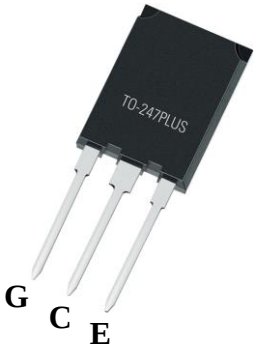
DGQ100N120CTL2A

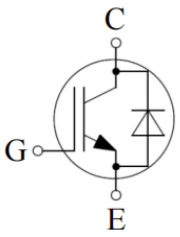
RoHS COMPLIANT



IGBT Discrete

V_{CE}	1200	V
I_C	100	A
$V_{CE(SAT)}$ I_C=100A	1.50	V

Circuit



Applications

- Inverter for motor drive
- AC and DC servo drive amplifier
- Uninterruptible power supply

Features

- High breakdown voltage to 1200V for improved reliability
- Maximum junction temperature 175℃
- Positive temperature coefficient
- Including fast & soft recovery anti-parallel FWD
- High short circuit capability(10us)

Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-Emitter Breakdown Voltage	V_{CE}	1200	V
DC Collector Current, limited by T_{jmax} T_C= 25°C T_C= 100°C	I_C	 150 100	A
Diode Forward Current, limited by T_{jmax} T_C= 25°C T_C= 100°C	I_F	 150 100	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}≤1200V, T_j≤ 150°C		200	A
Pulsed Collector Current, V_{GE}=15V, tp limited by T_{jmax}	I_{CM}	200	A
Diode Pulsed Current, tp limited by T_{jmax}	I_{Fpuls}	200	A
Short Circuit Withstand Time, V_{GE}= 15V, V_{CC}=600V， V_{CEM}≤1200V	T_{sc}	10	μs
Power Dissipation , Tj=175°C， T_C=25°C	P_{tot}	883	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	1200		-	V
Gate Threshold Voltage	$V_{GE(th)}$	V_{GE}=V_{CE}, I_C=1mA	4.8	5.8	6.8	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	V_{GE}=15V, I_C=100A T_j=25°C, T_j=125°C T_j=150°C		1.50 1.75 1.85	1.90	V
Zero Gate Voltage Collector Current	I_{CES}	V_{CE}=1200V, V_{GE}=0V T_j= 25°C, T_j=150°C			1 5	mA
Gate-Emitter Leakage Current	I_{GES}	V_{CE}= 0V, V_{GE}= ± 20V			100	nA

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Dynamic						
Input Capacitance	C_{ies}	V_{CE}= 25V, V_{GE}= 0V, f = 1MHz	-	12.9	-	nF
Reverse Transfer Capacitance	C_{res}		-	0.06	-	
Gate Charge	Q_G	V_{CC}=600V,I_C=100A, V_{GE}=15V	-	0.36	-	uC
Short Circuit Collector Current	I_{SC}	V_{GE}=15V, tsc≤10us, Vcc=600V	-	439	-	A

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= 100A T_j= 25°C, T_j= 125°C T_j= 150°C		2.00 2.05 2.05	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}= 600V, I_C=100A, V_{GE}= -5V~15V, R_g=10Ω	-	208	-	ns
Rise Time	t_r		-	165	-	ns
Turn-on Energy	E_{on}		-	17.6	-	mJ
Turn-off Delay Time	$t_{d(off)}$		-	448	-	ns
Fall Time	t_f		-	144	-	ns
Turn-off Energy	E_{off}		-	6.6	-	mJ
Dynamic , at T_j= 125℃						
Turn-on Delay Time	$t_{d(on)}$	V_{CC}= 600V, I_C=100A, V_{GE}= -5V~15V, R_g=10Ω	-	237	-	ns
Rise Time	t_r		-	163	-	ns
Turn-on Energy	E_{on}		-	18.1	-	mJ
Turn-off Delay Time	$t_{d(off)}$		-	490	-	ns
Fall Time	t_f		-	309	-	ns
Turn-off Energy	E_{off}		-	8.7	-	mJ
Dynamic , at T_j= 150℃						
Turn-on Delay Time	$t_{d(on)}$	V_{CC}= 600V, I_C=100A, V_{GE}= -5V~15V, R_g=10Ω	-	251	-	ns
Rise Time	t_r		-	161	-	ns
Turn-on Energy	E_{on}		-	18.5	-	mJ
Turn-off Delay Time	$t_{d(off)}$		-	507	-	ns
Fall Time	t_f		-	262	-	ns
Turn-off Energy	E_{off}		-	9.6	-	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=100A, V_R=600V, di/dt= -590A/μs	-	26	-	A
Diode reverse recovery time	trr		-	273	-	ns
Reverse Recovery Charge	Q_{rr}		-	4.43	-	uC
Reverse Recovery Energy	Erec		-	1.25	-	mJ
Dynamic , at Tj= 125℃						
Reverse Recovery Current	I_{rr}	I_F=100A, V_R=600V, di/dt= -590A/μs	-	38	-	A
Diode reverse recovery time	trr		-	421	-	ns
Reverse Recovery Charge	Q_{rr}		-	10.25	-	uC
Reverse Recovery Energy	Erec		-	3.19	-	mJ
Dynamic , at Tj= 150℃						
Reverse Recovery Current	I_{rr}	I_F=100A, V_R=600V, di/dt= -590A/μs	-	45	-	A
Diode reverse recovery time	trr		-	496	-	ns
Reverse Recovery Charge	Q_{rr}		-	12.44	-	uC
Reverse Recovery Energy	Erec		-	4.13	-	mJ

