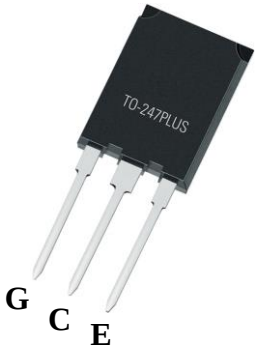
DGQ75N120CTL1A

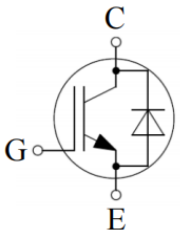
RoHS COMPLIANT



IGBT Discrete

V_{CE}	1200	V
I_C	75	A
$V_{CE(SAT)}$ I_C=75A	1.55	V

Circuit



Applications

- Resonant converters
- Uninterruptible power supplies
- Mid to high range switching frequency

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 75	A
Diode Forward Current, limited by T_{jmax} T_C= 25°C T_C= 100°C	I_F	 150 75	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		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}	I_{Fpuls}	300	A
Short Circuit Withstand Time, V_{GE}= 15V, V_{CC}=600V, V_{CEM}≤1200V	T_{sc}	10	μs
Power Dissipation , Tj=175°C, Tc=25°C	P_{tot}	645	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=2.6mA	4.8	5.6	6.4	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		1.55 1.80 1.90	1.90	V
Zero Gate Voltage Collector Current	I_{CES}	V_{CE}=1200V, V_{GE}=0V T_j= 25°C, T_j=150°C			0.25 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	-	6.92	-	nF
Reverse Transfer Capacitance	C_{res}		-	0.06	-	
Gate Charge	Q_G	V_{CC}=600V,I_C=75A, V_{GE}=15V	-	0.48	-	uC
Short Circuit Collector Current	I_{SC}	V_{GE}=15V, tsc≤10us, Vcc=600V	-	350	-	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= 75A T_j= 25°C, T_j= 125°C T_j= 150°C		2.00 1.90 1.80	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=75A, V_{GE}= -5V~15V, R_g=10Ω	-	135	-	ns
Rise Time	t_r		-	106	-	ns
Turn-on Energy	E_{on}		-	8.5	-	mJ
Turn-off Delay Time	$t_{d(off)}$		-	345	-	ns
Fall Time	t_f		-	210	-	ns
Turn-off Energy	E_{off}		-	5.1	-	mJ
Dynamic , at T_j= 125℃						
Turn-on Delay Time	$t_{d(on)}$	V_{CC}= 600V, I_C=75A, V_{GE}= -5V~15V, R_g=10Ω	-	135	-	ns
Rise Time	t_r		-	110	-	ns
Turn-on Energy	E_{on}		-	10.5	-	mJ
Turn-off Delay Time	$t_{d(off)}$		-	365	-	ns
Fall Time	t_f		-	315	-	ns
Turn-off Energy	E_{off}		-	7.0	-	mJ
Dynamic , at T_j= 150℃						
Turn-on Delay Time	$t_{d(on)}$	V_{CC}= 600V, I_C=75A, V_{GE}= -5V~15V, R_g=10Ω	-	135	-	ns
Rise Time	t_r		-	121	-	ns
Turn-on Energy	E_{on}		-	10.8	-	mJ
Turn-off Delay Time	$t_{d(off)}$		-	375	-	ns
Fall Time	t_f		-	345	-	ns
Turn-off Energy	E_{off}		-	7.5	-	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=75A, V_R=600V, di/dt= -500A/μs	-	9	-	A
Diode reverse recovery time	trr		-	268	-	ns
Reverse Recovery Charge	Q_{rr}		-	3.42	-	uC
Reverse Recovery Energy	Erec		-	1.52	-	mJ
Dynamic , at Tj= 125℃						
Reverse Recovery Current	I_{rr}	I_F=75A, V_R=600V, di/dt= -500A/μs	-	12	-	A
Diode reverse recovery time	trr		-	337	-	ns
Reverse Recovery Charge	Q_{rr}		-	6.58	-	uC
Reverse Recovery Energy	Erec		-	3.18	-	mJ
Dynamic , at Tj= 150℃						
Reverse Recovery Current	I_{rr}	I_F=75A, V_R=600V, di/dt= -500A/μs	-	14	-	A
Diode reverse recovery time	trr		-	375	-	ns
Reverse Recovery Charge	Q_{rr}		-	9.45	-	uC
Reverse Recovery Energy	Erec		-	3.73	-	mJ

