Features

- IGBT CHIP(Trench+Field Stop technology)
- Low Vcesat(typ) 1.5V@IC=6A
- Maximum junction temperature 175℃
- Short circuit withstand time 10us
- Low gate charge Qg

Application

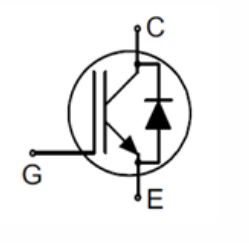
- DC-AC inverters
- Motion/servo control
- UPS systems

Product Summary

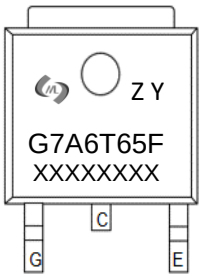
V_{CE}	I_C (T_J=100℃)	$V_{CE(sat)}$
650V	6A	1.5V

TO-263 top view

TO-252 top view



Schematic diagram



G7A6T65F : Device code
XXXXXXXX : Code

Marking and pin assignment

Pb-Free RoHS Halogen-Free

Absolute Maximum Ratings (TC=25℃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=100°C	6	A
I_{CRM}	Repetitive peak collector current	tp=1ms	22	A
t_{SC}	Short circuit withstand time	Short Circuit Withstand Time VGE=15V, VCC≤360V,Tvj=150°C	10	μs
P_{tot}	Power Dissipation	Tc=25°C	87	W
		Tc=100°C	43	W
Diode，Inverter				
V_{RRM}	Repetitive Reverse Voltage	T_J=25°C	650	V
I_F	Forward current,DC	T_J=100°C	6	A
I_{FRM}	Repetitive peak forward current	tp=1ms	22	A

Ordering Information (Example)						
Type	**Package**	**Marking**	**Minimum Package(pcs)**	**Inner Box Quantity(pcs)**	**Outer Carton Quantity(pcs)**	**Delivery Mode**
MGB6T65F7	TO-263	G7B6T65F	800	800	5,600	13"reel
MGU6T65F7	TO-252	G7A6T65F	2,500	5,000	35,000	13"reel

IGBT，Inverter

Electrical Characteristics (TC=25℃ 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=0.3mA		4.5	5.3	6.0	V
$V_{CE(sat)}$	Collector - Emitter Saturation Voltage	I_C=6A, V_{GE}=15V, T_J=25℃		--	1.5	2	V
		I_C=6A, V_{GE}=15V, T_J=150℃		--	1.8	--	V
I_{CES}	Collector Leakage Current	V_{CE}=650V, V_{GE}=0V, T_J=25°C		--	--	100	nA
I_{GES}	Gate Leakage Current	V_{CE}=0V,V_{GE}=20V, T_J=25°C		--	--	100	nA
Dynamic Electrical Characteristics @ TJ = 25°C (unless otherwise stated)							
Q_g	Gate Charge	V_{CE}=480V, I_C=6A , V_{GE}=0 to 15V		--	18	--	nC
Q_{ge}	Gate to Emitter Charge			--	6	--	nC
Q_{gc}	Gate to Collector Charge			--	6.4	--	nC
C_{ies}	Input Capacitance	V_{CE}=25V, V_{GE}=0V, f =1MHz		--	458	--	nF
C_{oes}	Output Capacitance			--	20	--	nF
C_{res}	Reverse Transfer Capacitance			--	2.5	--	pF
$t_{d(on)}$	Turn-on Delay Time	V_{CC}=400V,I_C=6A $R_{G(on)}$ =30Ω,$R_{G(off)}$ =30Ω V_{GE}=15V, Inductive Load	T_J=25℃	--	8	--	ns
			T_J=150℃	--	8	--	ns
t_r	Turn-on Rise Time		T_J=25℃	--	16	--	ns
			T_J=150℃	--	20	--	ns
$t_{d(off)}$	Turn-Off Delay Time		T_J=25℃	--	53	--	ns
			T_J=150℃	--	67	--	ns
t_f	Turn-Off Fall Time		T_J=25℃	--	64	--	ns
			T_J=150℃	--	86	--	ns
E_{on}	Turn on Energy		T_J=25℃		0.086		mJ
			T_J=150℃	--	0.103	--	mJ
E_{off}	Turn off Energy		T_J=25℃	--	0.047	--	mJ
			T_J=150℃	--	0.07	--	mJ