Thermal Resistance

Parameter	Symbol	Max. Value	Unit
IGBT Thermal Resistance, Junction - Case	R_{th}(j-c)	0.17	K/W
Diode Thermal Resistance, Junction - Case	R_{th}(j-c)	0.27	K/W
Thermal Resistance, Junction - Ambient	R_{th}(j-a)	40	K/W

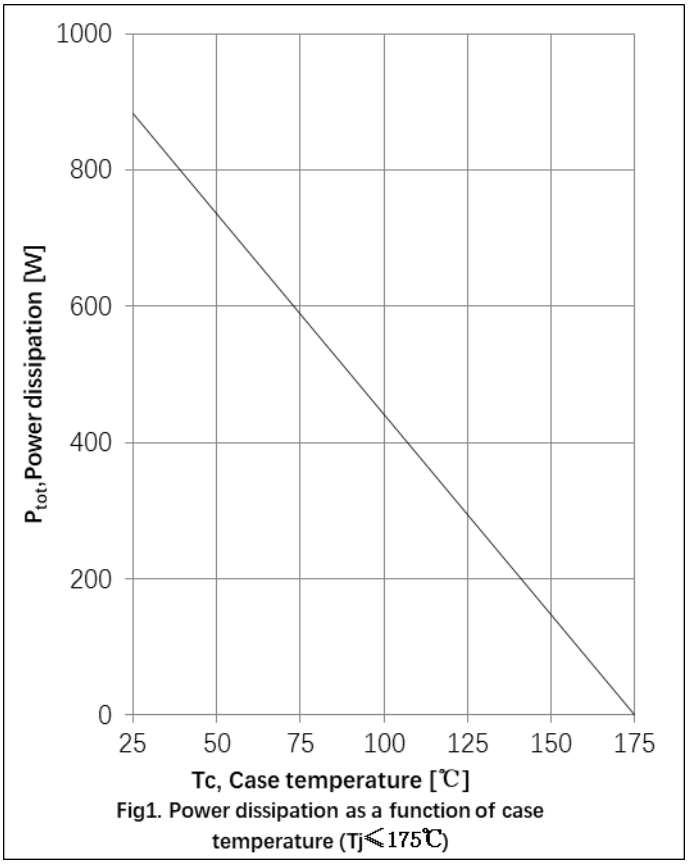


Fig1. Power dissipation as a function of case temperature (Tj≤175℃)

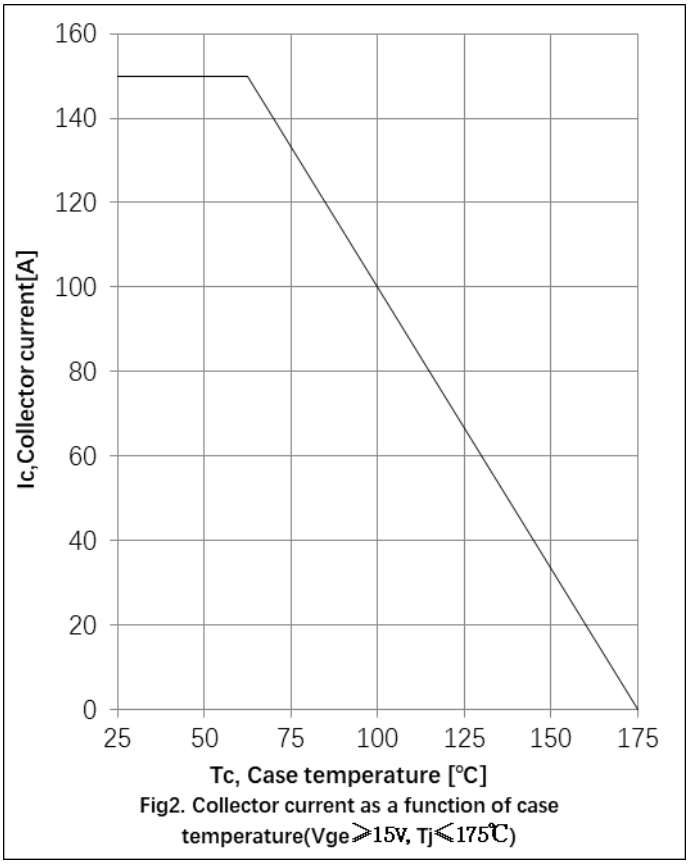


Fig2. Collector current as a function of case temperature(Vge≥15V, Tj≤175℃)