Thermal Resistance

Parameter	Symbol	Max. Value	Unit
IGBT Thermal Resistance, Junction - Case	R_{th}(j-c)	0.23	K/W
Diode Thermal Resistance, Junction - Case	R_{th}(j-c)	0.35	K/W
Thermal Resistance, Junction - Ambient	R_{th}(j-a)	40	K/W

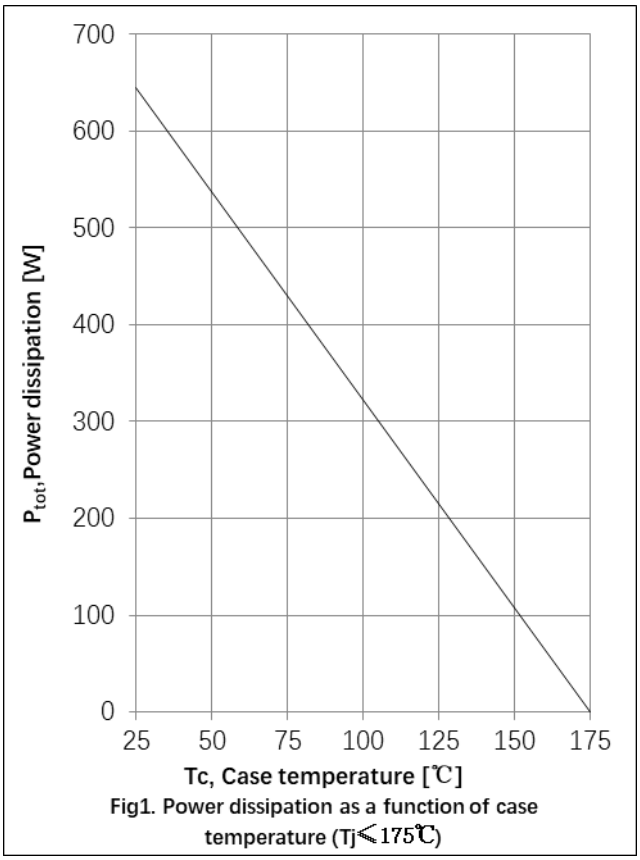


Fig1. Power dissipation as a function of case temperature (Tj≤175℃)

