

Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-Emitter Breakdown Voltage	V_{CE}	650	V
DC Collector Current, limited by T_{jmax} T_C= 25°C T_C= 100°C	I_C	60 30	A
Diode Forward Current, limited by T_{jmax} T_C= 25°C T_C= 100°C	I_F	60 30	A
Continuous Gate-Emitter Voltage	V_{GE}	20	V
Transient Gate-Emitter Voltage (tp 10µs,D<0.010)	V_{GE}	30	V
Turn off Safe Operating Area V_{CE} 650V, T_j 4		120	A
Pulsed Collector Current, V_{GE}=15V, tp limited by T_{jmax}	I_{CM}	120	A
Diode Pulsed Current, tp limited by T_{jmax}	I_{Fpuls}	120	A
Short Circuit Withstand Time, V_{GE}= 15V, V_{CC}=400V, V_{CEM} 650V	T_{sc}	5	d
Power Dissipation , Tj=175°C Tc=25°C	P_{tot}	187	

Electrical Characteristics of the IGBT T_j= 25 unless otherwise specified

Parameter	Symbol	Conditions	Min.	Typ.

Electrical Characteristics of the Diode T_j= 25 unless otherwise specified

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static						
Diode Forward Voltage	V_F	I_F= 30A T_j= 25°C, T_j= 125°C T_j= 150°C		1.90 1.85 1.75	2.60	V

Switching Characteristic, Inductive Load

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Dynamic , at T_j= 25						
Turn-on Delay Time	$t_{d(on)}$	V_{CC}=400V, I_C=30A, V_{GE}= 0v~15V, Rg=10 ,Ls=60nH	-	8	-	ns
Rise Time	t_r		-	22	-	ns
Turn-on Energy	E_{on}		-	1.05	-	mJ
Turn-off Delay Time	$t_{d(off)}$		-	80	-	ns
Fall Time	t_f		-	84	-	ns
Turn-off Energy	E_{off}		-	0.49	-	mJ
Dynamic , at T_j= 125						
Turn-on Delay Time	$t_{d(on)}$	V_{CC}=400V, I_C=30A, V_{GE}= 0v~15V, Rg=10 ,Ls=60nH	-	7	-	ns
Rise Time	t_r		-	21	-	ns
Turn-on Energy	E_{on}		-	1.11	-	mJ
Turn-off Delay Time	$t_{d(off)}$		-	86	-	ns
Fall Time	t_f		-	112	-	ns
Turn-off Energy	E_{off}		-	0.64	-	mJ
Dynamic , at T_j= 150						
Turn-on Delay Time	$t_{d(on)}$	V_{CC}=400V, I_C=30A, V_{GE}= 0v~15V, Rg=10 ,Ls=60nH	-	8	-	ns
Rise Time	t_r		-	21	-	ns
Turn-on Energy	E_{on}		-	1.14	-	mJ
Turn-off Delay Time	$t_{d(off)}$		-	90	-	ns
Fall Time	t_f		-	135	-	ns
Turn-off Energy	E_{off}		-	0.73	-	mJ

Electrical Characteristics of the DIODE

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Dynamic , at T_j= 25						
Reverse Recovery Current	I_{rr}	I_F=30A,V_R=400V di/dt= -35 2 d	-	7	-	A
Reverse Recovery Charge	Q_{rr}		-	0.14	-	uC
Diode reverse recovery time	trr		-	42	-	ns
Reverse Recovery Energy	Erec		-	0.09	-	mJ
Dynamic , at Tj= 125						
Reverse Recovery Current	I_{rr}	I_F=30A,V_R=400V di/dt= -35 2 d	-	13	-	A
Reverse Recovery Charge	Q_{rr}		-	0.94	-	uC
Diode reverse recovery time	trr		-	153	-	ns
Reverse Recovery Energy	Erec		-	0.22	-	mJ
Dynamic , at Tj= 150						
Reverse Recovery Current	I_{rr}	I_F=30A,V_R=400V di/dt= -35 2 d	-	15	-	A
Reverse Recovery Charge	Q_{rr}		-	1.26	-	uC
Diode reverse recovery time	trr		-	161	-	ns
Reverse Recovery Energy	Erec		-	0.26	-	mJ

Thermal Resistance

Parameter	Symbol	Max. Value	Unit
IGBT Thermal Resistance, Junction - Case	R_{th}(j-c)	0.80	K/W
Diode Thermal Resistance, Junction - Case	R_{th}(j-c)	1.4	K/W
Thermal Resistance, Junction - Ambient	R_{th}(j-a)	40	K/W

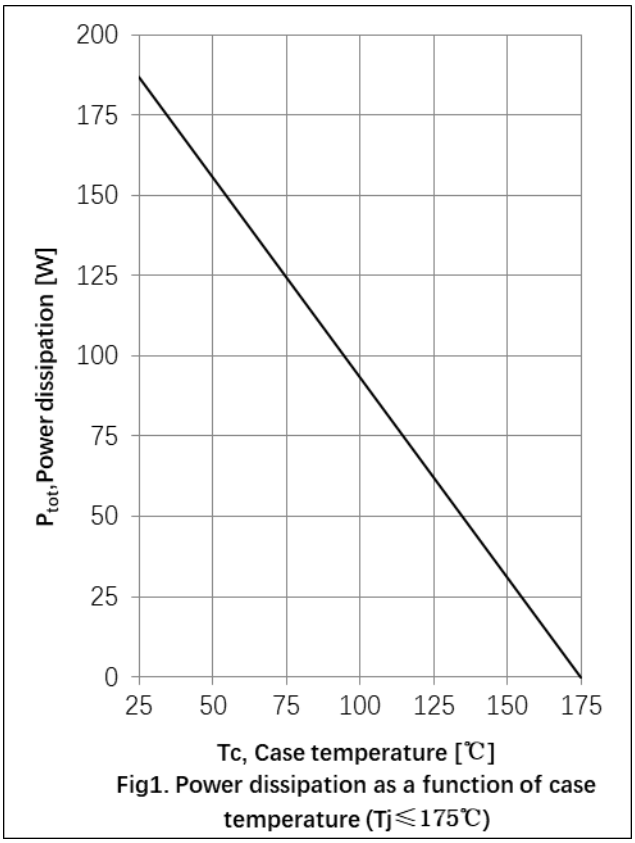


Fig1. Power dissipation as a function of case temperature (Tj≤175℃)