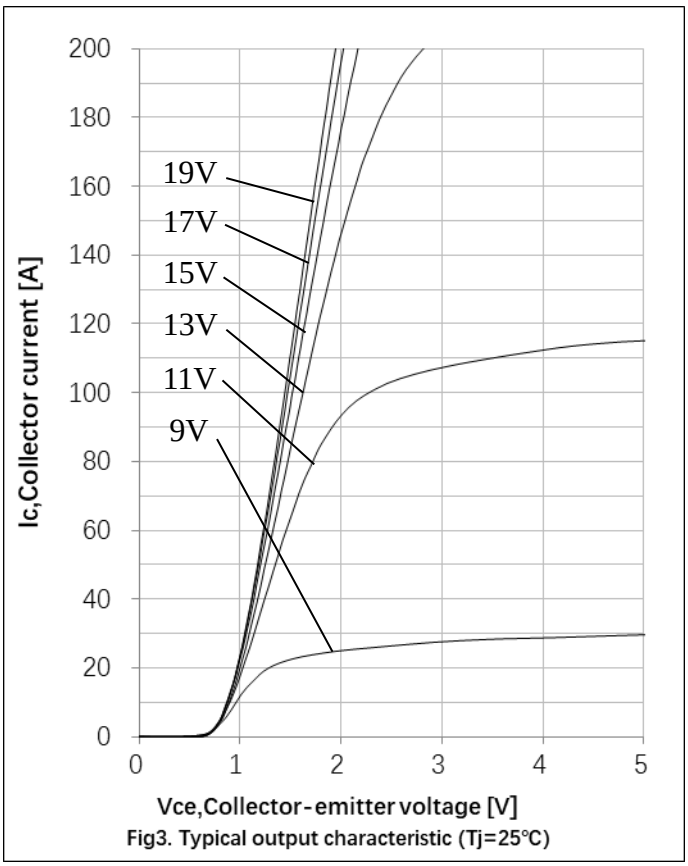


Fig3. Typical output characteristic (Tj=25℃)

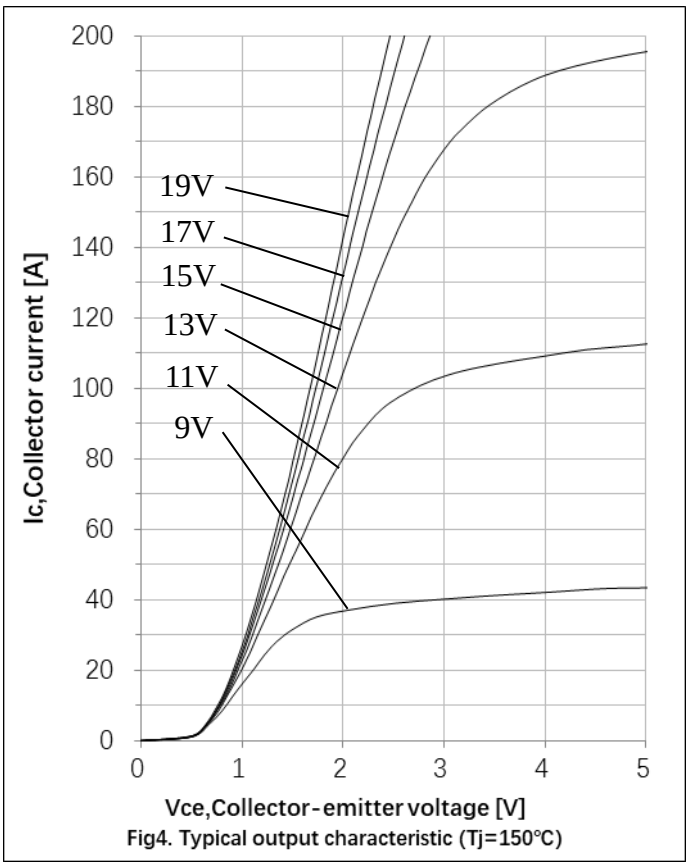


Fig4. Typical output characteristic (Tj=150℃)