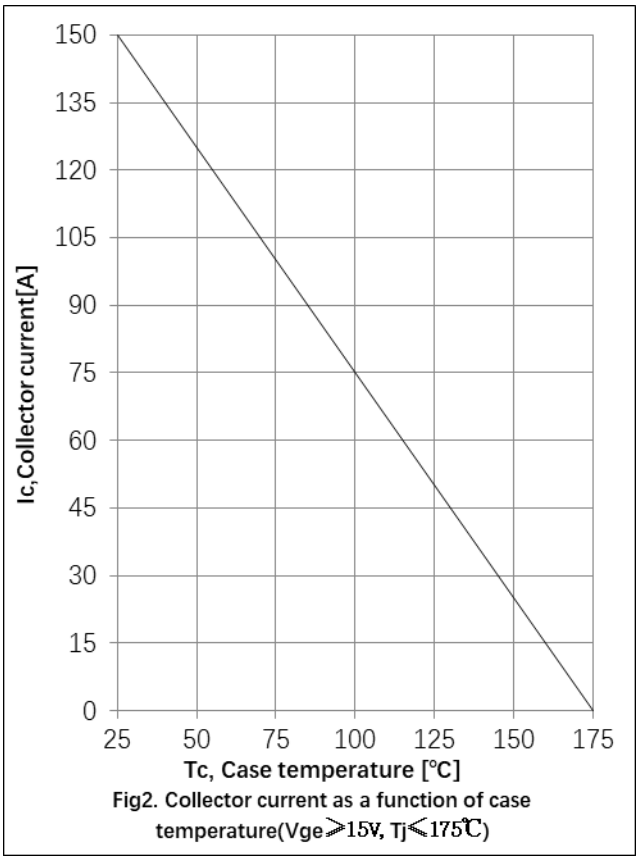


Fig2. Collector current as a function of case temperature(Vge≥15V, Tj≤175℃)

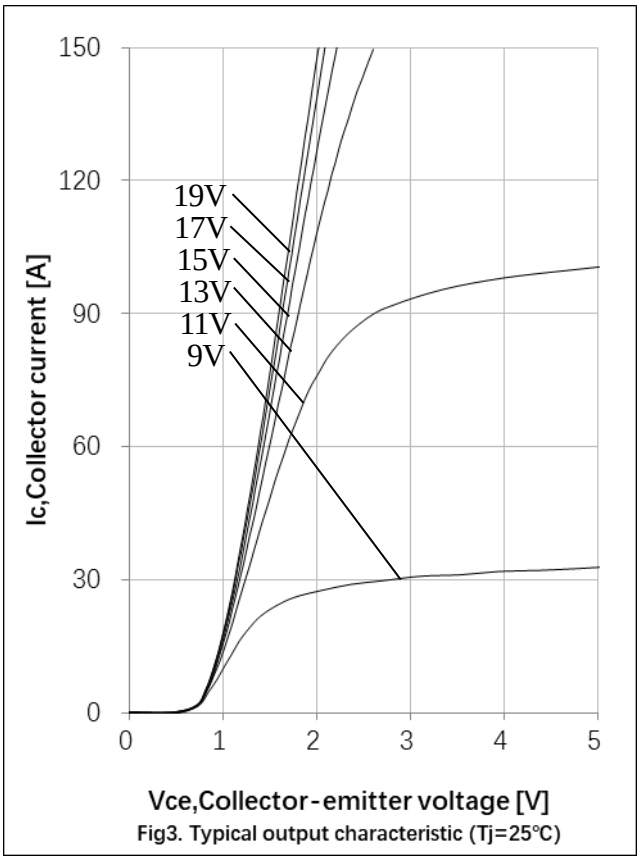


Fig3. Typical output characteristic (Tj=25℃)