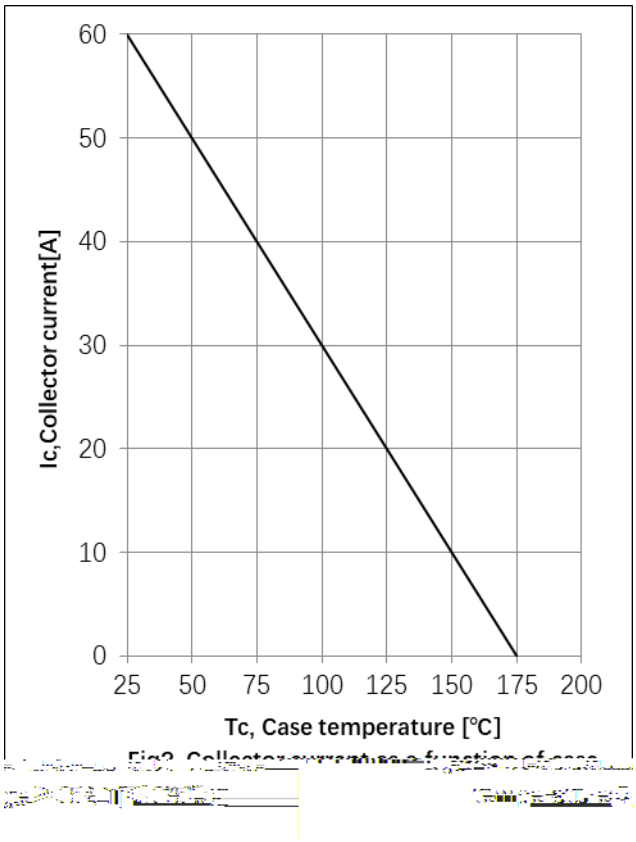


Fig2. Collector current as a function of case

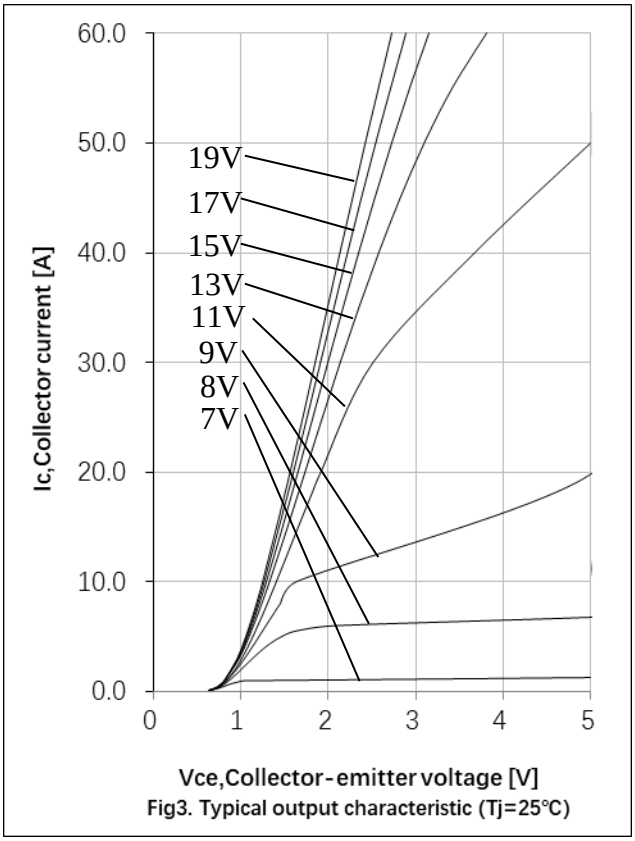


Fig3. Typical output characteristic (Tj=25℃)