Diode，Inverter

Absolute Maximum Ratings (TC=25℃unless otherwise noted)							
Symbol	**Parameter**			**Min**	**Typ**	**Max**	**Unit**
Common Ratings (TC=25°C Unless Otherwise Noted)							
V_F	Forward Voltage	I_F=6A , V_{GE}=0V,	T_J=25°C	--	1.65	2	V
			T_J=150°C	--	1.44	--	V
t_{rr}	Reverse Recovery Time	I_F=6A , V_R=400V dIF/dt=-200A/μs	T_J=25°C	--	55	--	ns
			T_J=150°C	--	129	--	ns
I_{rrm}	Peak reverse recovery current		T_J=25°C	--	4.1	--	A
			T_J=150°C	--	7.2	--	A
Q_{rr}	Repetitive peak forward current		T_J=25°C	--	113	--	μC
			T_J=150°C	--	368	--	μC

Typical Operating Characteristics

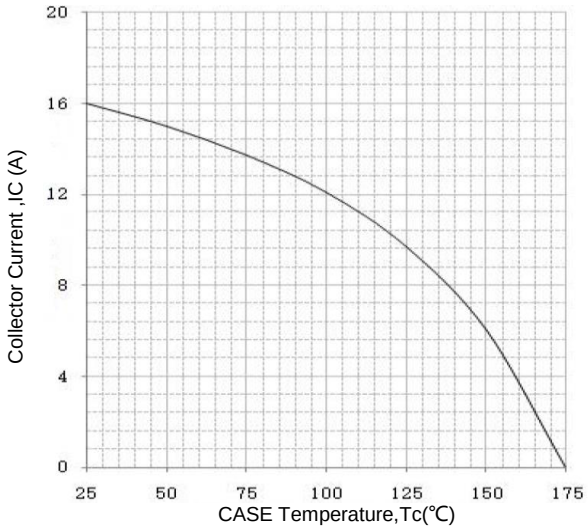


Figure 1. Collector current as a function of case temperature

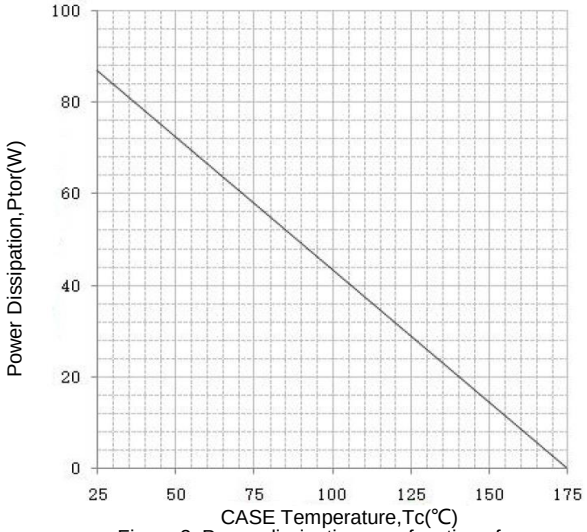


Figure 2. Power dissipation as a function of case temperature

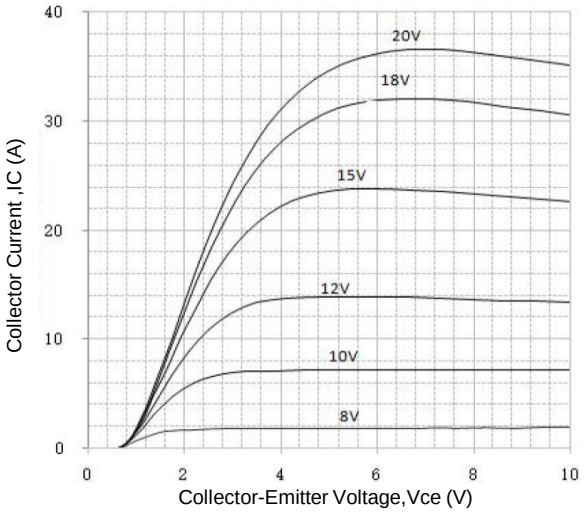


Figure 3. Typical output characteristic（Tj=25℃）

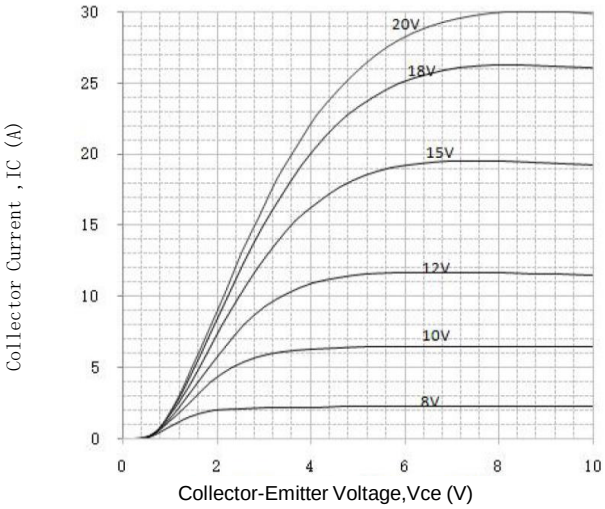


Figure 4. Typical output characteristic（Tj=150℃）

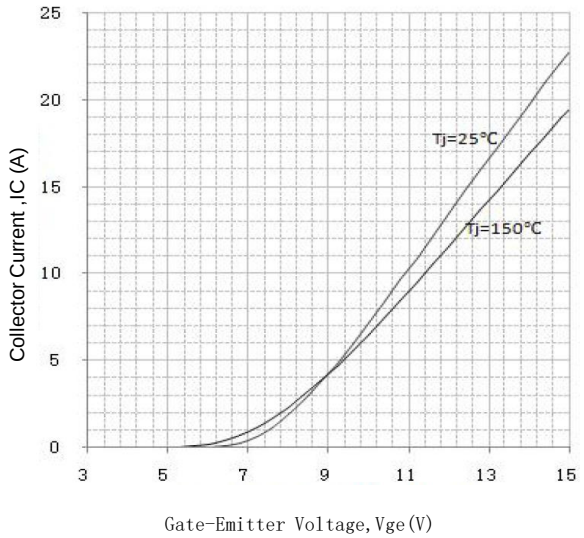


Figure 5. Typical transfer characteristic（V_{CE}=10V）

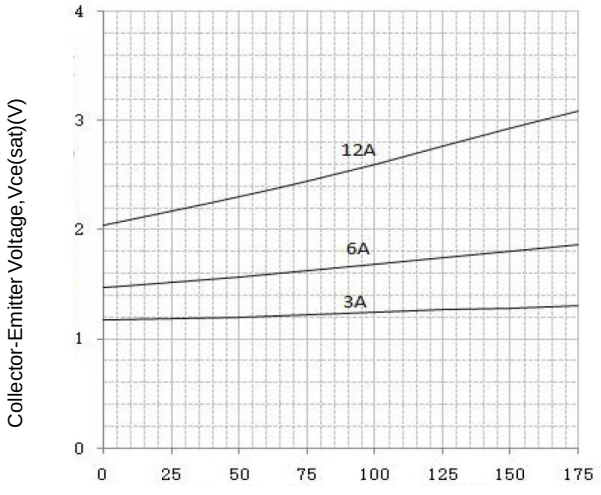


Figure 6. Typical collector-emitter saturation voltage as a function of junction temperature

