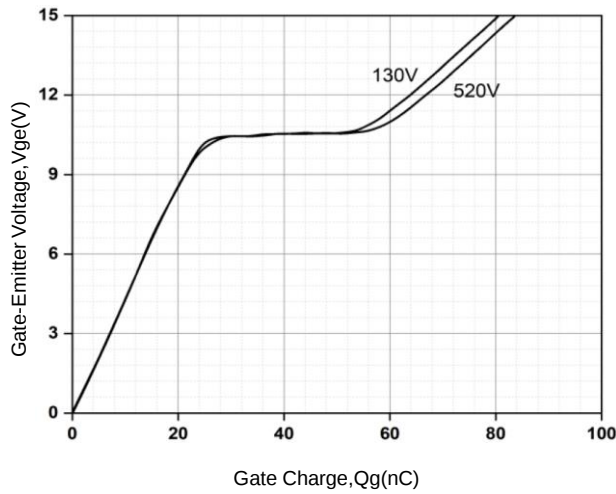


Figure 7. Typical gate charge

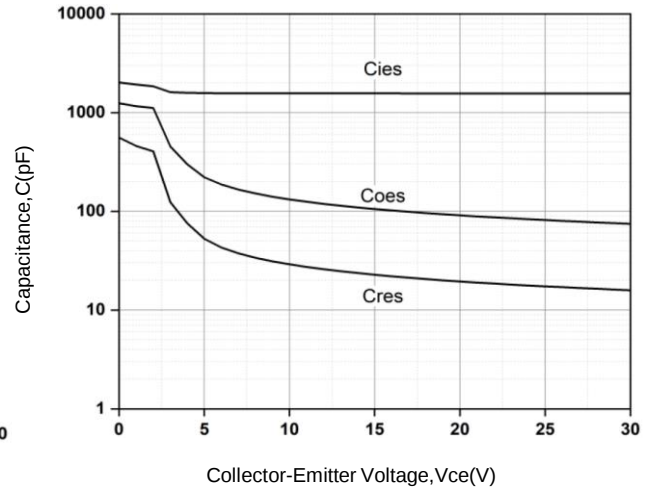


Figure 8. Typical capacitance as a function of collector-emitter voltage ($f=1\text{MHz}$)

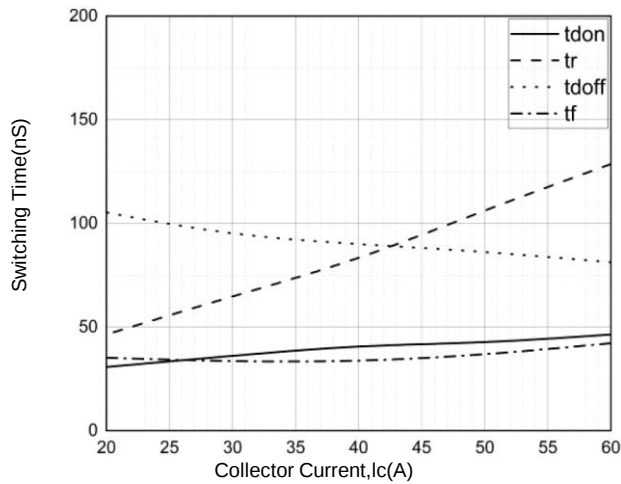


Figure 9. Typical switching times as a function of collector current ($T_j=25^\circ\text{C}$, $V_{CC}=400\text{V}$, $R_g=10\Omega$)

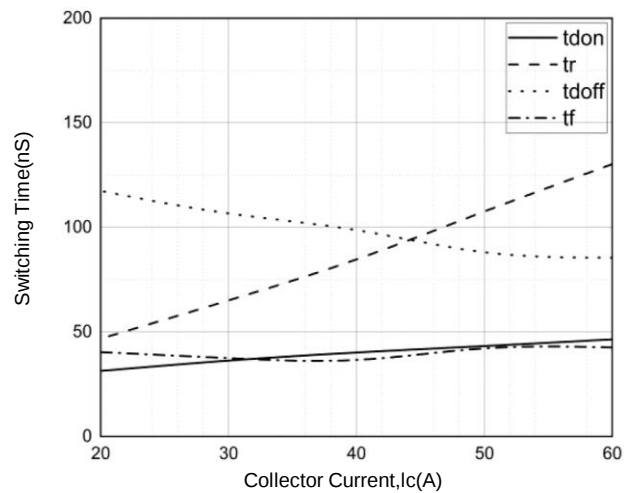


Figure 10. Typical switching times as a function of collector current ($T_j=150^\circ\text{C}$, $V_{CC}=400\text{V}$, $R_g=10\Omega$)