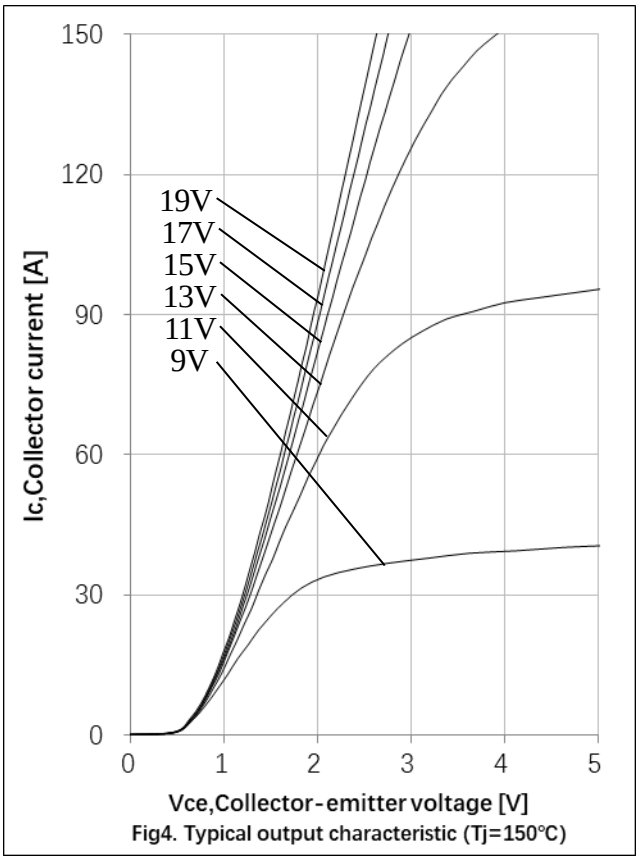


Fig4. Typical output characteristic (Tj=150℃)

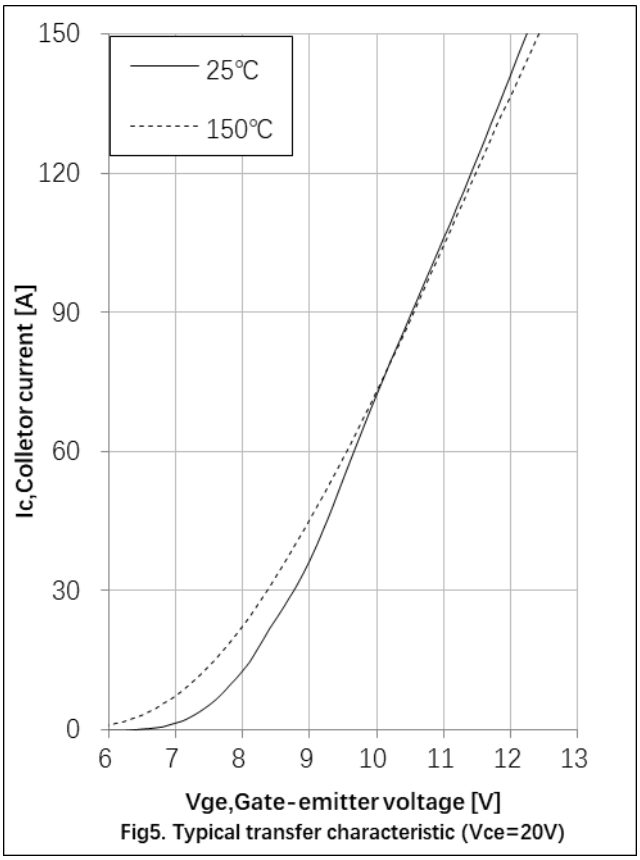


Fig5. Typical transfer characteristic (Vce=20V)