Typical Operating Characteristics

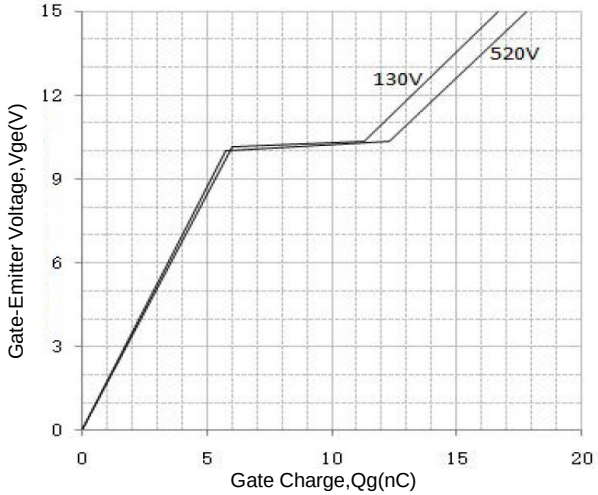


Figure 7. Typical gate charge

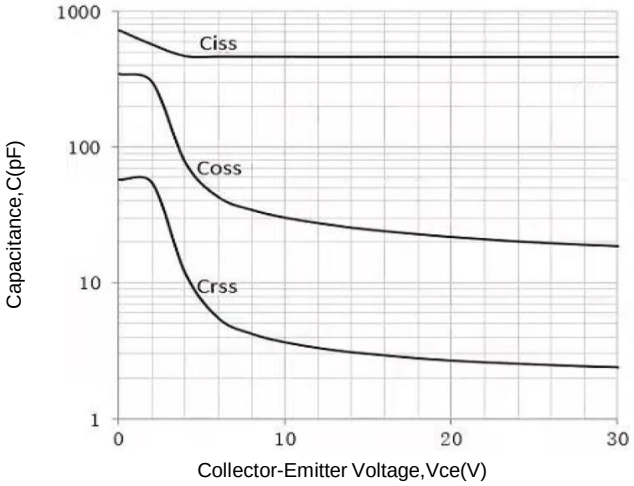


Figure 8. Typical capacitance as a function of collector-emitter voltage（f=1MHz）

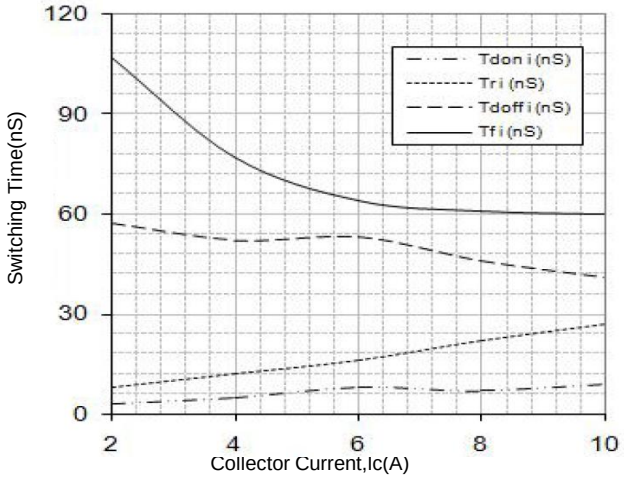


Figure 9. Typical switching times as a function of collector current（Tj=25℃，V_{CC}=400V，Rg=30Ω）

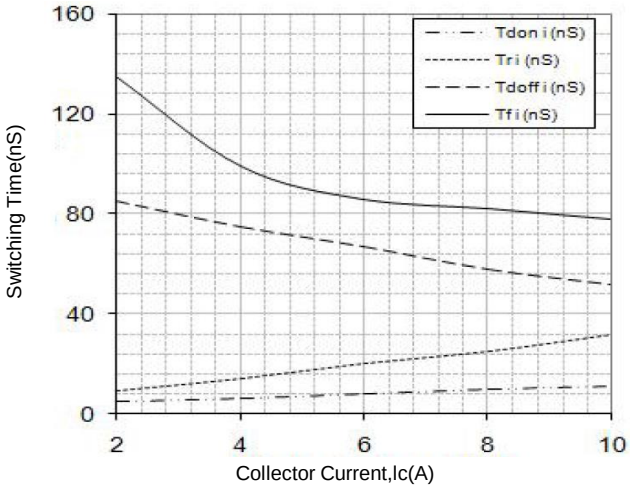


Figure 10. Typical switching times as a function of collector current（Tj=150℃，V_{CC}=400V，Rg=30Ω）

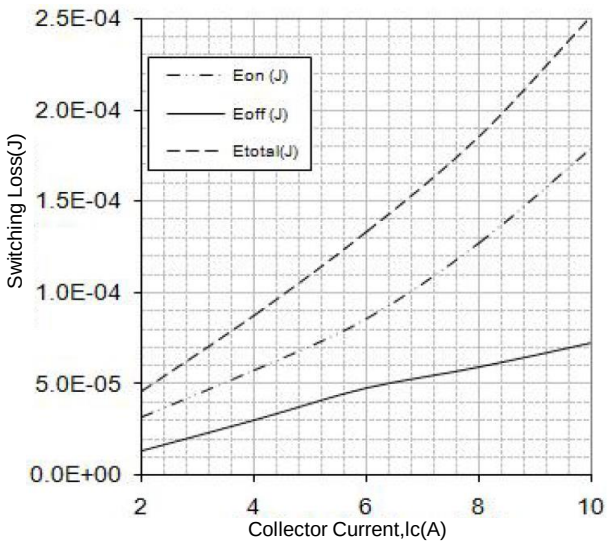


Figure 11. Typical switching energy losses as a function of collector current（Tj=25℃，V_{CC}=400V，Rg=30Ω）

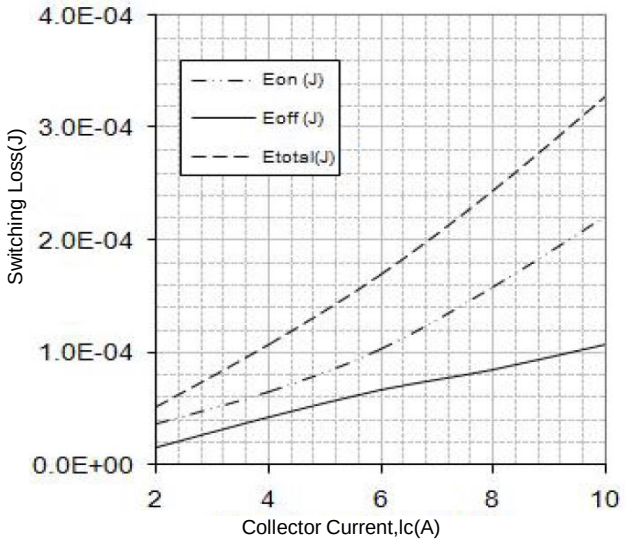


Figure 12. Typical switching energy losses as a function of collector current（Tj=150℃，V_{CC}=400V，Rg=30Ω）