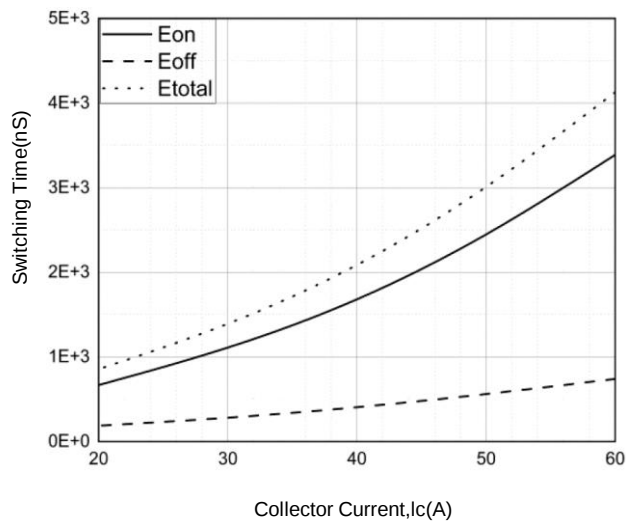


Figure 11. Typical switching energy losses as a function of collector current ($T_j=25^\circ\text{C}$, $V_{CC}=400\text{V}$, $R_g=10\Omega$)

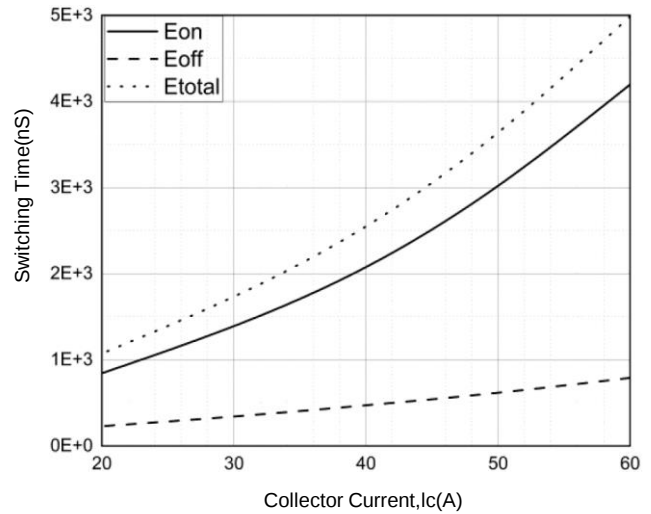


Figure 12. Typical switching energy losses as a function of collector current ($T_j=150^\circ\text{C}$, $V_{CC}=400\text{V}$, $R_g=10\Omega$)

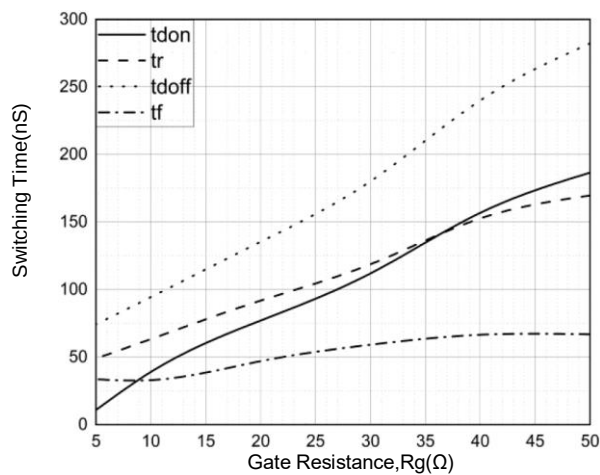


Figure 13. Typical switching times as a function of gate resistor ($T_j=25^\circ\text{C}$, $V_{cc}=400\text{V}$, $I_c=30\text{A}$)

