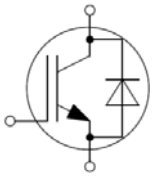
DGW75N65CTL1

RoHS COMPLIANT

IGBT Discrete

V_{CE}	650	V
I_C	75	A
VCE(SAT) IC=75A	1.65	V

Circuit



Applications

- High frequency switching application
- Resonant converters
- Uninterruptible power supply
- Welding converters

Features

- High speed smooth switching device for hard & soft switching
- Maximum junction temperature 175℃
- Positive temperature coefficient
- High ruggedness, temperature stable
- Pb-free lead plating; RoHS compliant

■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 value limited by bondwire T_C= 100°C	I_C	85 80	A
Diode Forward Current, limited by T_{jmax} T_C= 25°C value limited by bondwire T_C= 100°C	I_F	85 80	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≤ 150°C		300	A
Pulsed Collector Current, V_{GE}=15V, tp limited by T_{jmax}	I_{CM}	300	A
Diode Pulsed Current, tp limited by T_{jmax}	IFpuls	300	A
Power Dissipation , Tj=175°C,Tc=25°C	P_{tot}	395	W
Operating Junction Temperature	T_j	-40...+175	°C
Storage Temperature	T_s	-55...+150	°C
Soldering Temperature, wave soldering 1.6mm (0.063in.) from case for 10s		260	°C

■Electrical Characteristics of the IGBT（T_j= 25℃unless otherwise specified）:

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static						
Collector-Emitter Breakdown Voltage	BV_{CES}	V_{GE}=0V, I_C=250μA	650		-	V
Gate Threshold Voltage	$V_{GE(th)}$	V_{GE}=V_{CE}, I_C=0.75mA	4.25	5.05	5.85	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	V_{GE}=15V, I_C=75A T_j=25°C, T_j=125°C T_j=150°C	1.45	1.65 2.05 2.15	1.95	V
Zero Gate Voltage Collector Current	I_{CES}	V_{CE}=650V, V_{GE}=0V T_j= 25°C, T_j=150°C			0.25 3.00	mA
Gate-Emitter Leakage Current	I_{GES}	V_{CE}= 0V, V_{GE}= ± 20V			200	nA

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Dynamic						
Input Capacitance	C_{ies}	V_{CE}= 25V, V_{GE}= 0V, f = 1MHz	-	8.15	-	nF
Reverse Transfer Capacitance	C_{res}		-	0.24	-	
Gate Charge	Q_G	V_{CC}=300V,I_C=75A, V_{GE}=15V	-	0.58	-	uC

■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}=300V, I_C=75A, V_{GE}= 0v~15V, Rg=10Ω,Ls=60nH	-	75	-	ns
Rise Time	t_r		-	91	-	ns
Turn-on Energy	E_{on}		-	2.5	-	mJ
Turn-off Delay Time	$t_{d(off)}$		-	468	-	ns
Fall Time	t_f		-	41	-	ns
Turn-off Energy	E_{off}		-	1.3	-	mJ
Total switching energy	Ets			3.8		mJ
Dynamic , at T_j= 125℃						
Turn-on Delay Time	$t_{d(on)}$	V_{CC}=300V, I_C=75A, V_{GE}= 0v~15V, Rg=10Ω,Ls=60nH	-	70	-	ns
Rise Time	t_r		-	79	-	ns
Turn-on Energy	E_{on}		-	3.5	-	mJ
Turn-off Delay Time	$t_{d(off)}$		-	508	-	ns
Fall Time	t_f		-	48	-	ns
Turn-off Energy	E_{off}		-	1.6	-	mJ
Total switching energy	Ets			5.1		mJ
Dynamic , at T_j= 150℃						
Turn-on Delay Time	$t_{d(on)}$	V_{CC}=300V, I_C=75A, V_{GE}= 0v~15V, Rg=10Ω,Ls=60nH	-	68	-	ns
Rise Time	t_r		-	76	-	ns
Turn-on Energy	E_{on}		-	3.7	-	mJ
Turn-off Delay Time	$t_{d(off)}$		-	519	-	ns
Fall Time	t_f		-	52	-	ns
Turn-off Energy	E_{off}		-	1.7	-	mJ
Total switching energy	Ets			5.4		mJ

■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= 75A T_j= 25°C, T_j= 125°C T_j= 150°C	1.30	1.61 1.45 1.41	1.90	V

■Electrical Characteristics of the Diode

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Dynamic , at T_j= 25℃						
Reverse Recovery Current	I_{rr}	I_F=75A,V_R=300V -di/dt=550A/μs,	-	13	-	A
Reverse Recovery Charge	Q_{rr}		-	0.73	-	uC
Diode reverse recovery time	trr		-	100	-	ns
Reverse Recovery Energy	Erec		-	0.12		mJ
Dynamic , at Tj= 125℃						
Reverse Recovery Current	I_{rr}	I_F=75A,V_R=300V -di/dt=550A/μs,	-	32	-	A
Reverse Recovery Charge	Q_{rr}		-	3.4	-	uC
Diode reverse recovery time	trr		-	140	-	ns
Reverse Recovery Energy	Erec		-	0.4		mJ
Dynamic , at Tj= 150℃						
Reverse Recovery Current	I_{rr}	I_F=75A,V_R=300V -di/dt=550A/μs,	-	38	-	A
Reverse Recovery Charge	Q_{rr}		-	3.58	-	uC
Diode reverse recovery time	trr		-	160	-	ns
Reverse Recovery Energy	Erec		-	0.49		mJ

■Thermal Resistance

Parameter	Symbol	Max. Value	Unit
IGBT Thermal Resistance, Junction - Case	R_{th}(j-c)	0.38	K/W
Diode Thermal Resistance, Junction - Case	R_{th}(j-c)	0.45	K/W
Thermal Resistance, Junction - Ambient	R_{th}(j-a)	40	K/W