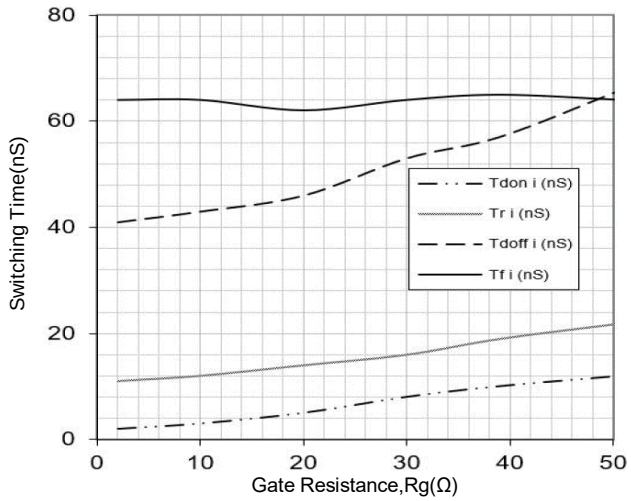


Figure 13. Typical switching times as a function of gate resistor（Tj=25℃，V_{CC}=400V，Ic=6A）

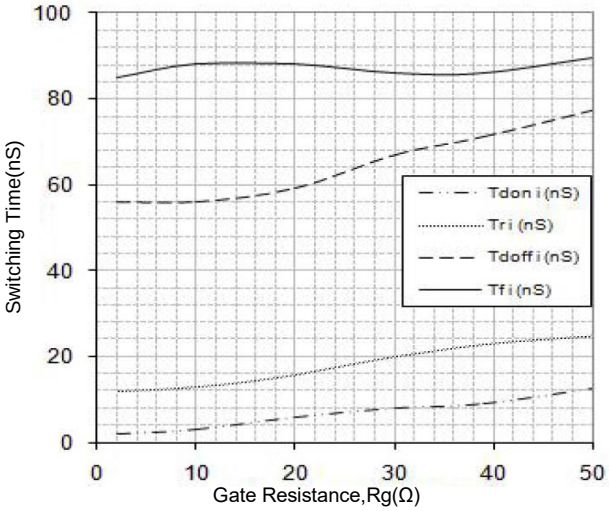


Figure 14. Typical switching times as a function of gate resistor（Tj=150℃，V_{CC}=400V，Ic=6A）

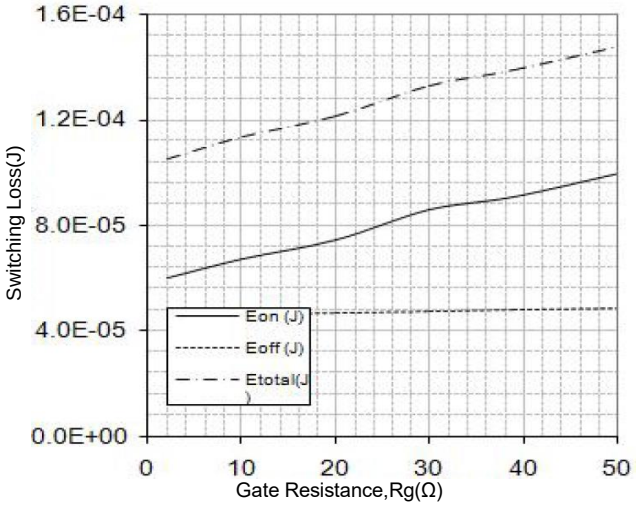


Figure 16. Typical switching energy losses as a function of gate resistor（Tj=25℃，V_{CC}=400V，Ic=6A）

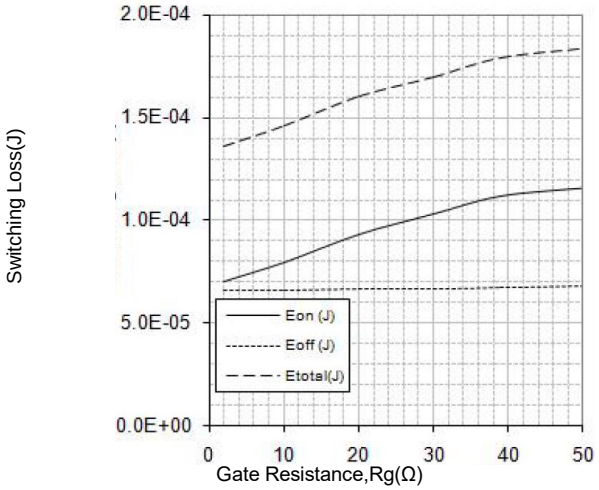


Figure 16. Typical switching energy losses as a function of gate resistor（Tj=150℃，V_{CC}=400V，Ic=6A）