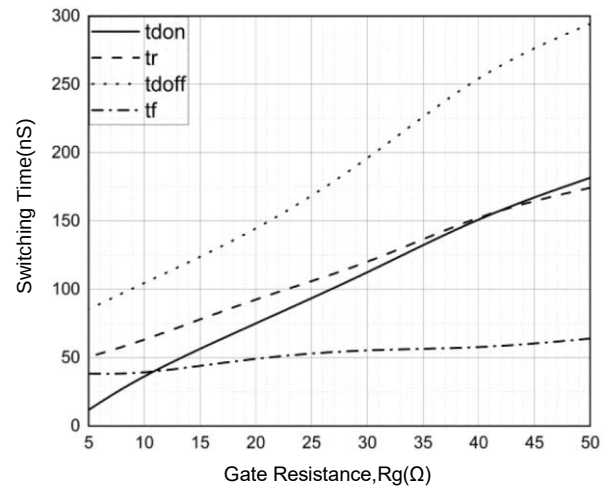


Figure 14. Typical switching times as a function of gate resistor ($T_j=150^\circ\text{C}$, $V_{cc}=400\text{V}$, $I_c=30\text{A}$)

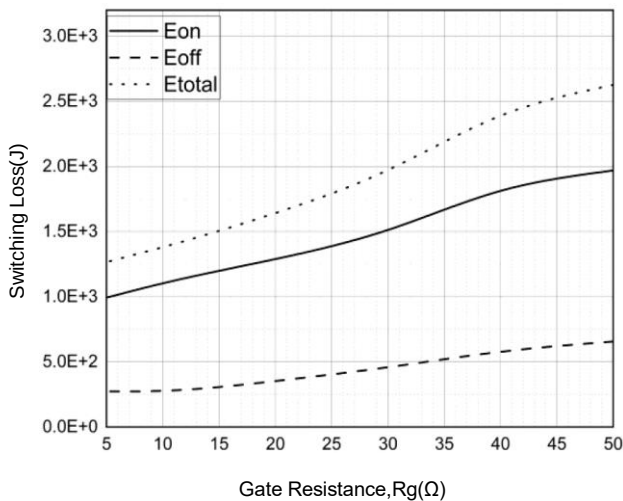


Figure 15. Typical switching energy losses as a function of gate resistor ($T_j=25^\circ\text{C}$, $V_{cc}=400\text{V}$, $I_c=30\text{A}$)

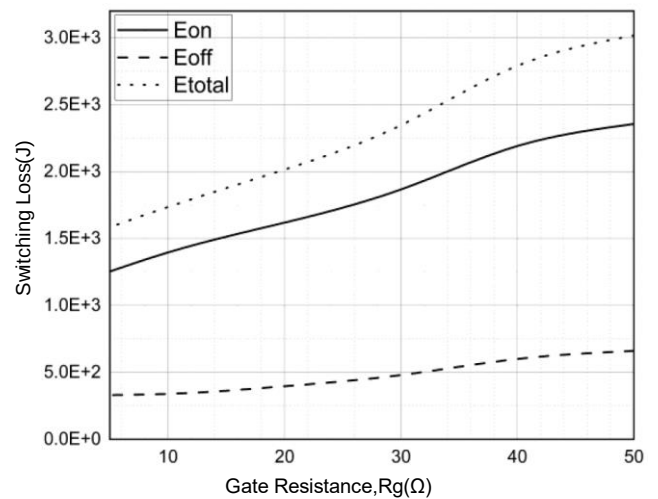


Figure 16. Typical switching energy losses as a function of gate resistor ($T_j=150^\circ\text{C}$, $V_{cc}=400\text{V}$, $I_c=30\text{A}$)