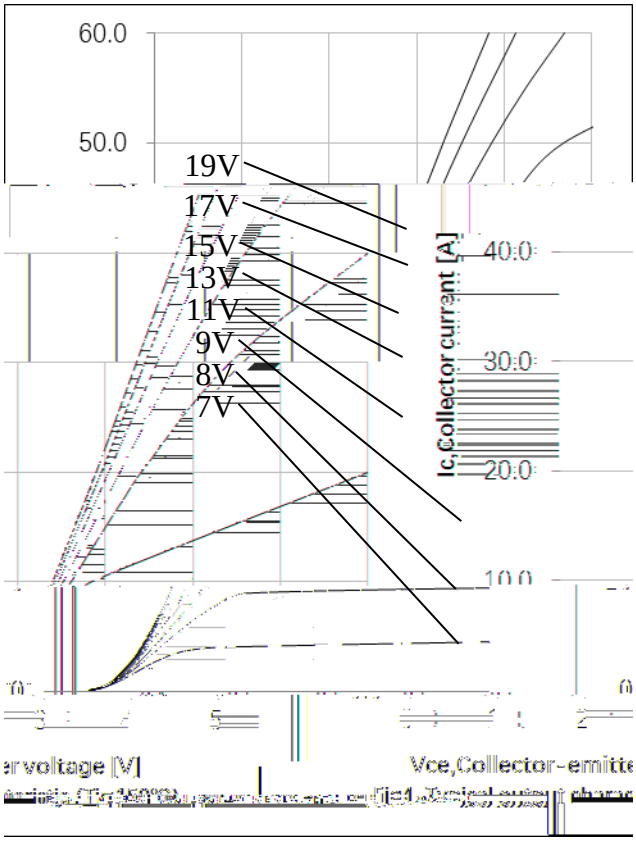
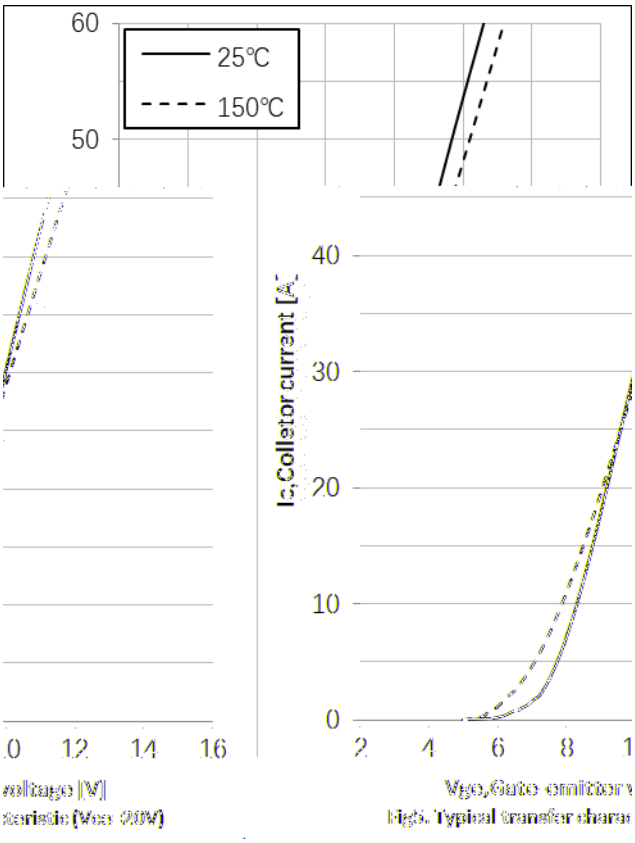
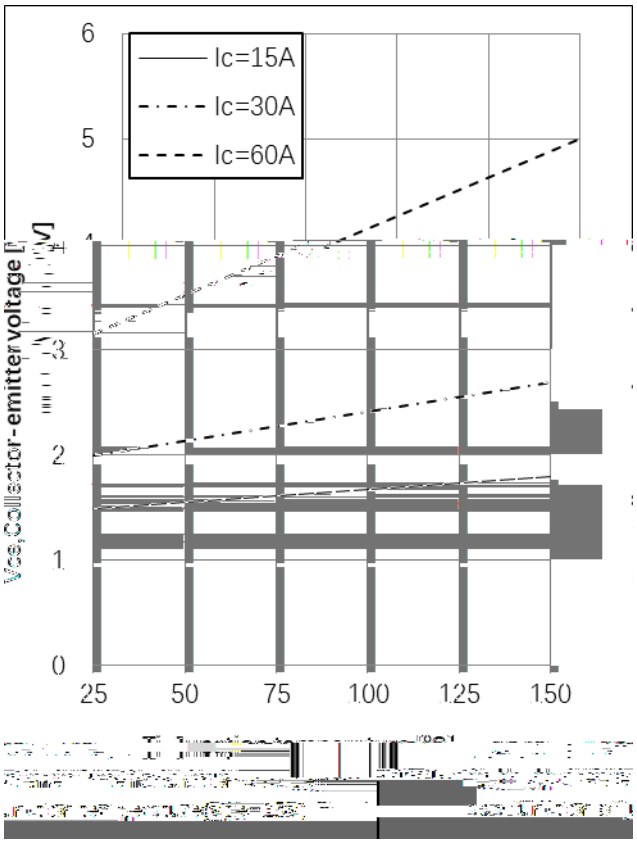
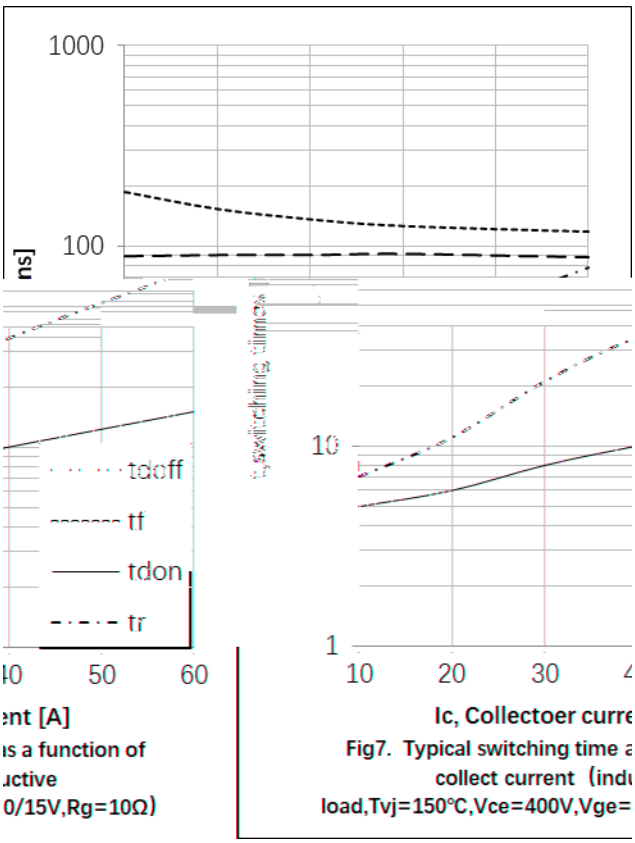