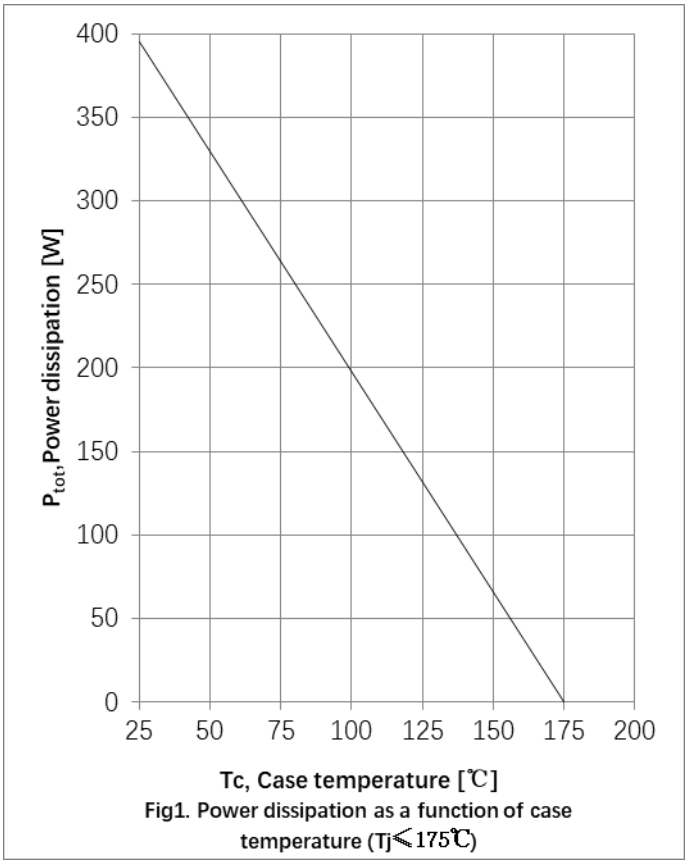


Fig1. Power dissipation as a function of case temperature (Tj≤175℃)

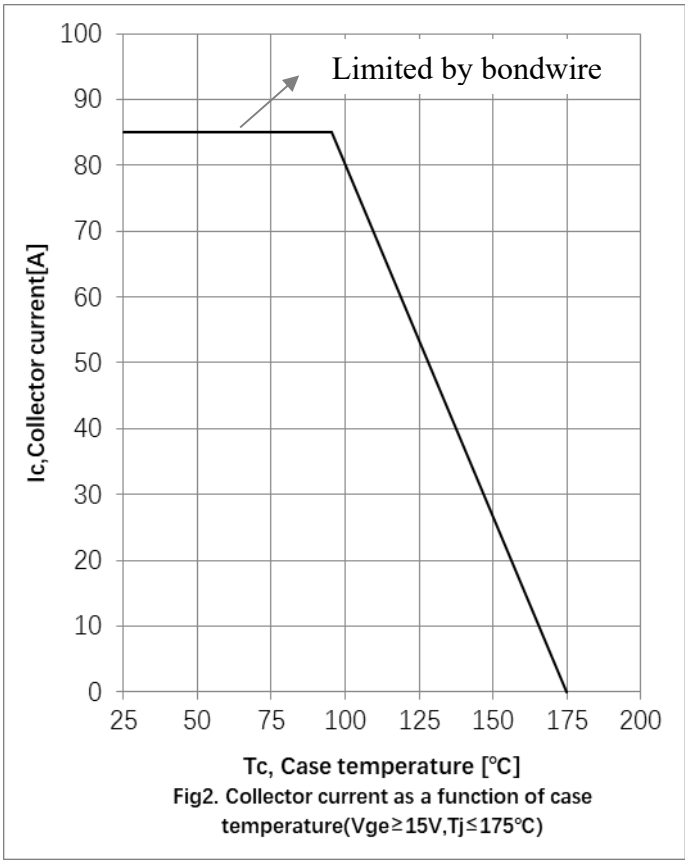


Fig2. Collector current as a function of case temperature(Vge≥15V,Tj≤175°C)

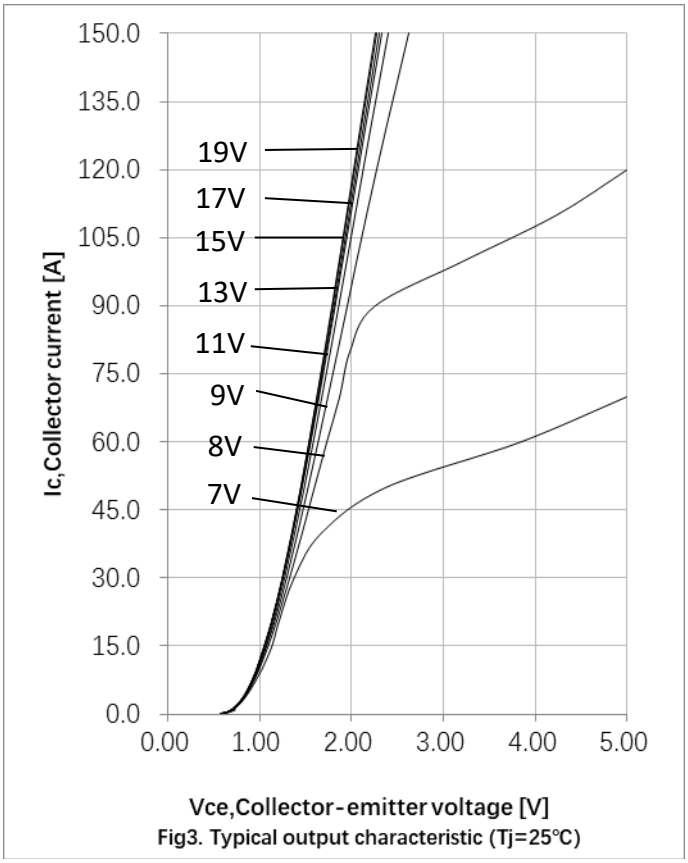


Fig3. Typical output characteristic (Tj=25°C)

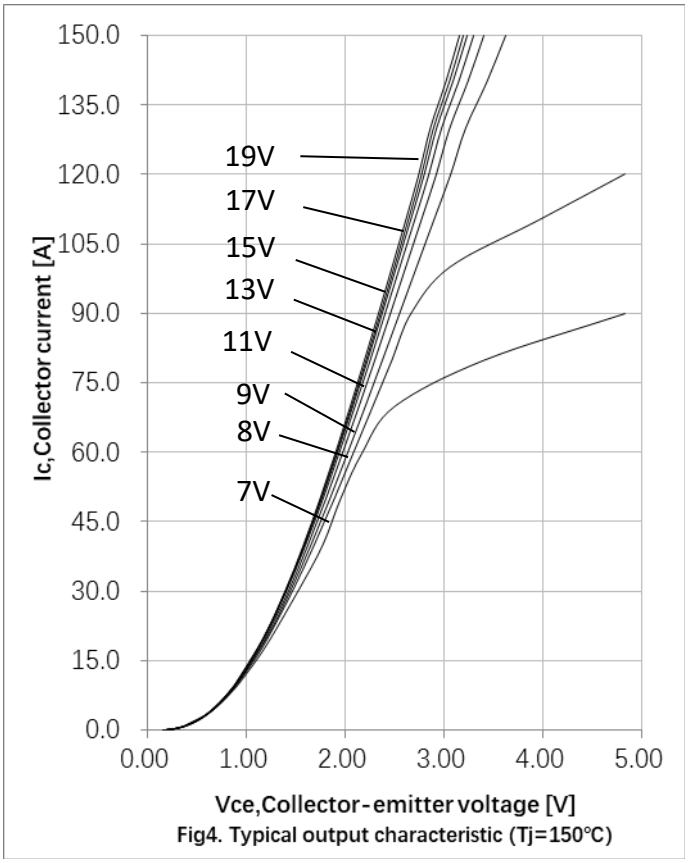


Fig4. Typical output characteristic (Tj=150°C)