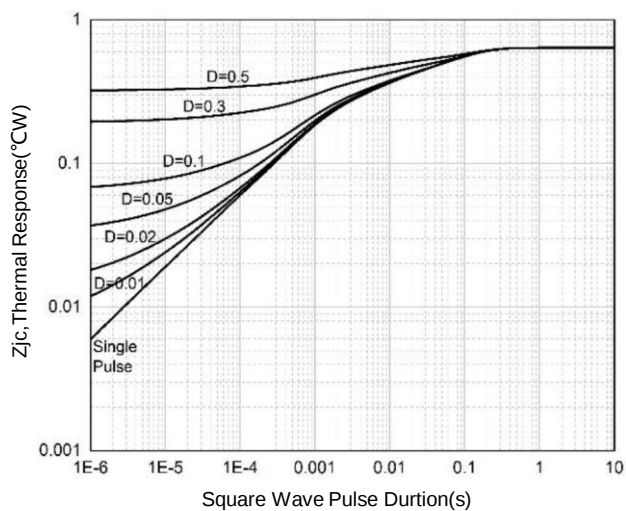


Figure 17. IGBT transient thermal impedance ($D=tp/T$)

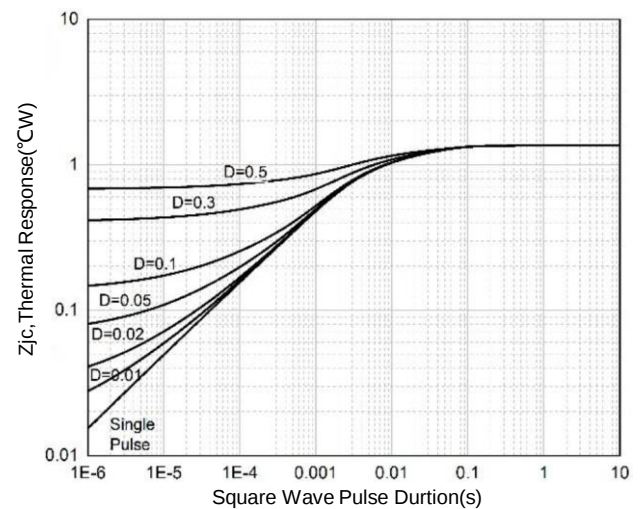


Figure 18. Diode transient thermal impedance as a function of pulse width ($D=tp/T$)

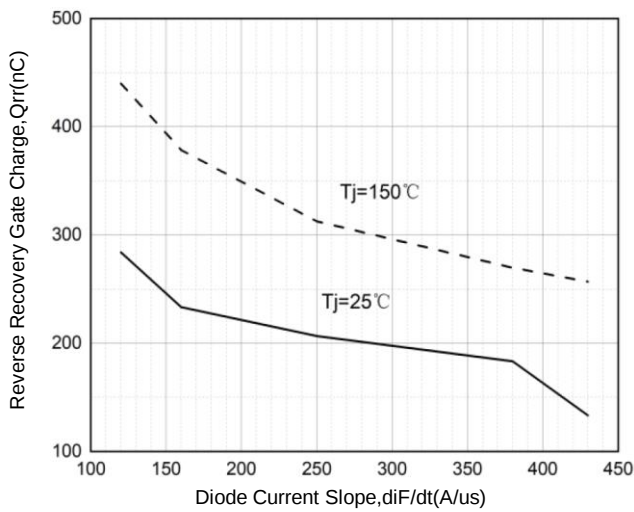


Figure 19. Typical reverse recovery charge as a function of diode current slope ($V_{CC}=400V$, $I_F=30A$)