Fig4. Typical output characteristic

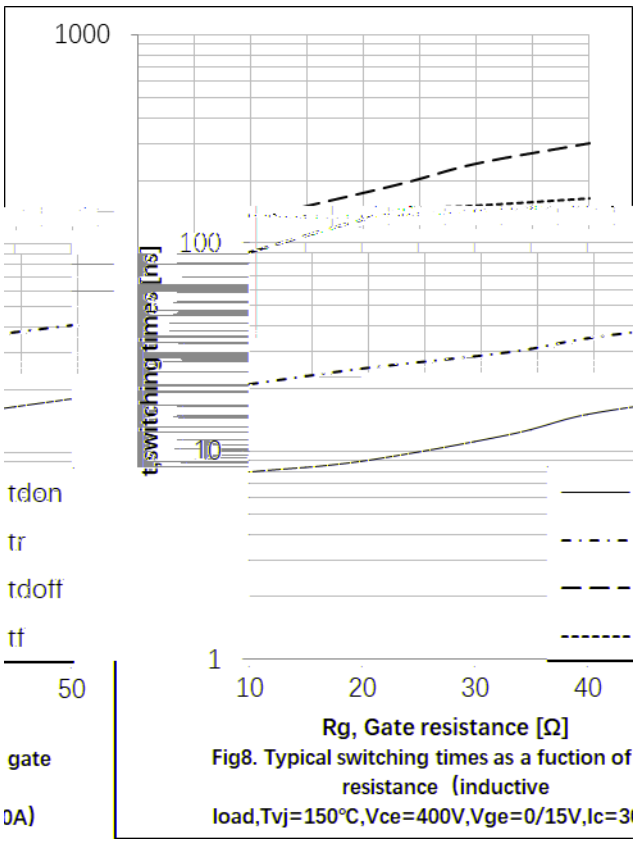






nt [A]
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0/15V,Rg=10Ω)

Ic, Collectoer curre
Fig7. Typical switching time a
collect current（indu
load,Tvj=150°C,Vce=400V,Vge=



gate
0A)

Rg, Gate resistance [Ω]
Fig8. Typical switching times as a fuction of
resistance（inductive
load,Tvj=150°C,Vce=400V,Vge=0/15V,Ic=3

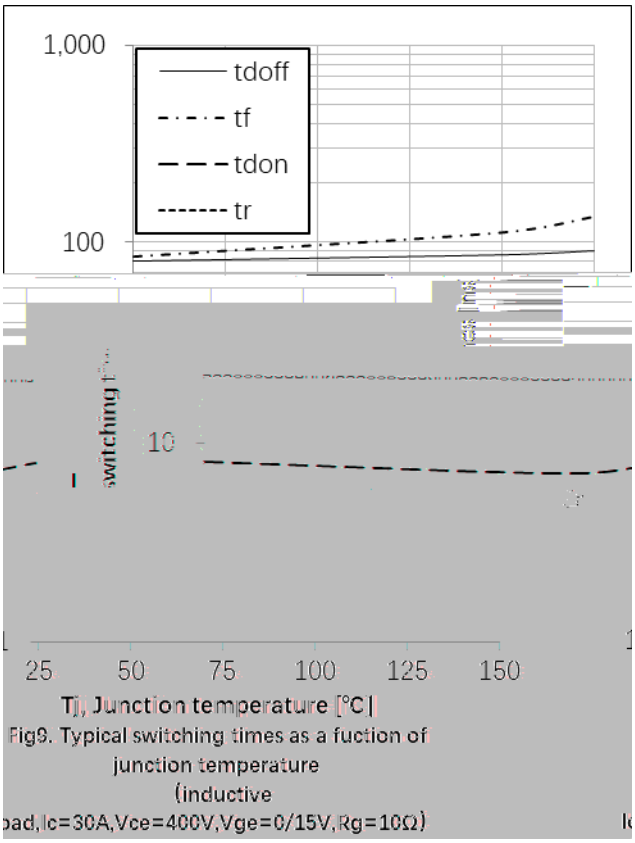


Fig9. Typical switching times as a fuction of junction temperature (inductive load,Ic=30A,Vce=400V,Vge=0/15V,Rg=10Ω)