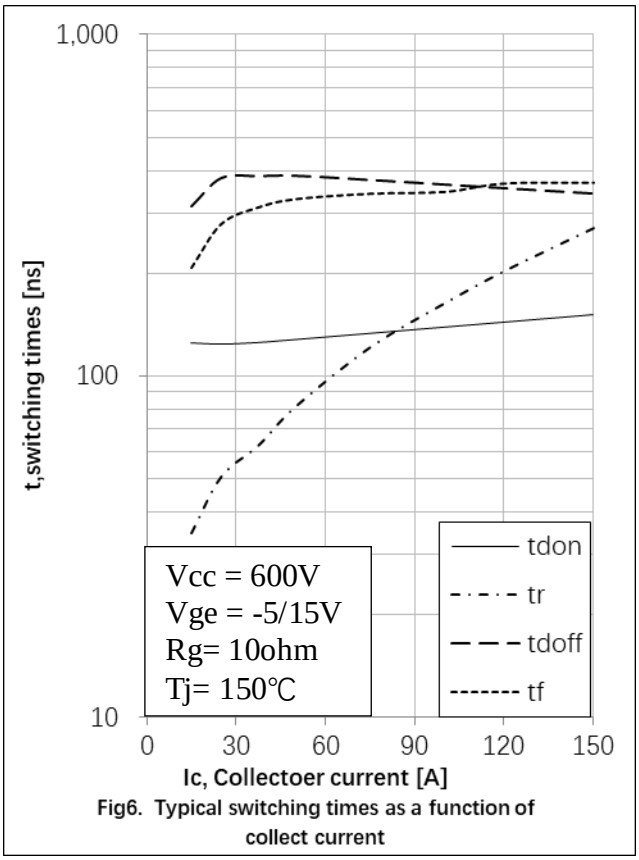


Fig6. Typical switching times as a function of collect current

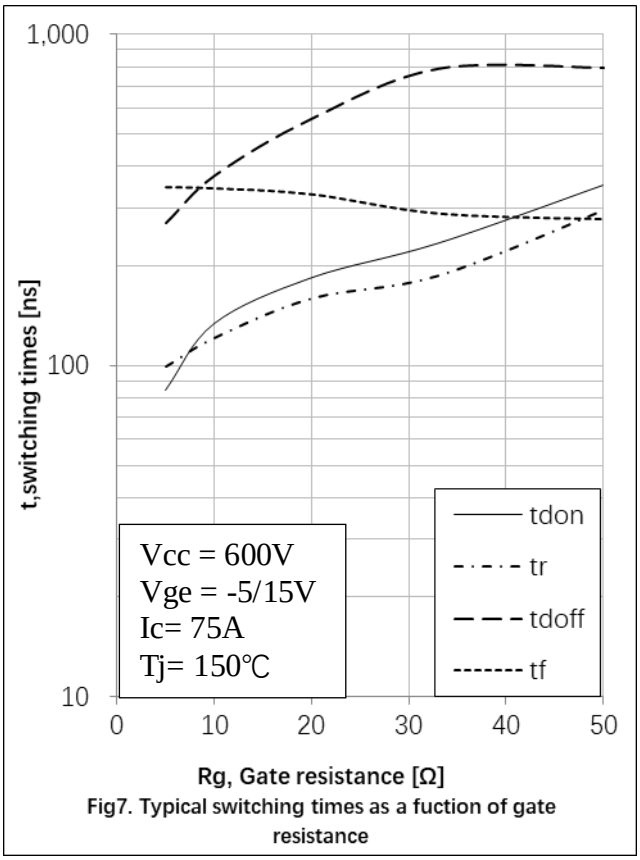


Fig7. Typical switching times as a fuction of gate resistance

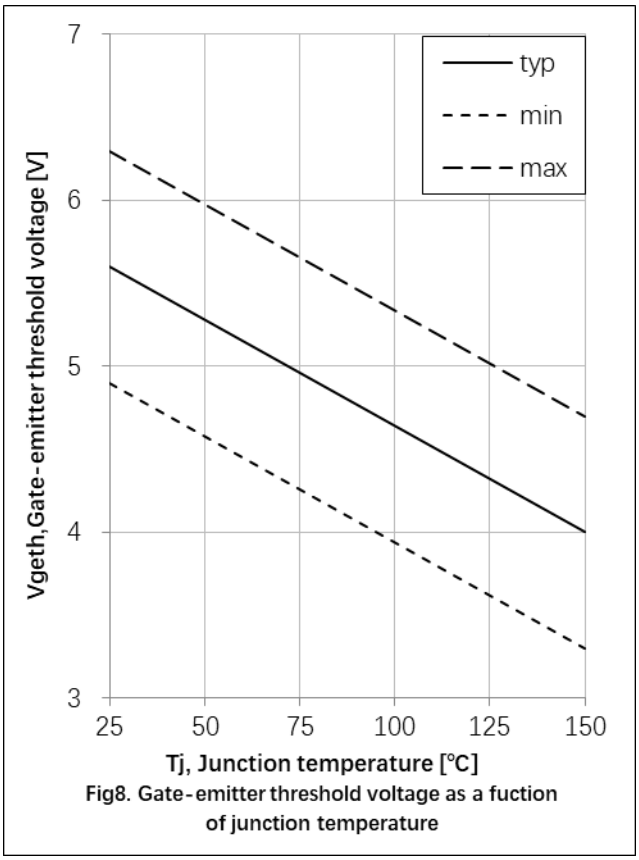