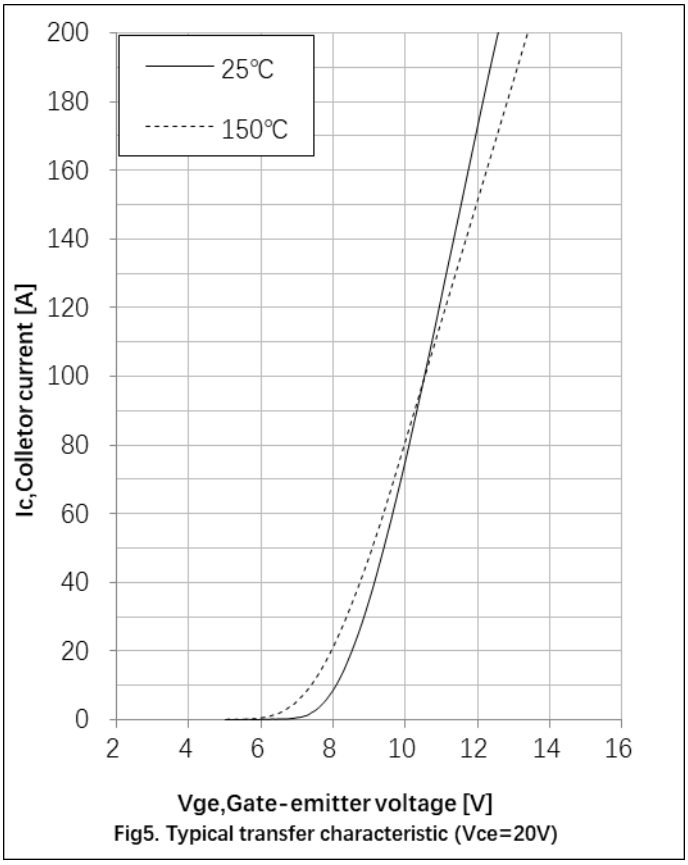


Fig5. Typical transfer characteristic (Vce=20V)