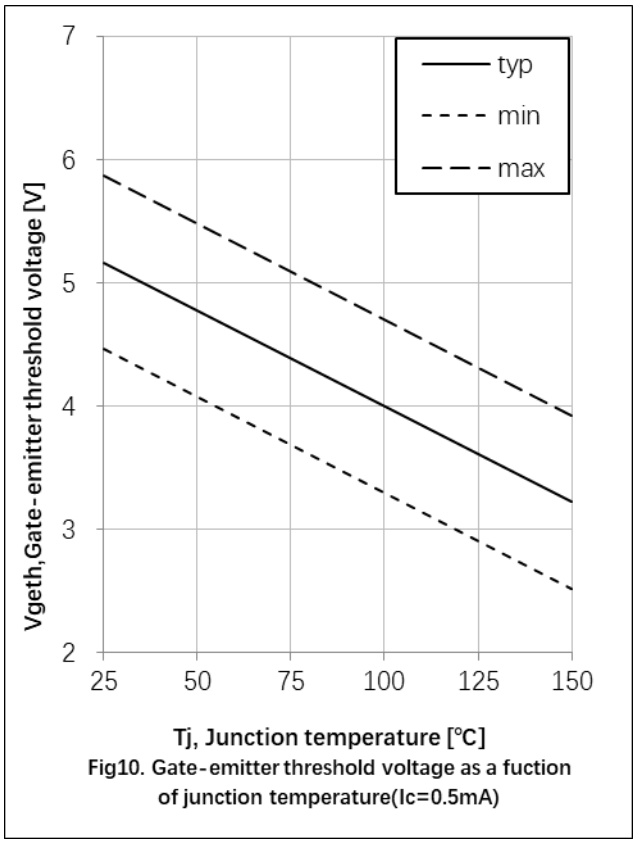


Fig10. Gate-emitter threshold voltage as a fuction of junction temperature(Ic=0.5mA)

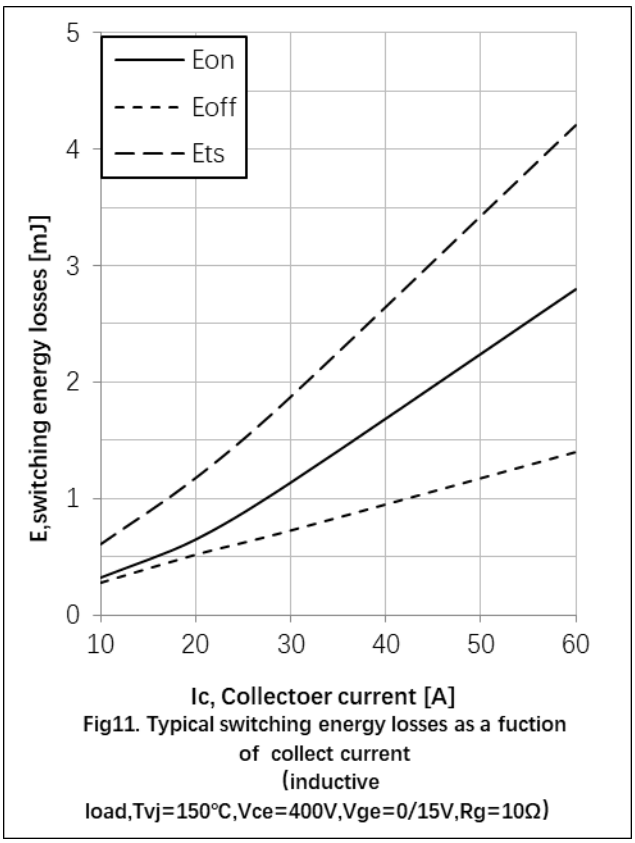


Fig11. Typical switching energy losses as a fuction of collect current (inductive load,Tvj=150°C,Vce=400V,Vge=0/15V,Rg=10Ω)