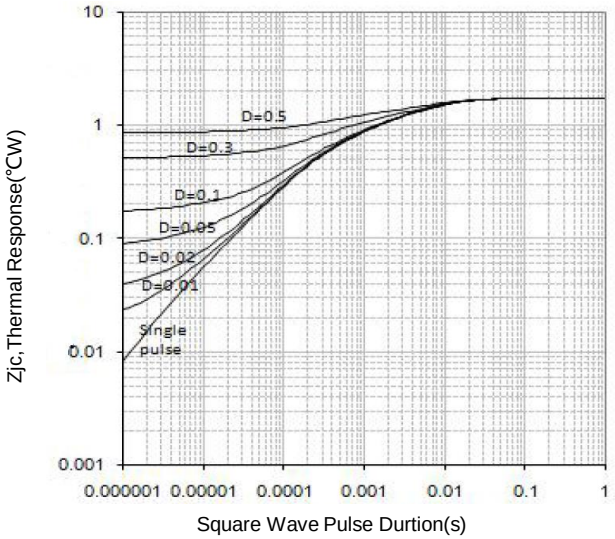


Figure 17. IGBT transient thermal impedance(D=tp/T)

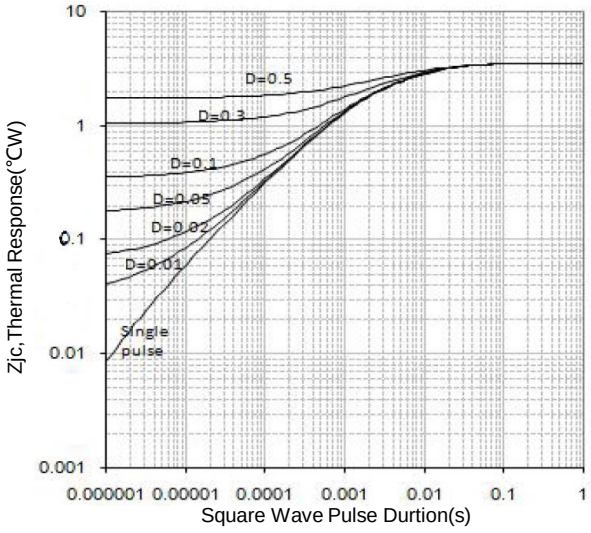


Figure 18. Diode transient thermal impedance as a function of pulse width(D=tp/T)

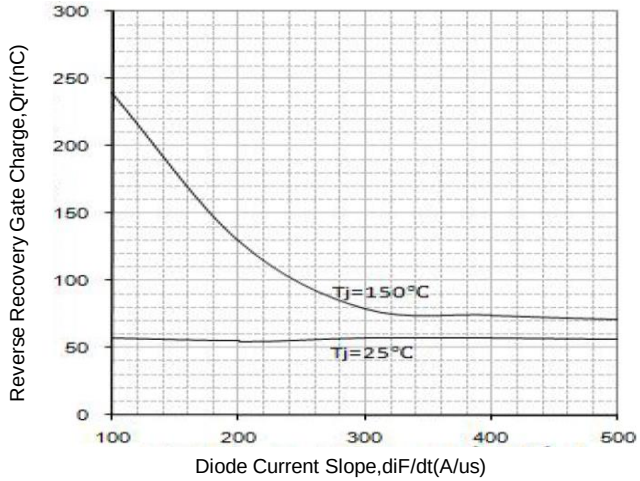


Figure 19. Typical reverse recovery charge as a function of diode current slope（V_{CC}=400V，IF=6A）

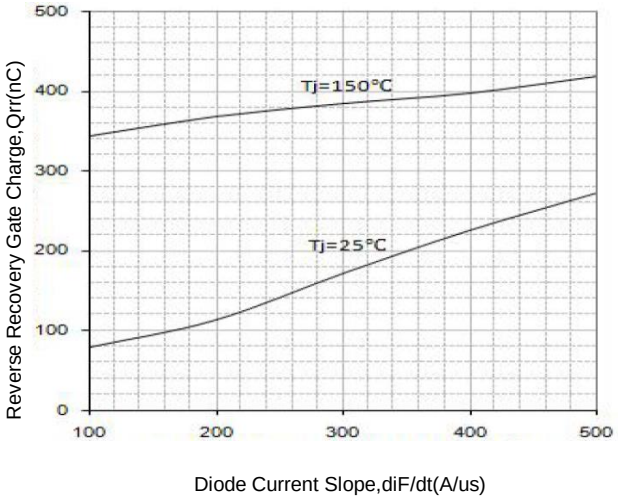


Figure 20. Typical reverse recovery time as a function of diode current slope（V_{CC}=400V，IF=6A）