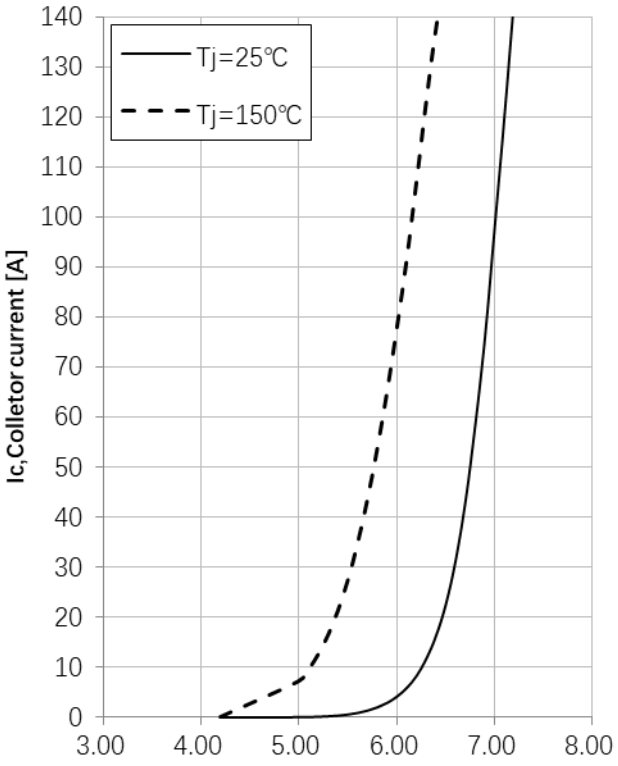


Fig5. Typical transfer characteristic (Vce=20V)

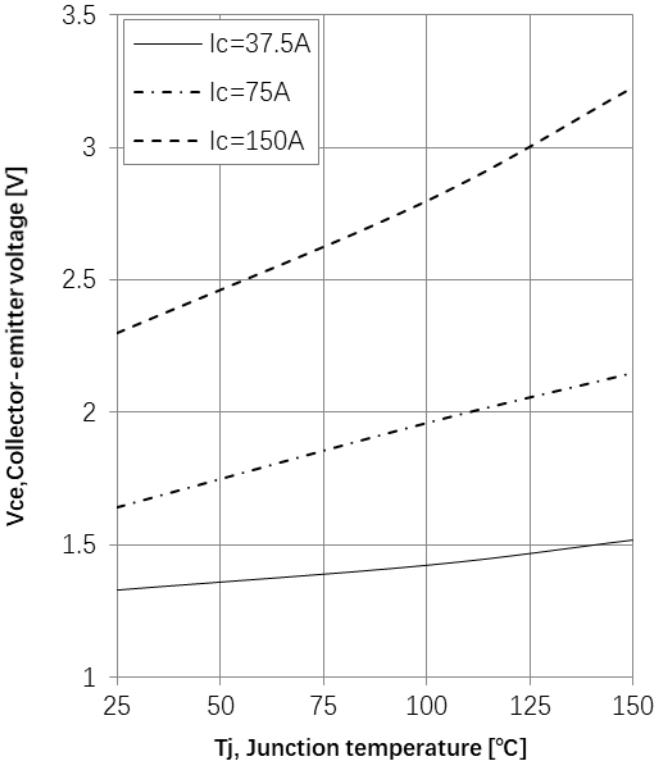


Fig6. Typical collector-emmiter saturation voltage as a function of junction temperature(Vge=15V)

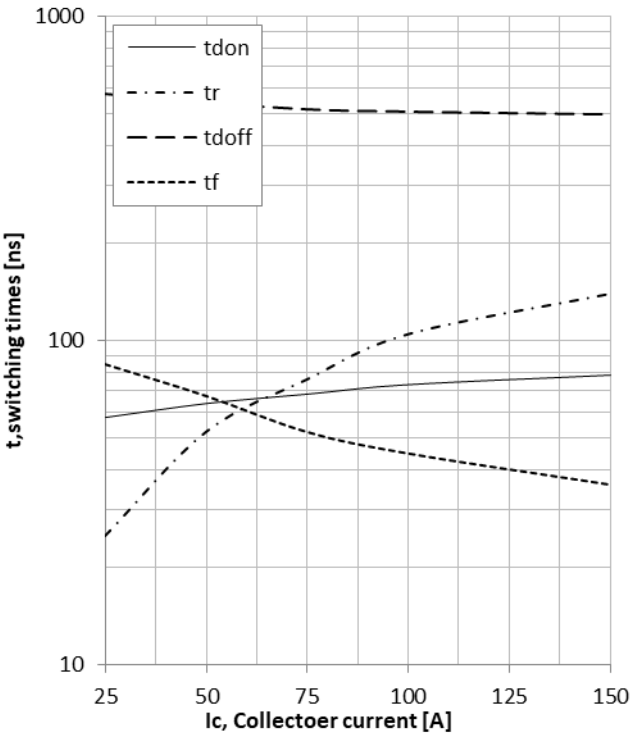


Fig7. Typical switching time as a function of collect current (inductive load,Tj=150℃,Vce=300V,Vge=0/15V,Rg=10Ω)

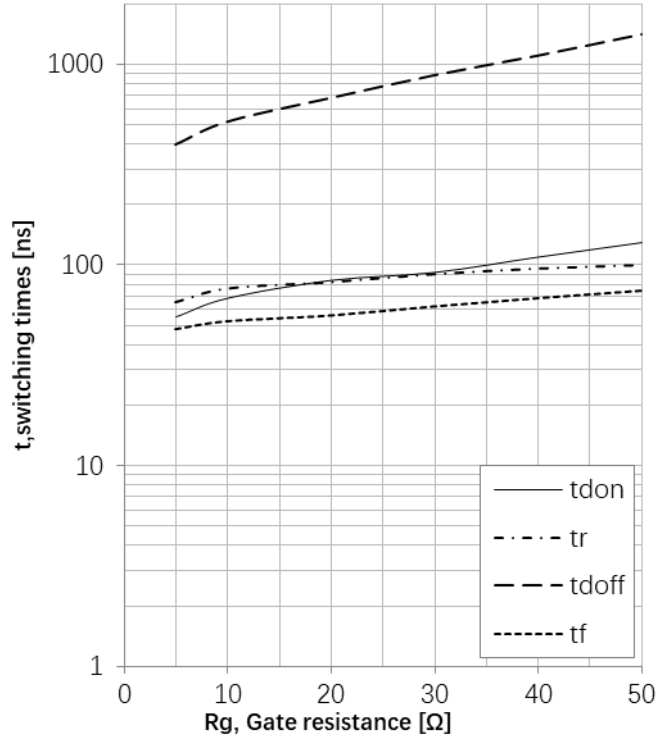


Fig8. Typical swotching times as a fuction of gate resistance（inductive load,Tj=150℃,Vce=300V,Vge=0/15V,Ic=75A）