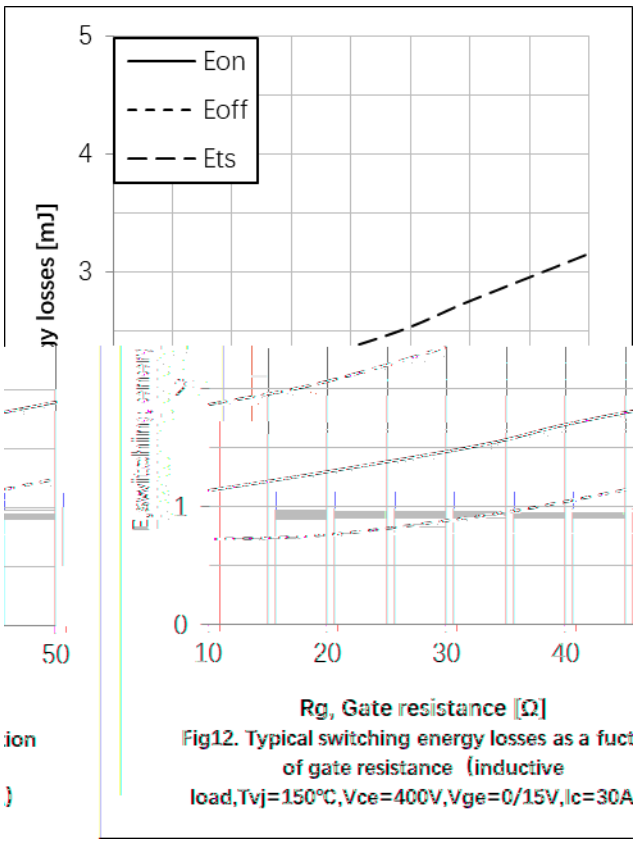
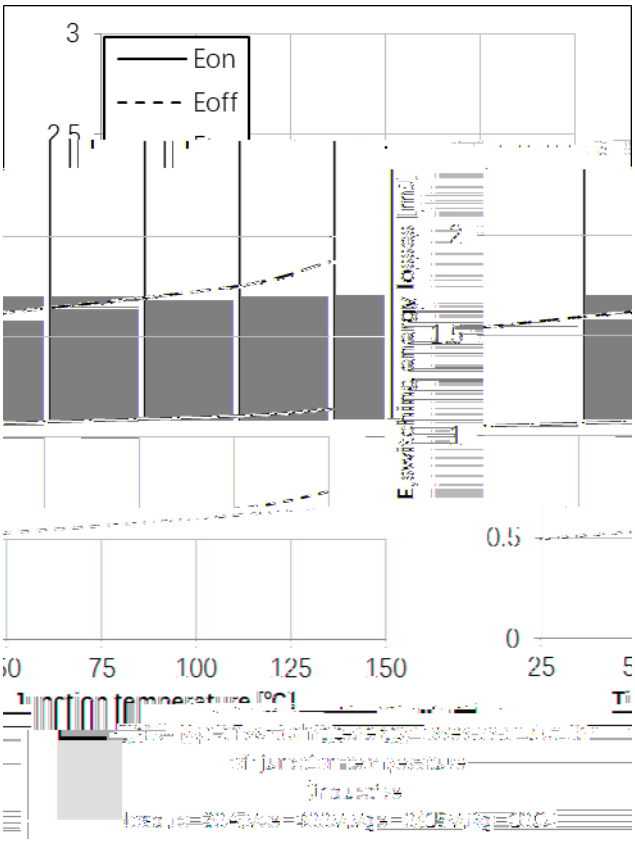
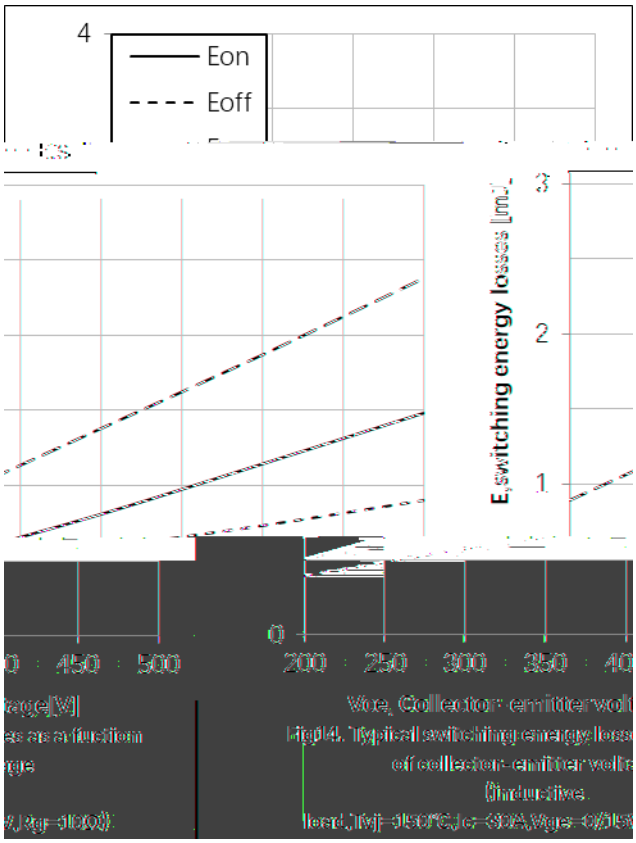


Fig12. Typical switching energy losses as a fuct of gate resistance (inductive load,Tvj=150°C,Vce=400V,Vge=0/15V,Ic=30A





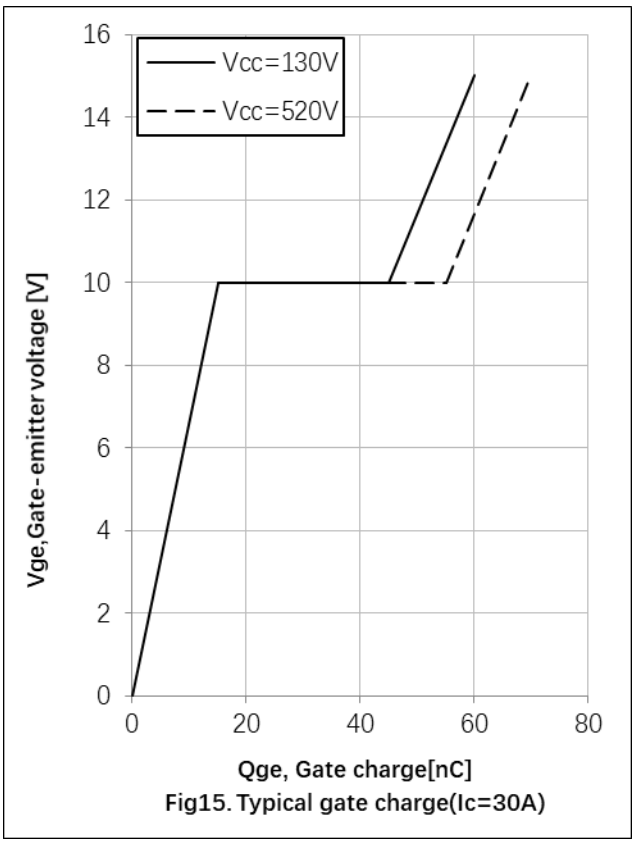


Fig15. Typical gate charge(Ic=30A)