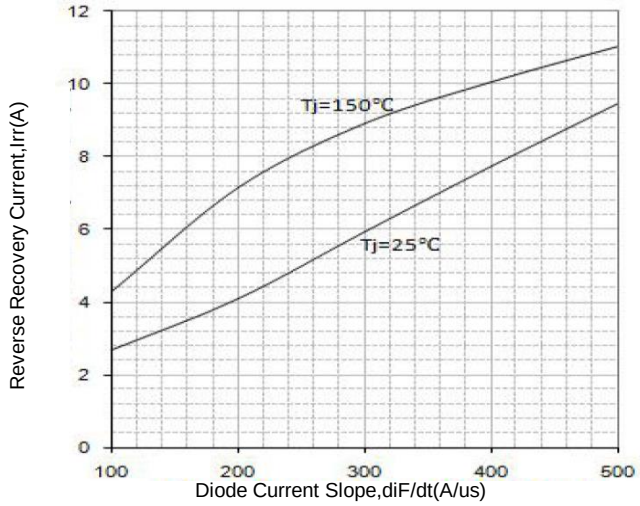


Figure 21. Typical reverse recovery current as a function of diode current slope（V_{CC}=400V，IF=6A）

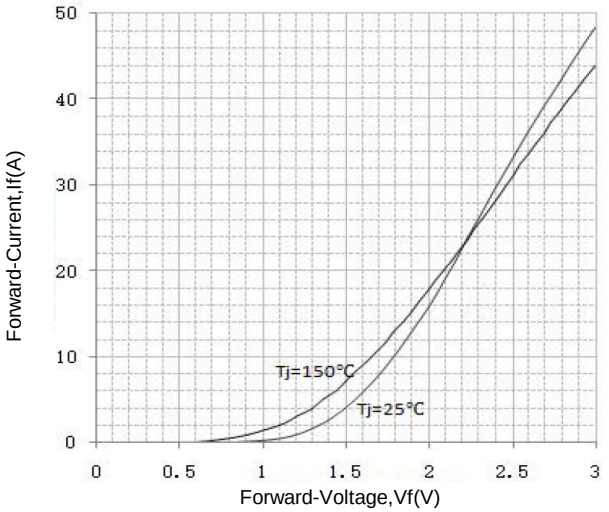


Figure 22. Typical diode forward current as a function of forward voltage

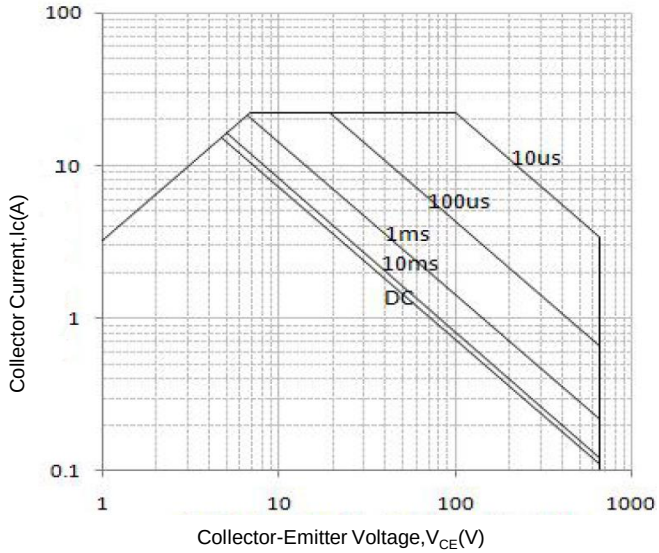
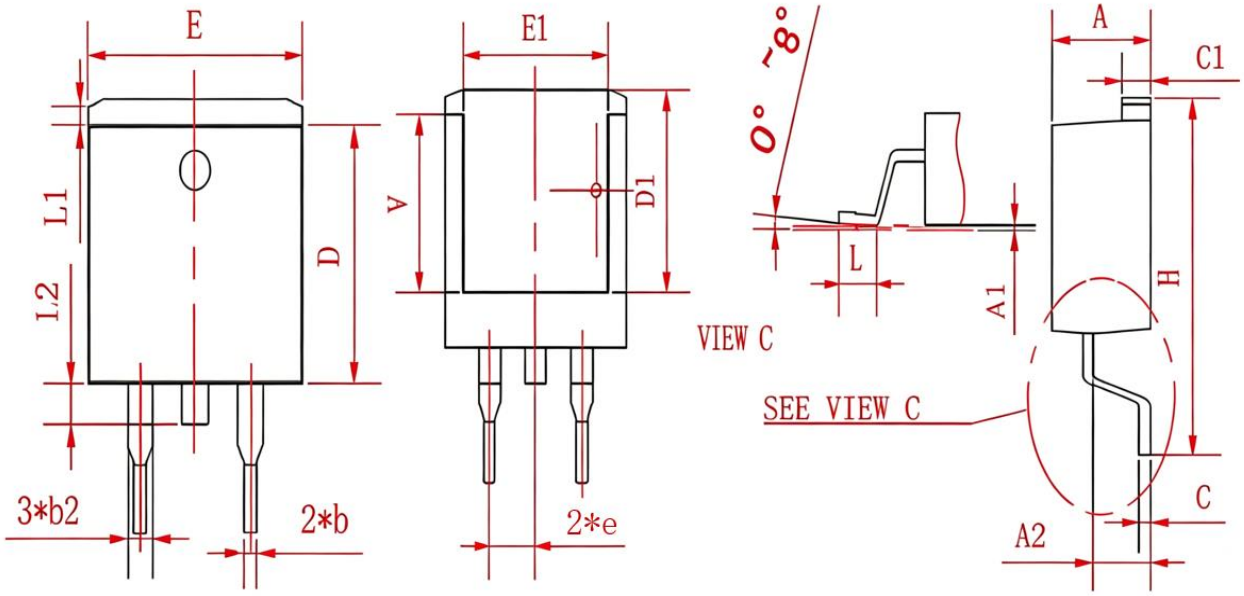