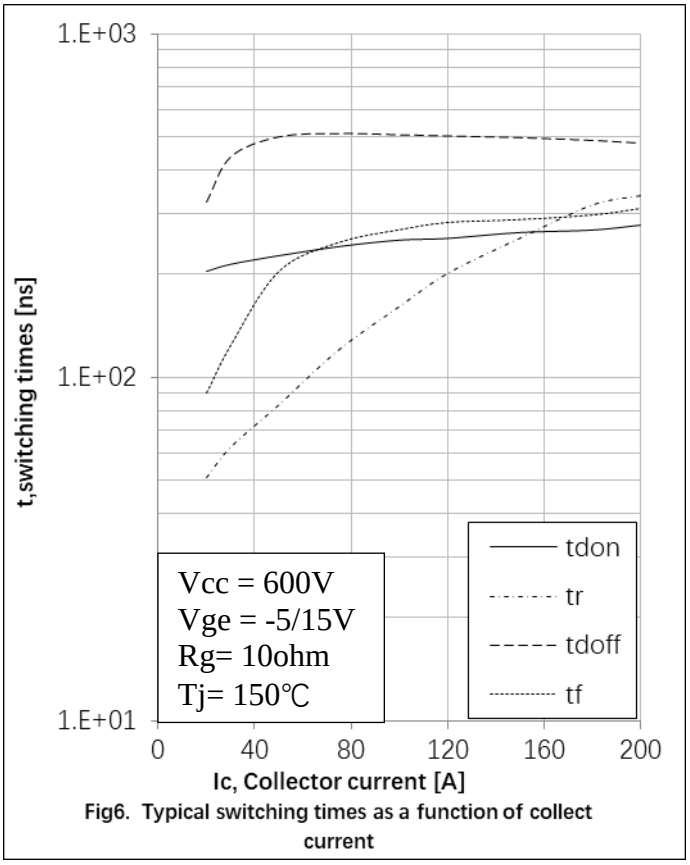


Fig6. Typical switching times as a function of collect current

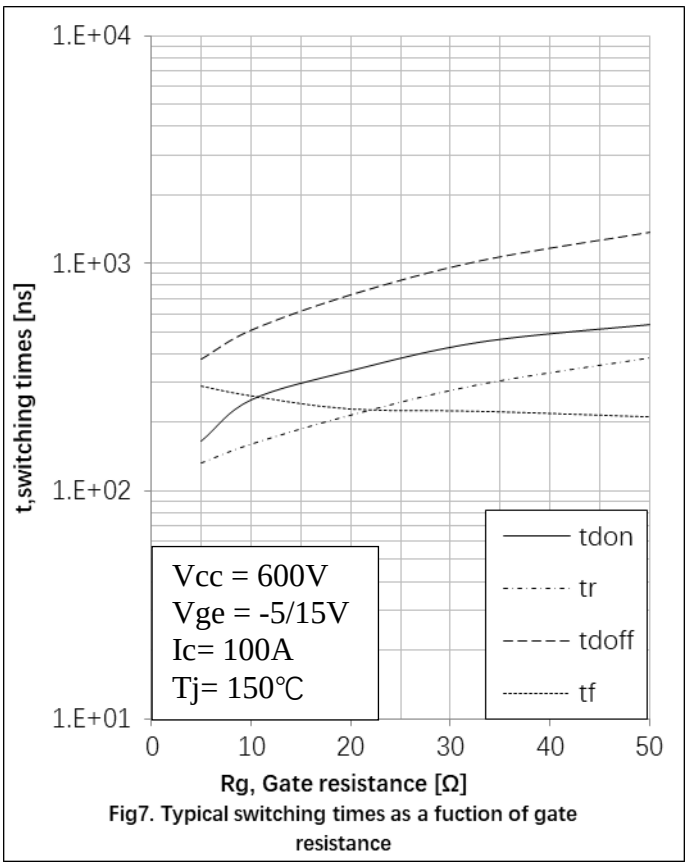


Fig7. Typical switching times as a fuction of gate resistance

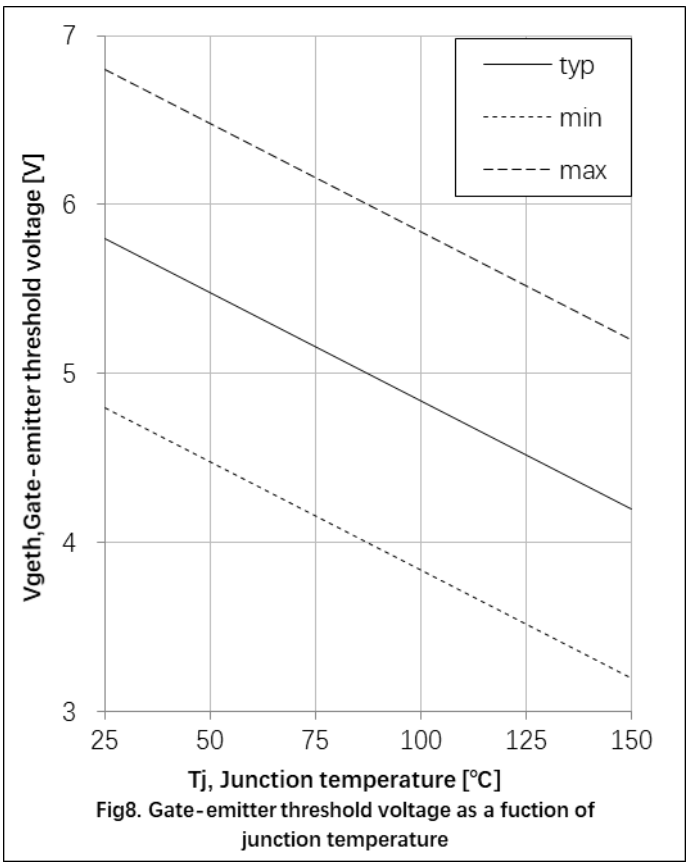


Fig8. Gate-emitter threshold voltage as a fuction of junction temperature

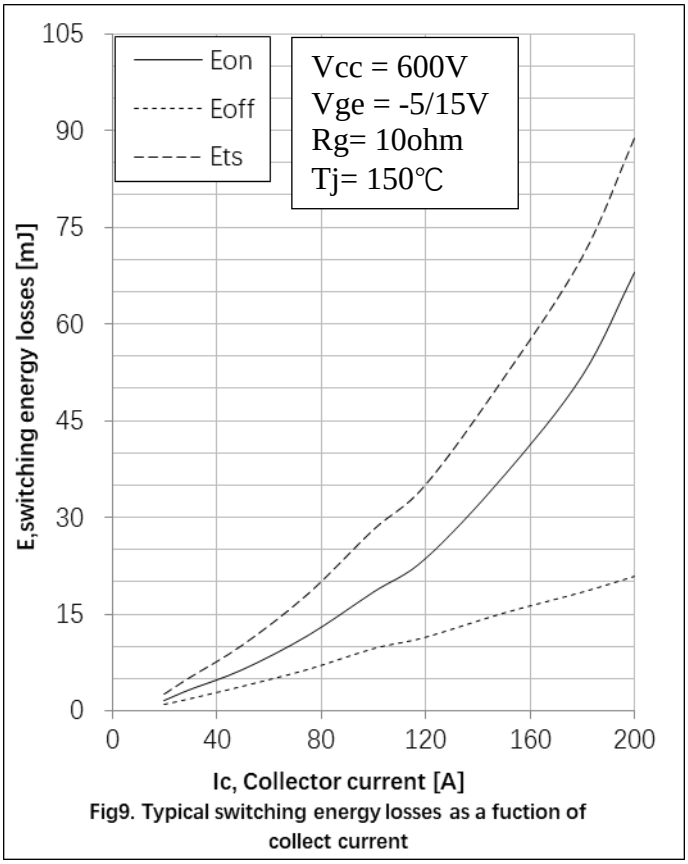


Fig9. Typical switching energy losses as a fuction of collect current

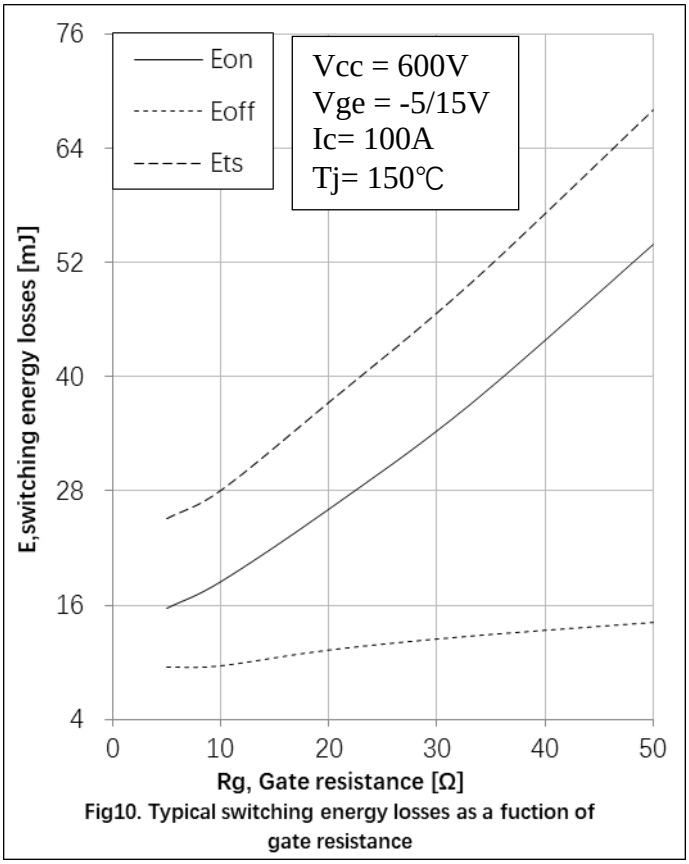