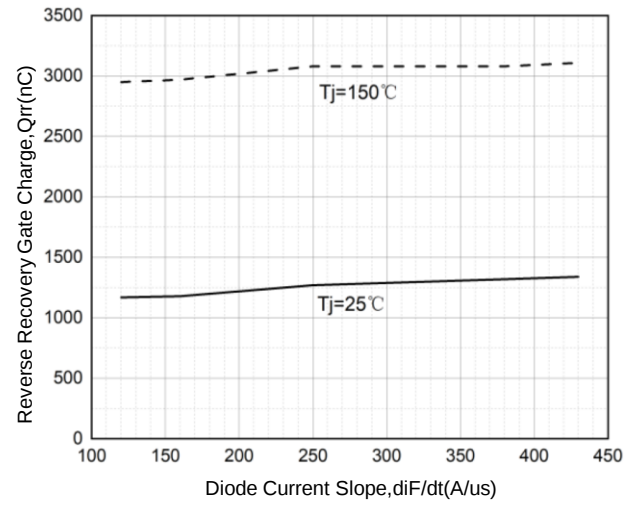


Figure 20. Typical reverse recovery time as a function of diode current slope ($V_{CC}=400V$, $I_F=30A$)

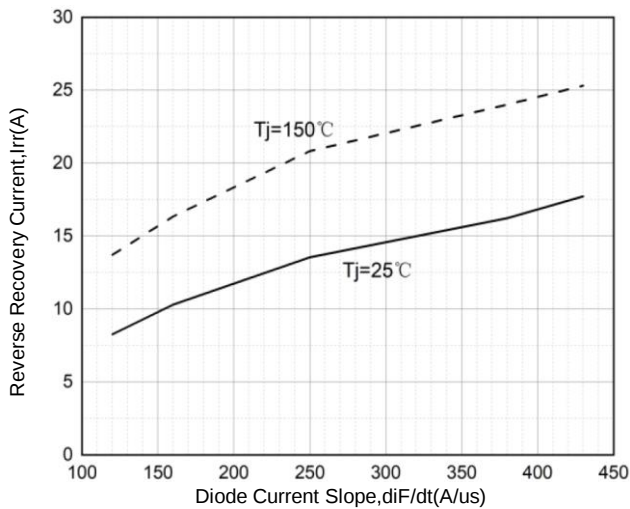


Figure 21. Typical reverse recovery current as a function of diode current slope ($V_{CC}=400V$, $I_F=30A$)