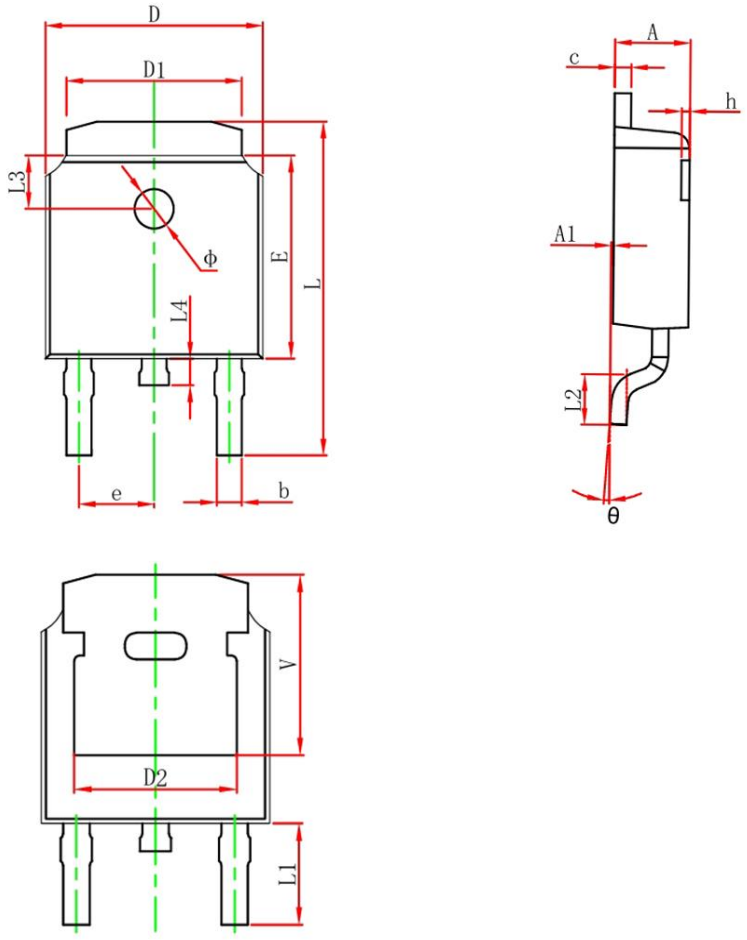
Figure 23. Safe operating area

TO-263 Package information



Symbol	Dimensions in Millimeters(mm)		Dimensions In Inches	
	Min	Max	Min	Max
A	4.300	4.800	0.169	0.189
A1	0.000	0.250	0.000	0.010
A2	2.350	2.700	0.093	0.106
b	0.700	0.940	0.028	0.037
b2	1.150	1.350	0.045	0.053
C	0.350	0.650	0.014	0.026
C1	1.200	1.400	0.047	0.055
D	8.400	9.400	0.331	0.370
D1	7.800	8.100	0.307	0.319
e	2.540 Typ.		0.100 Typ.	
E	9.850	10.300	0.388	0.406
E1	7.000	8.500	0.276	0.335
H	15.000	15.700	0.591	0.618
L	2.300	2.800	0.091	0.110
L1	0.900	1.300	0.035	0.051
L2	1.000	1.500	0.039	0.059
V	6.700 REF.		0.264 REF.	

TO-252 Package information



Symbol	Dimensions in Millimeters(mm)		Dimensions In Inches	
	Min	Max	Min	Max
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.635	0.770	0.025	0.030
c	0.450	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.712	10.312	0.386	0.406
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.250 REF.		0.207 REF.	