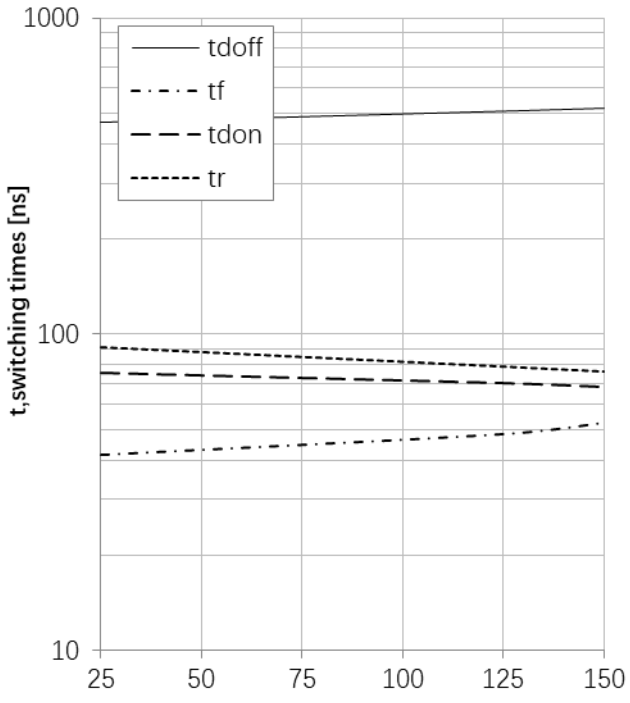


Fig9. Typical swotching times as a fuction of junction temperature（inductive load,Ic=75A,Vce=300V, Vge=0/15V,Rg=10Ω）

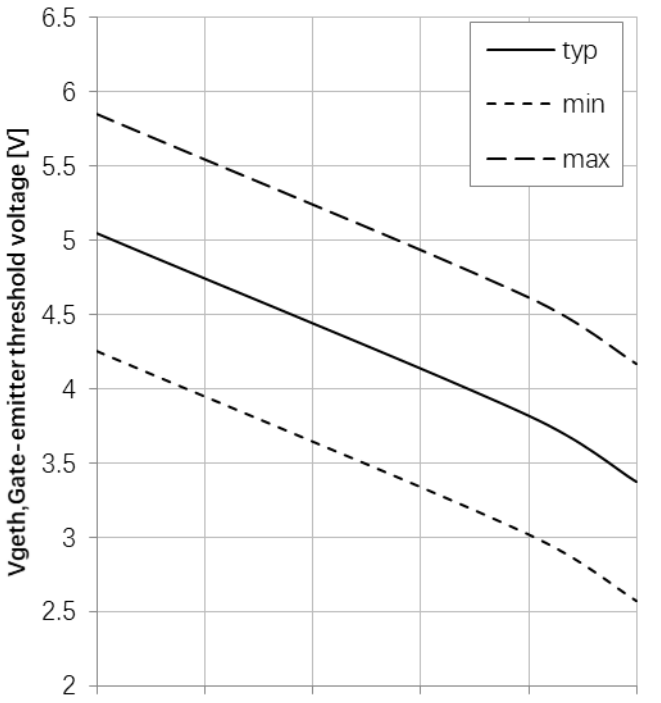


Fig10. Gate-emitter threshold voltage as a fuction of Junction temperature(Ic=0.75mA)

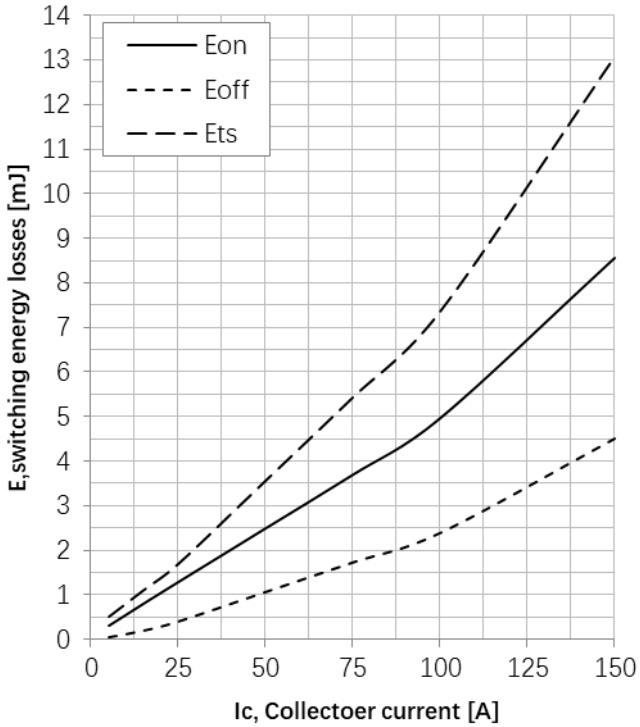


Fig11. Typical swotching energy losses as a fuction of collect current (inductiveload,Tj=150C,Vce=300V,Vge=0/15V,Rg=10Ω)

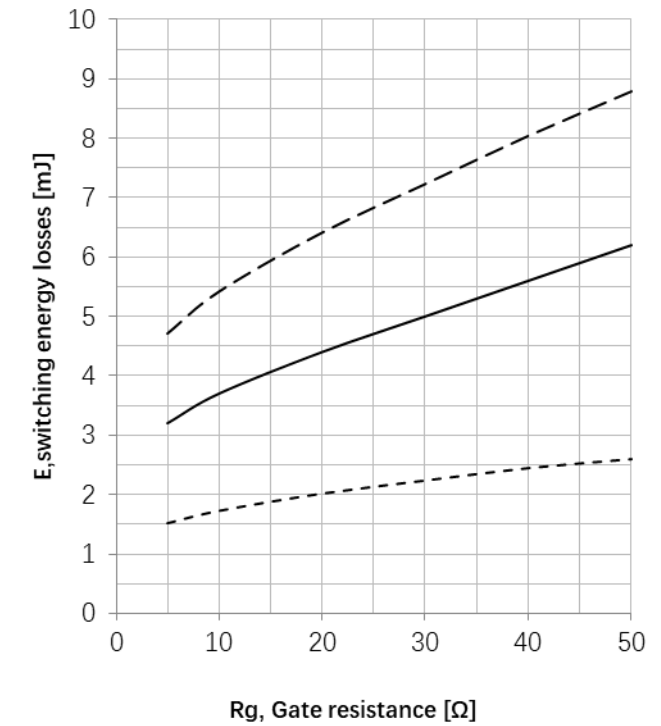


Fig12. Typical swotching energy losses as a fuction of gate resistance (inductive load,Tj=150C,Vce=300V,Vge=0/15V,Ic=75A)