Fig10. Typical switching energy losses as a fuction of gate resistance

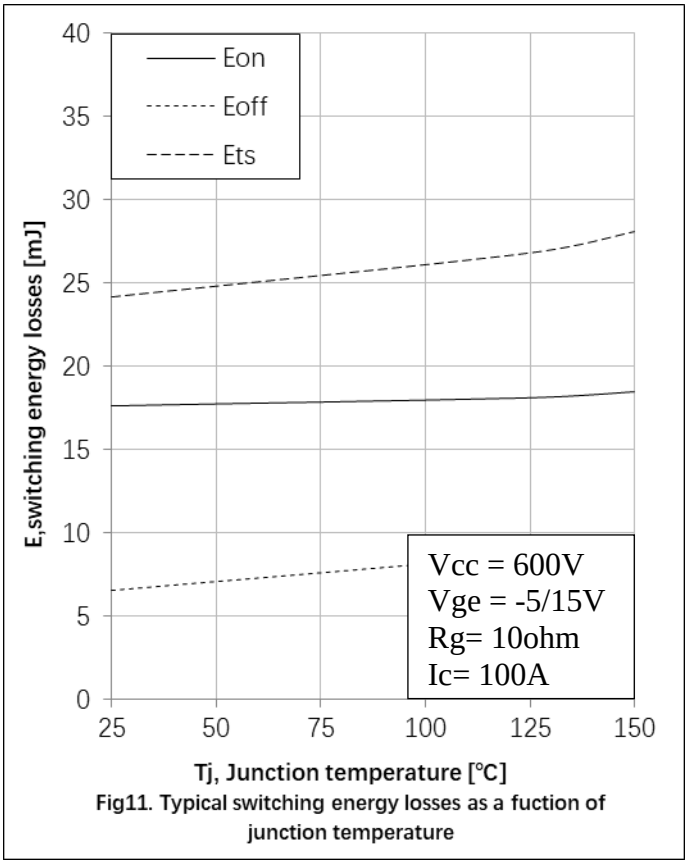


Fig11. Typical switching energy losses as a fuction of junction temperature

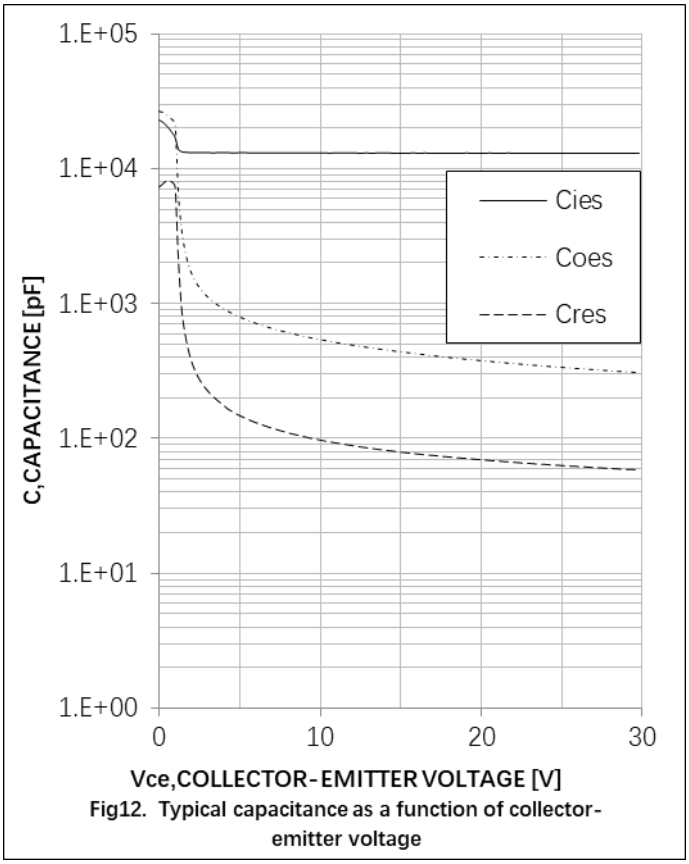


Fig12. Typical capacitance as a function of collector-emitter voltage

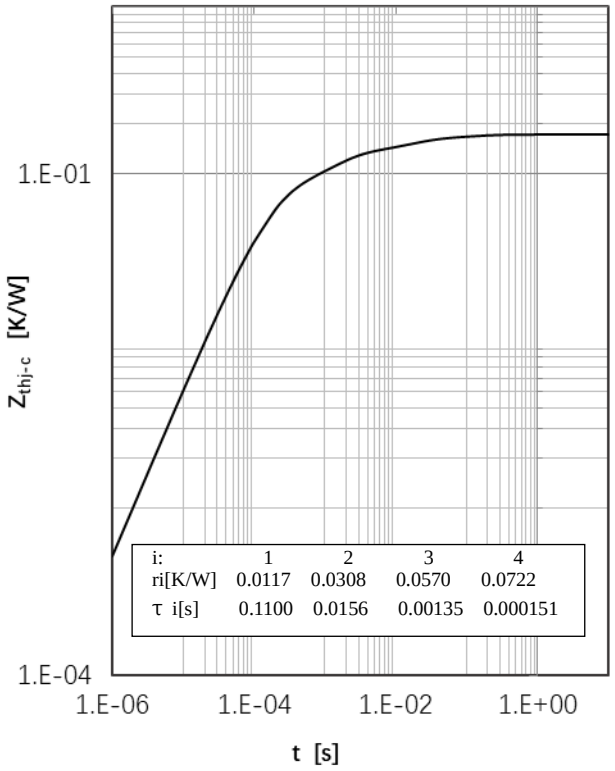


Fig 13. IGBT Transient Thermal Impedance

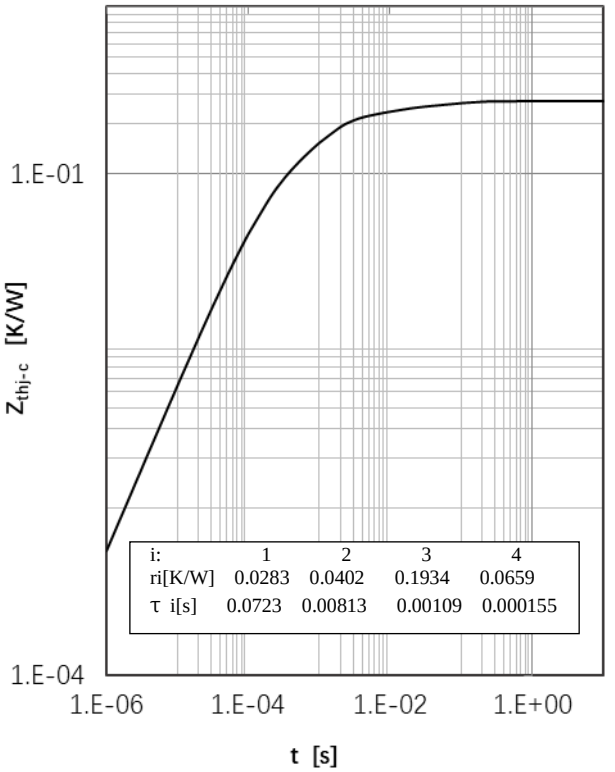


Fig 14. Diode Transient Thermal Impedance