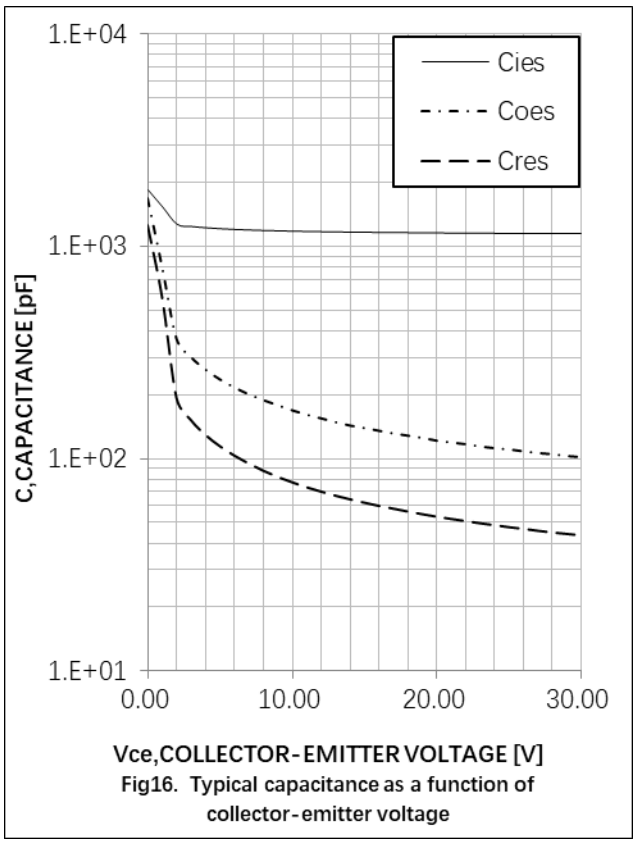


Fig16. Typical capacitance as a function of collector-emitter voltage

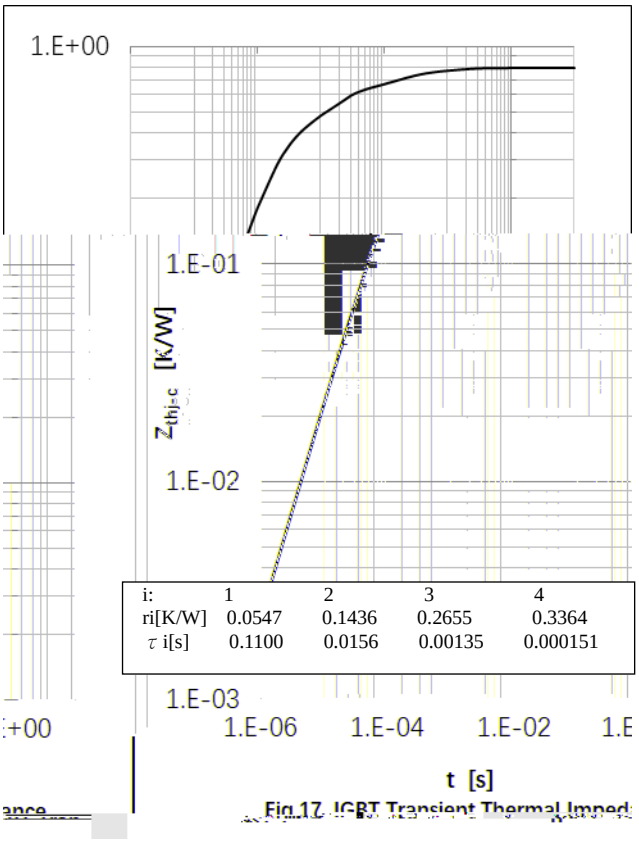


Fig 17. IGBT Transient Thermal Impedance

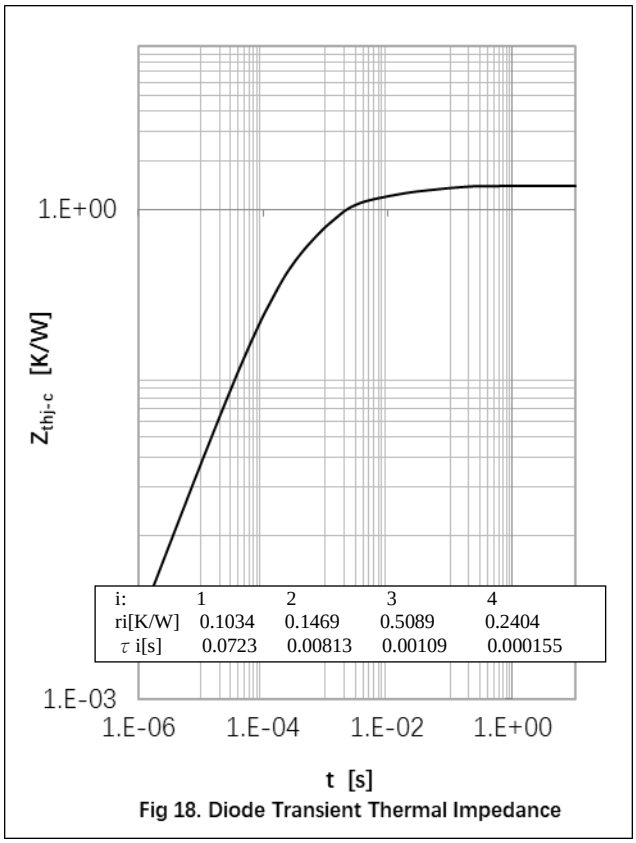
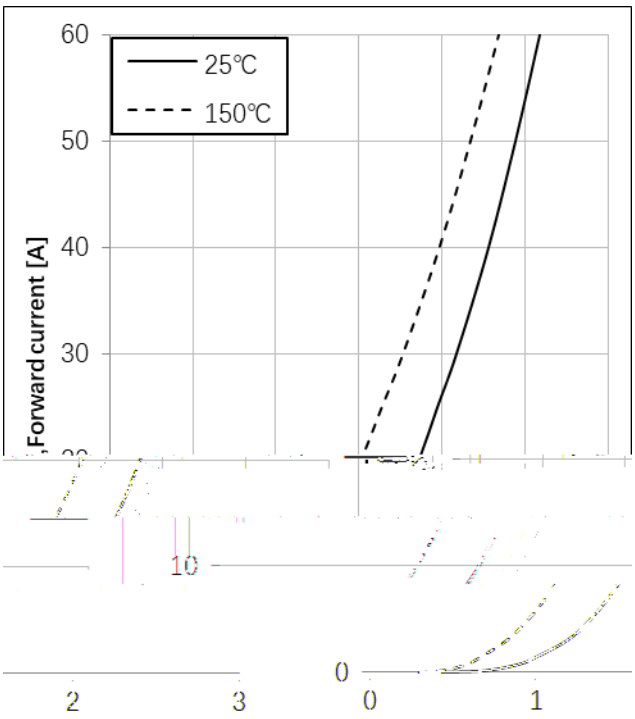
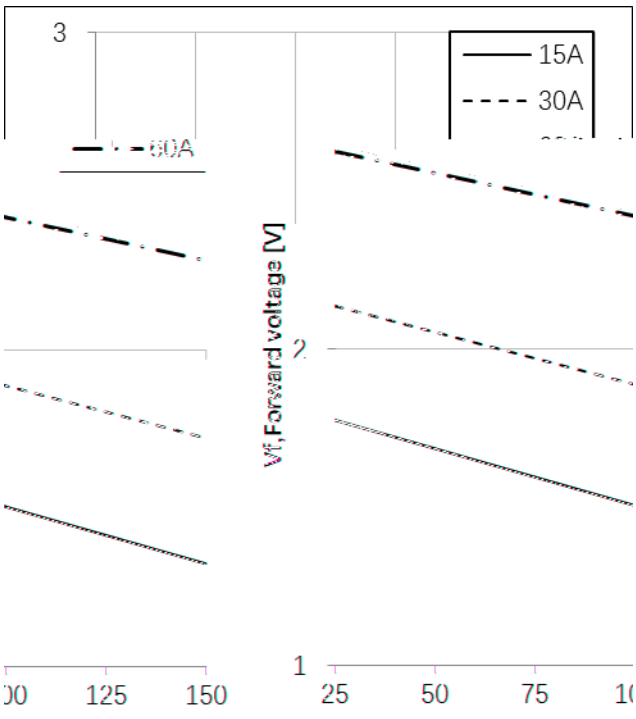