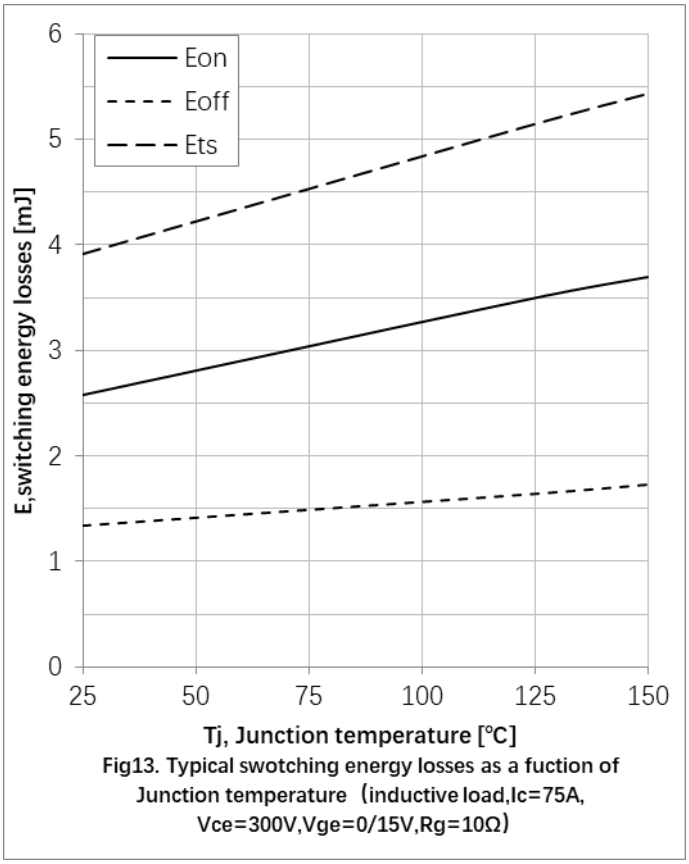


Fig13. Typical swotching energy losses as a fuction of Junction temperature （inductive load,Ic=75A, Vce=300V,Vge=0/15V,Rg=10Ω）

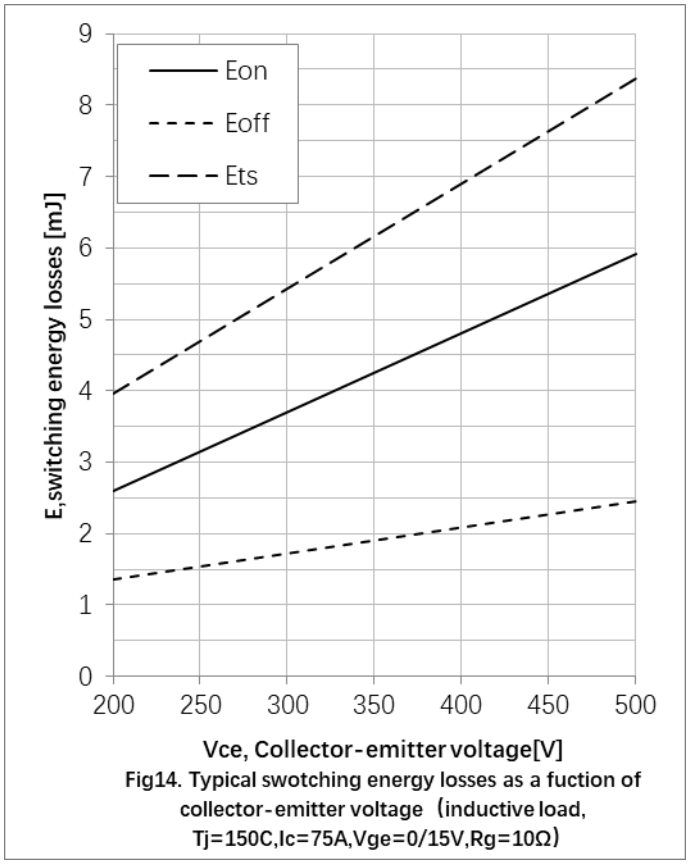


Fig14. Typical swotching energy losses as a fuction of collector-emitter voltage （inductive load, Tj=150C,Ic=75A,Vge=0/15V,Rg=10Ω）