Fig8. Gate-emitter threshold voltage as a fuction of junction temperature

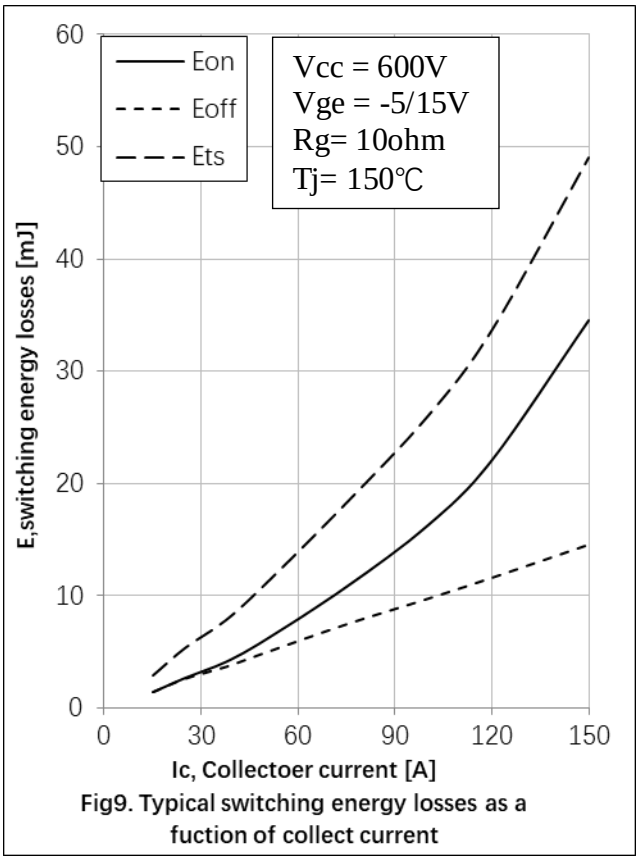


Fig9. Typical switching energy losses as a fuction of collect current

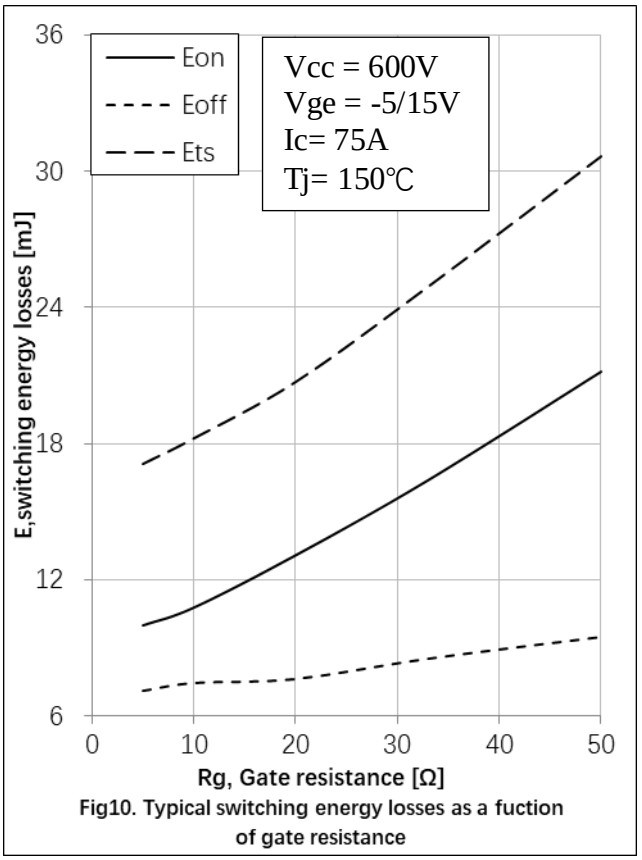


Fig10. Typical switching energy losses as a fuction of gate resistance