Fig 18. Diode Transient Thermal Impedance



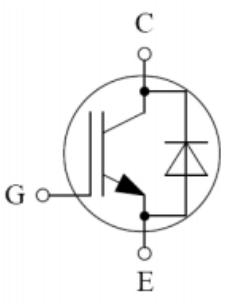
ge [V]
t as a function of
ge

Vf,Forward volta
Fig13. Diode forawrd curren
foraward volta



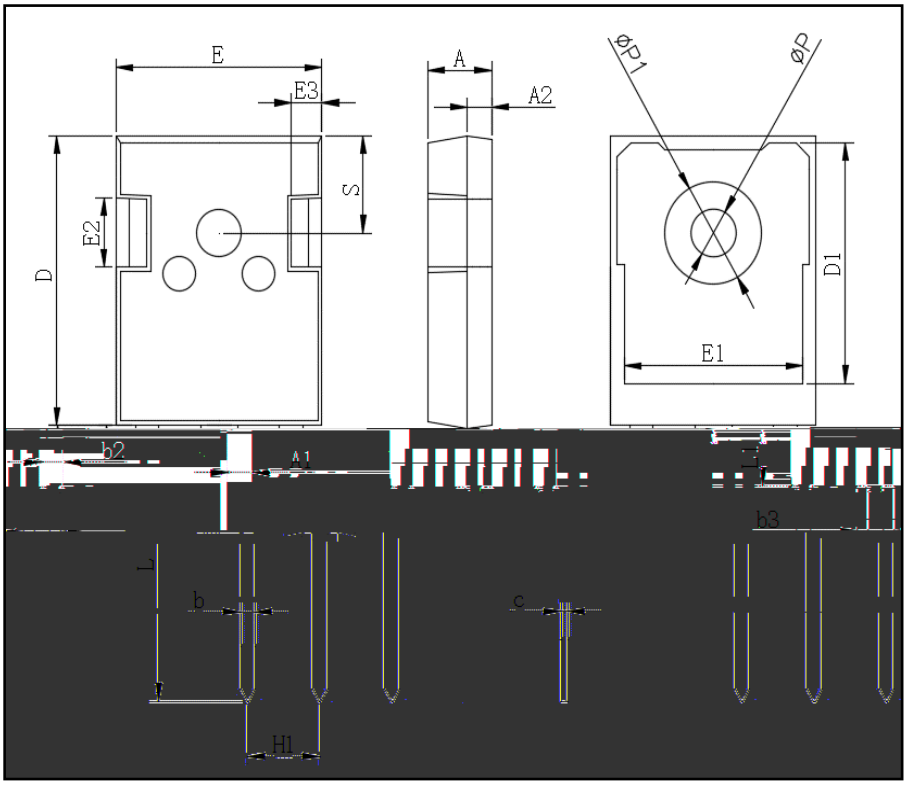
ture [℃]
d voltage as a
nperature

Tj, Junction tempera
Fig20. Typical diode forawar
function of junction ten





Package Outline Information



TO-247AB		
Dim	Min	Max
A	4.80	5.20
A1	2.21	2.61
A2	1.85	2.15
b	1.0	1.4
b2	1.91	2.21
C	0.5	0.7
D	20.70	21.30
D1	16.25	16.85
E	15.50	16.10
E1	13.0	13.6
E2	4.80	5.20
E3	2.30	2.70
L	19.62	20.22
L1	-	4.30
ΦP	3.40	3.80
ΦP1	-	7.30
S	6.15TYP	
H1	5.44TYP	
b3	2.80	3.20