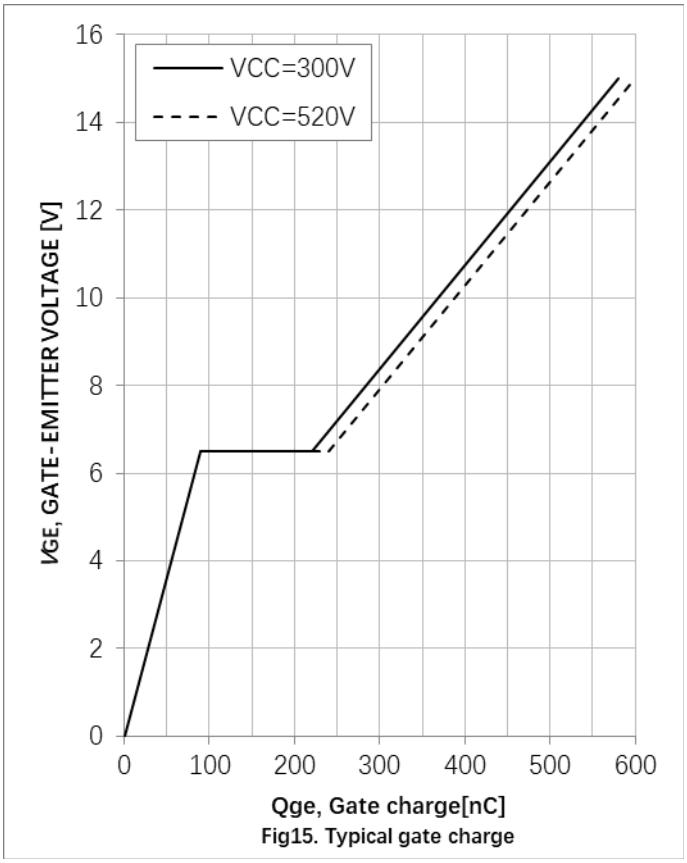


Fig15. Typical gate charge

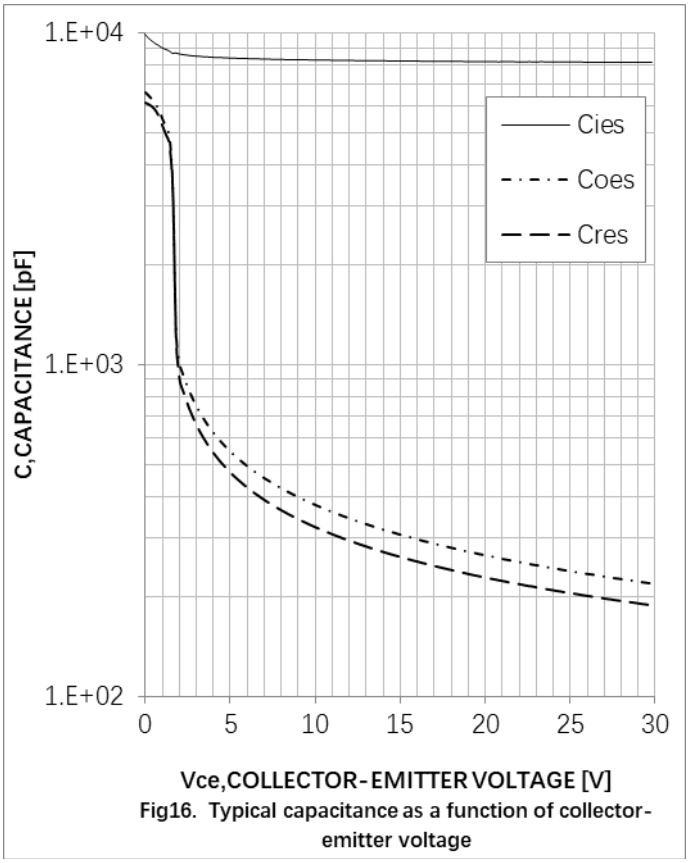


Fig16. Typical capacitance as a function of collector-emitter voltage

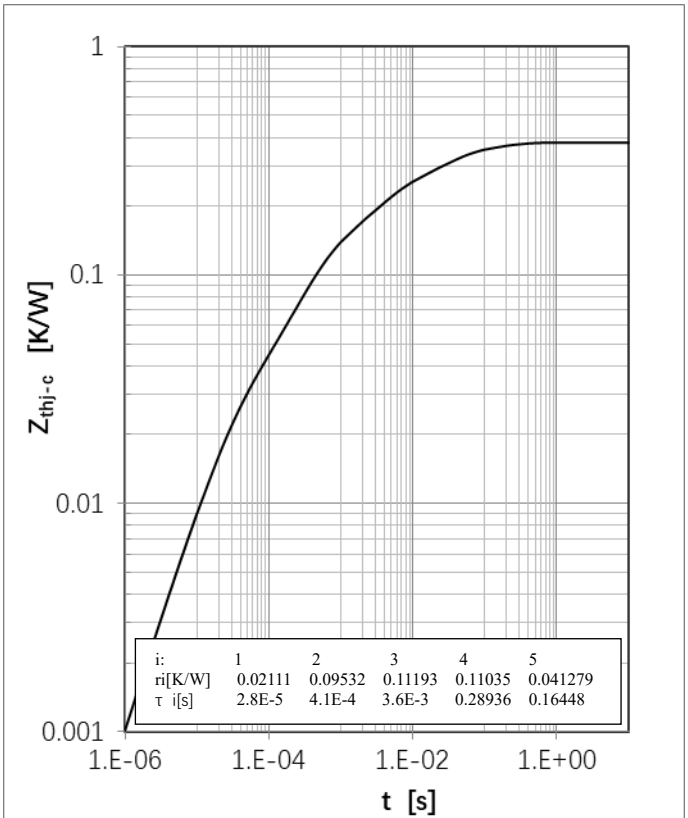


Fig 17. IGBT Transient Thermal Impedance

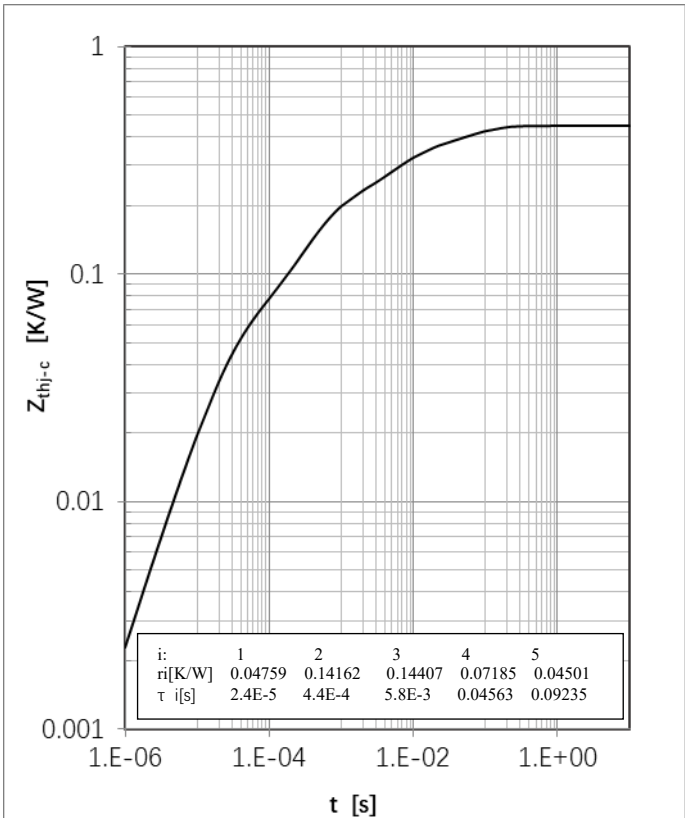


Fig 18. Diode Transient Thermal Impedance

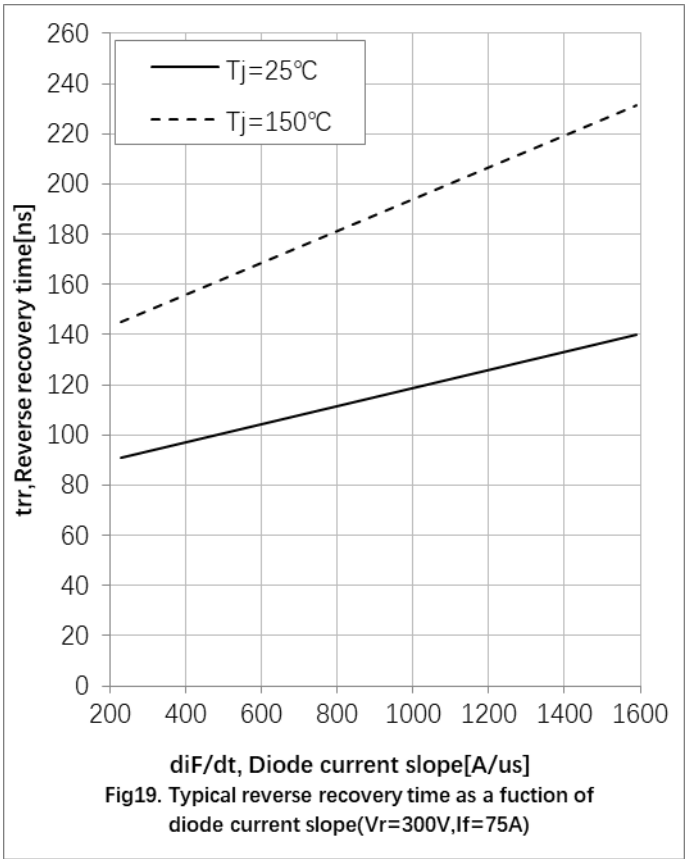


Fig19. Typical reverse recovery time as a fuction of diode current slope(Vr=300V,If=75A)