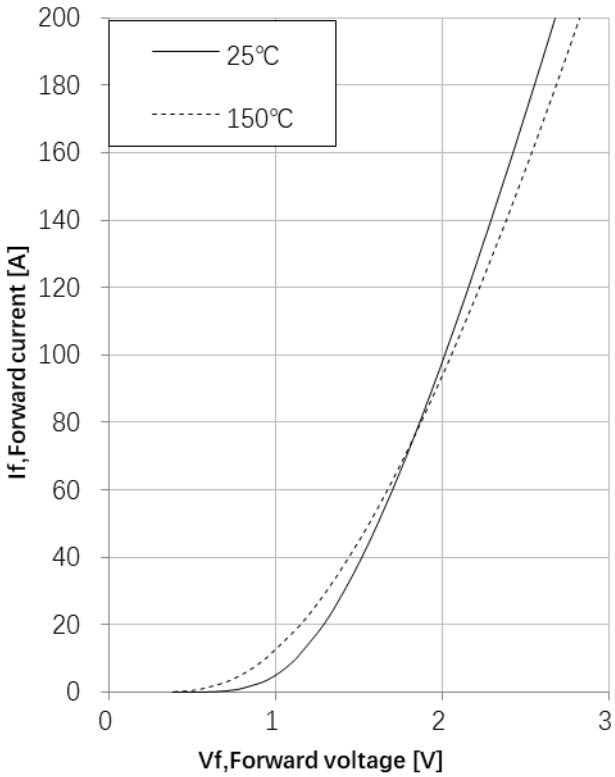


Fig15. Diode forawrd current as a function of foraward voltage

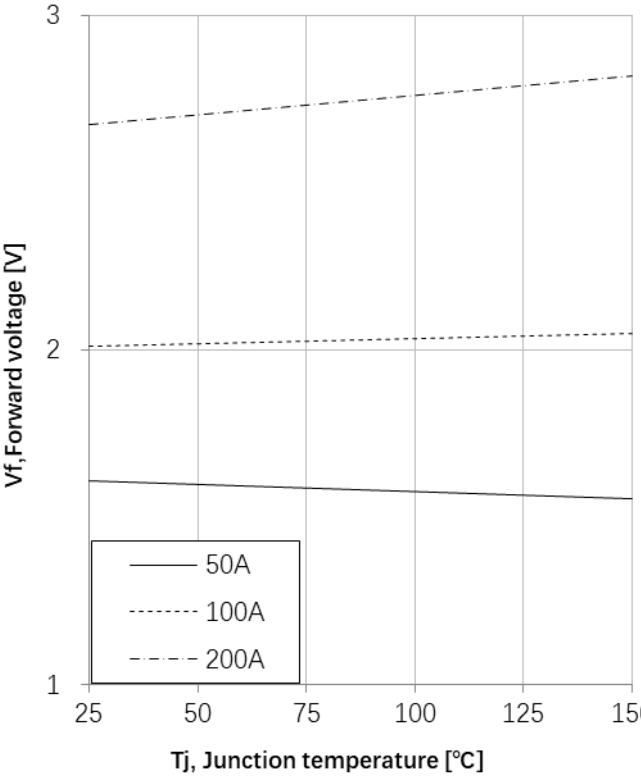
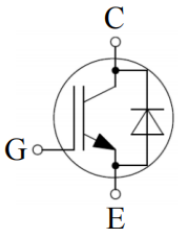


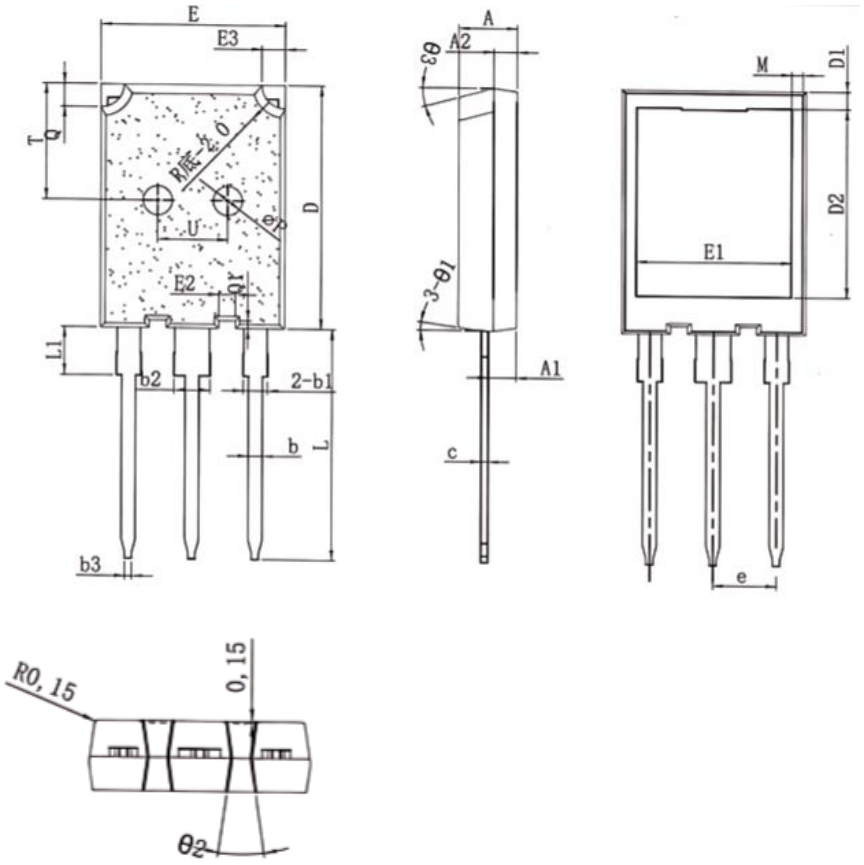
Fig16. Typical diode foraward voltage as a function of junction temperature

Circuit Diagram



- **Package Outline Information**

CASE: TO 247plus



SYMBOL	mm		
	MIN	NOM	MAX
*A	4.90	5.00	5.10
*A1	2.30	2.40	2.50
A2	1.90	2.00	2.10
*b	1.15	1.20	1.25
*b1	1.95	2.10	2.25
*b2	2.95	3.10	3.25
b3	0.45	0.60	0.75
*c	0.55	0.60	0.68
*D	20.90	21.00	21.10
D1	1.00	1.20	1.40
D2	16.05	16.35	16.65
*E	15.70	15.80	15.90
E1	13.10	13.30	13.50
E2	1.25	1.45	1.65
E3	1.80	2.00	2.20
*e	5.40	5.44	5.48
*L	19.80	19.95	20.10
*L1	–	–	4.30
M	0.50	0.70	0.90
ΦP	2.30	2.50	2.70
Q	1.80	2.00	2.20
Q1	0.50	0.68	0.80
T	9.80	10.00	10.20
U	5.80	6.00	6.20
θ1	5°	7°	9°
θ2	13°	16°	19°
θ3	13°	15°	17°

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