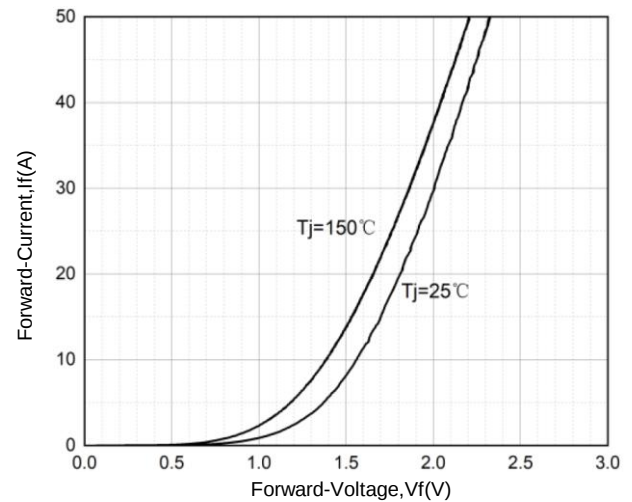


Figure 22. Typical diode forward current as a function of forward voltage

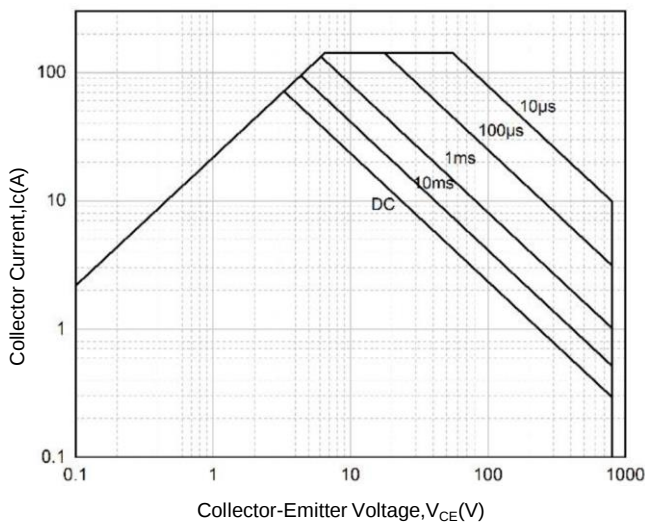
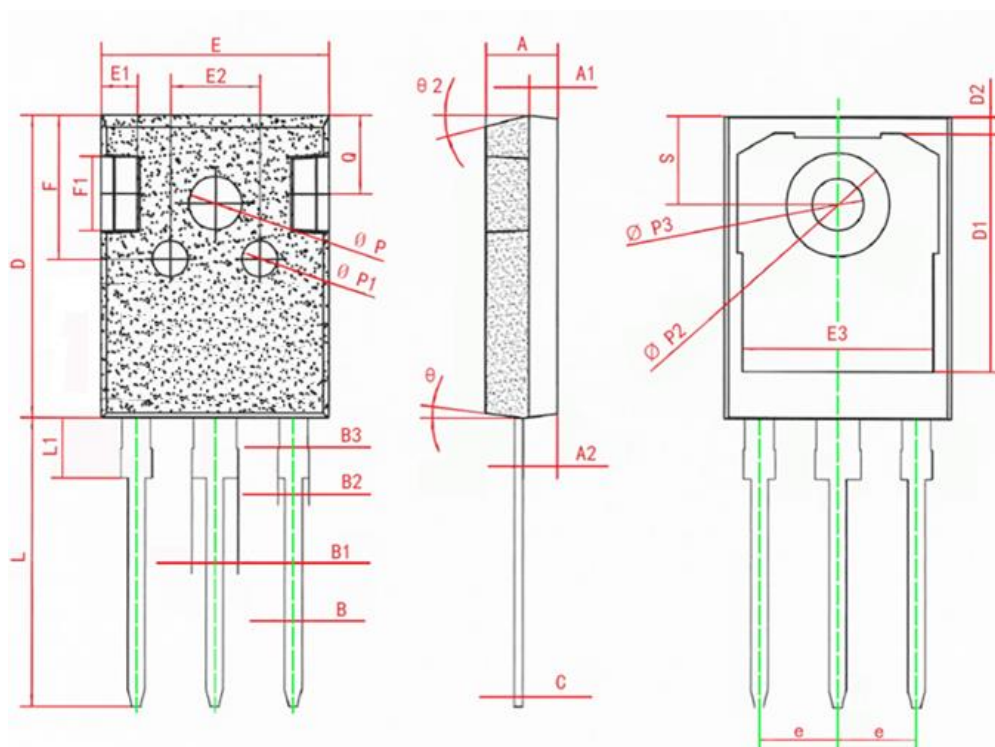


Figure 23. Safe operating area

TO-247 Package information


Symbol	Dimensions in Millimeters(mm)		Dimensions In Inches	
	Min	Max	Min	Max
A	4.900	5.100	0.192	0.200
A1	1.900	2.100	0.074	0.082
A2	2.300	2.500	0.090	0.098
B	1.140	1.240	0.044	0.048
B1	3.050	3.250	0.120	0.127
B2	2.000	2.200	0.078	0.086
B3	1.900	2.100	0.074	0.082
C	0.550	0.650	0.021	0.025
D	20.800	21.200	0.818	0.834
D1	16.350	16.750	0.643	0.659
D2	1.020	1.320	0.040	0.051
E	15.600	16.000	0.614	0.629
E1	2.400	2.600	0.094	0.102
E2	6.100	6.300	0.240	0.248
E3	13.060	13.460	0.514	0.529
F	9.800	10.200	0.385	0.401
F1	4.800	5.400	0.188	0.212
F2	7.900	8.100	0.311	0.318
e	5.436BSC		0.214BSC	
L	19.720	20.120	0.776	0.792
L1	3.900	4.300	0.153	0.169
ØP	3.550	3.950	0.139	0.155
ØP1	2.400	2.600	0.094	0.102
ØP2	7.090	7.290	0.279	0.287
ØP3	3.500	3.700	0.137	0.145
S	6.050	6.250	0.238	0.246
Q	5.400	5.600	0.212	0.220
θ	5°	9°	5°	9°
θ1	5°	9°	5°	9°
θ2	13°	17°	13°	17°