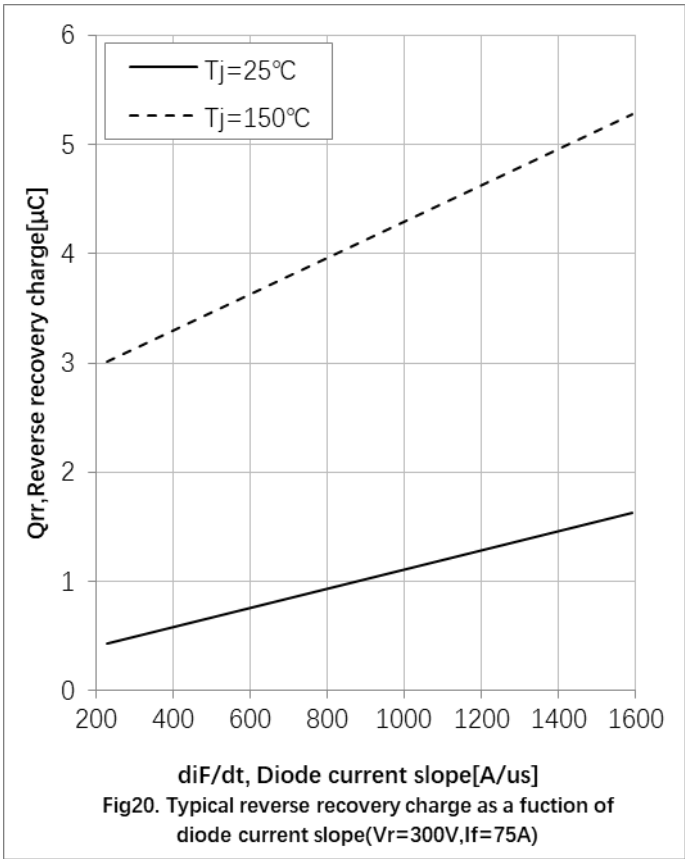


Fig20. Typical reverse recovery charge as a fuction of diode current slope(Vr=300V,If=75A)

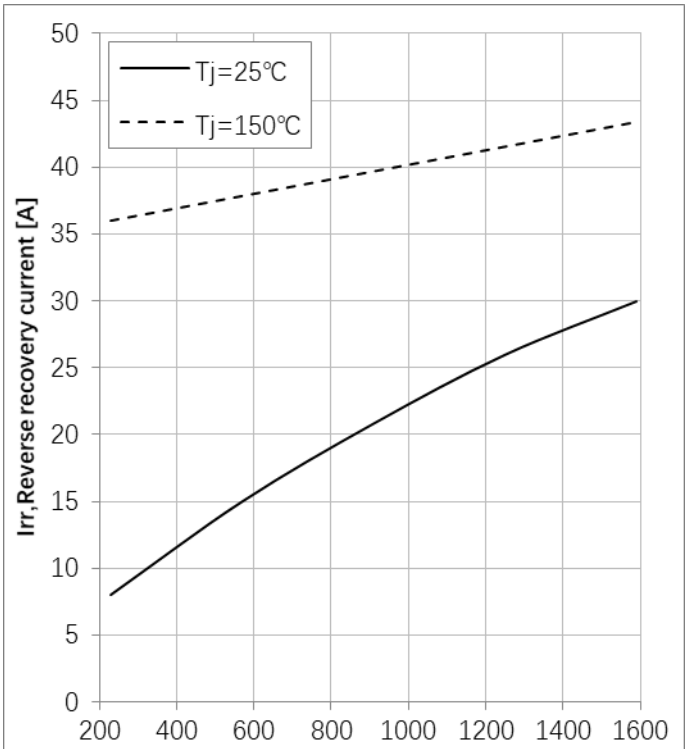


Fig21. Typical reverse recovery current as a fuction of diode current slope(Vr=300V,If=75A)

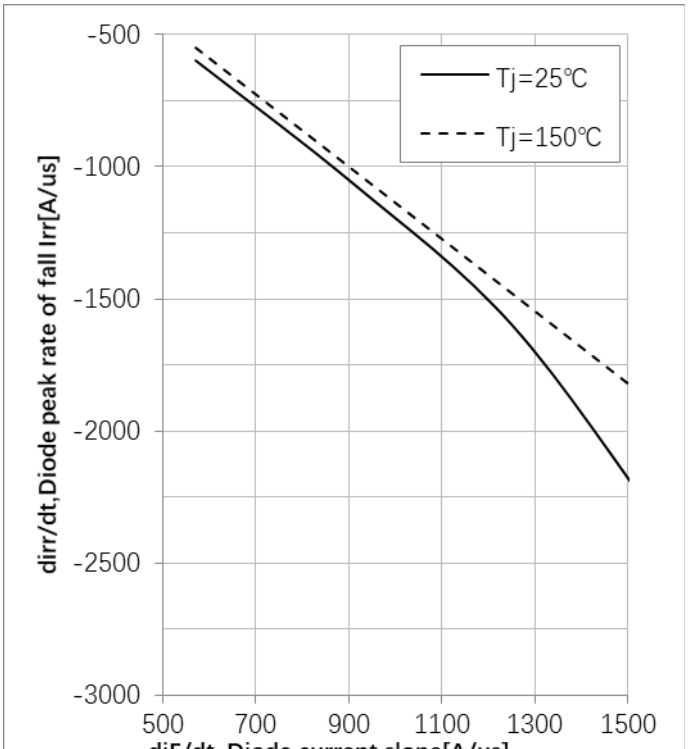


Fig22. Typical diode peak rate of fall of reverse recovery current as a fuction of diode current slope(Vr=300V,If=75A)

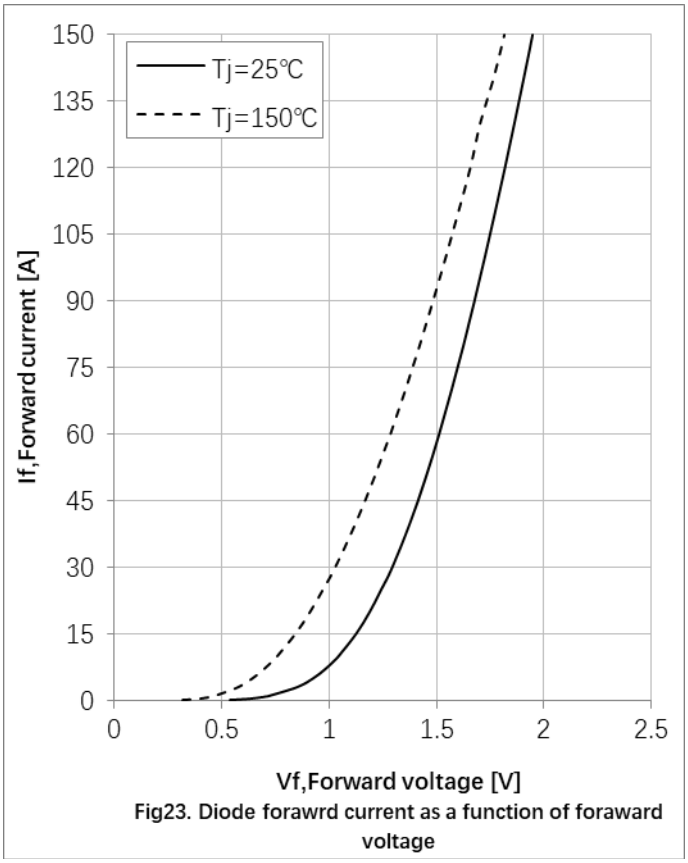


Fig23. Diode forawrd current as a function of foraward voltage

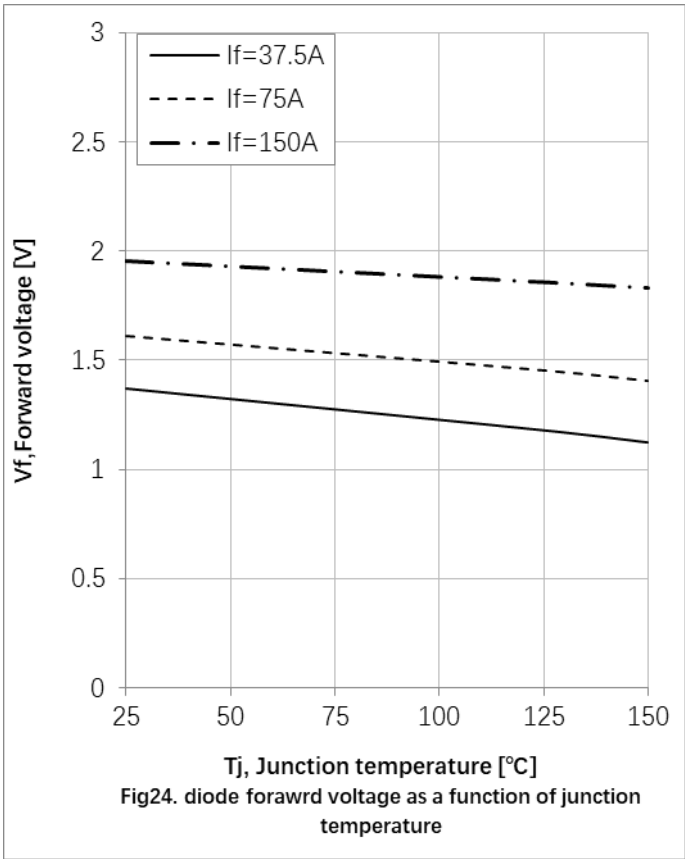
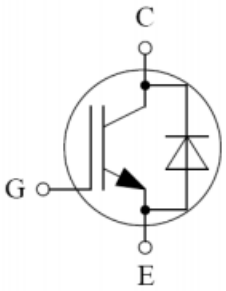
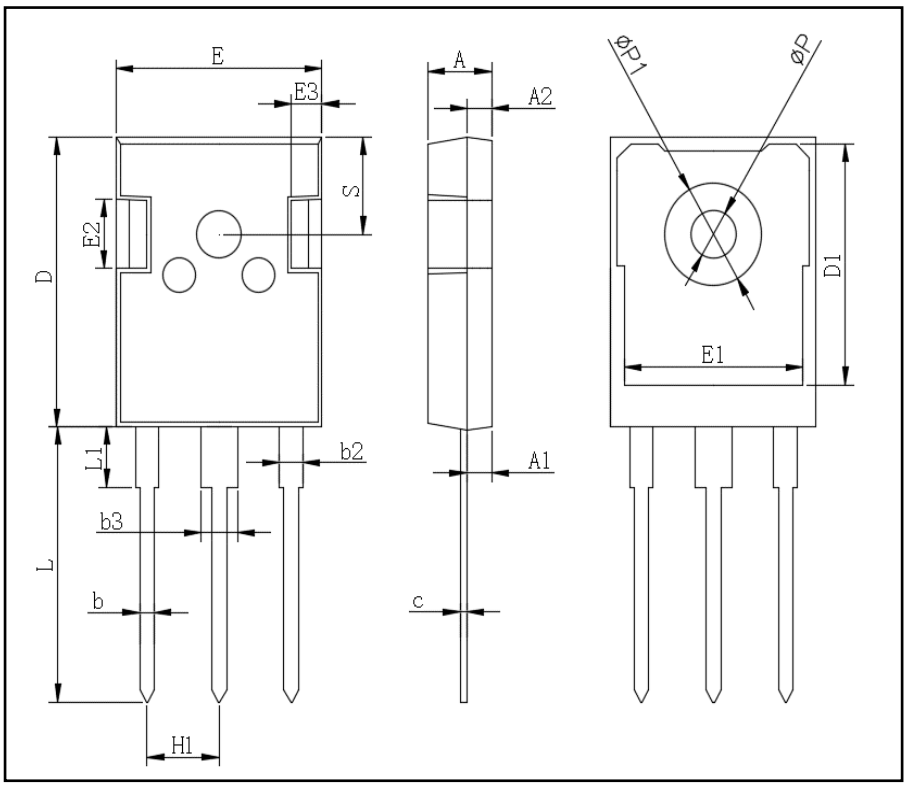


Fig24. diode forawrd voltage as a function of junction temperature

Circuit Diagram



■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