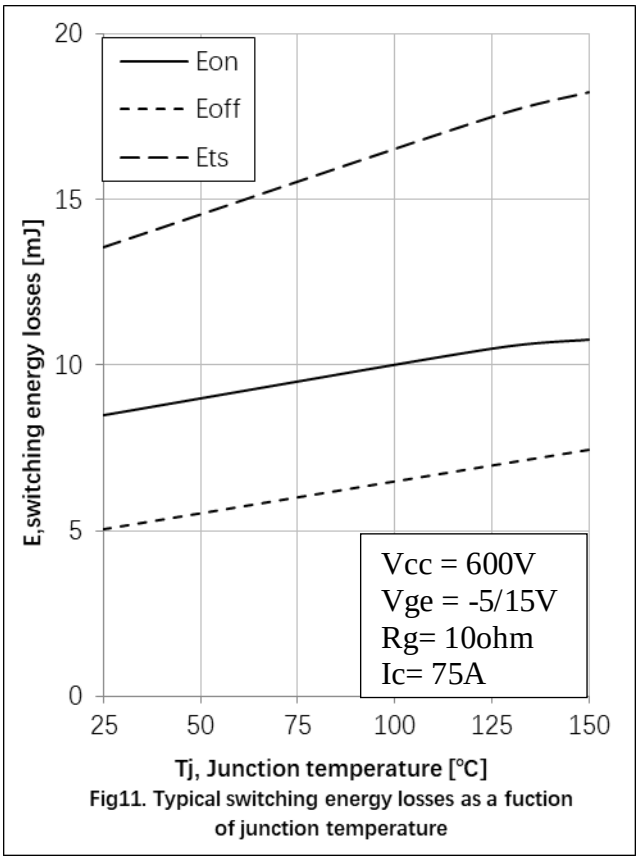


Fig11. Typical switching energy losses as a fuction of junction temperature

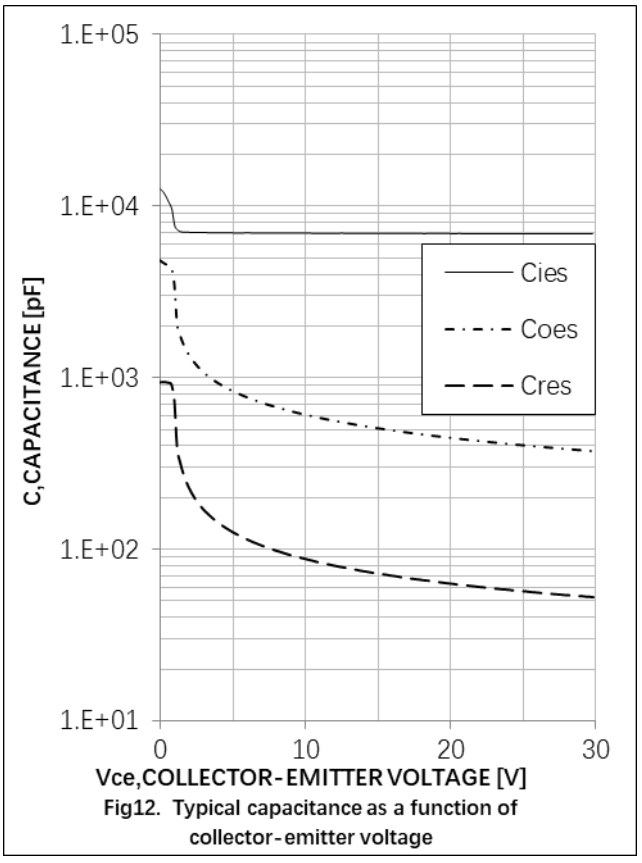


Fig12. Typical capacitance as a function of collector-emitter voltage

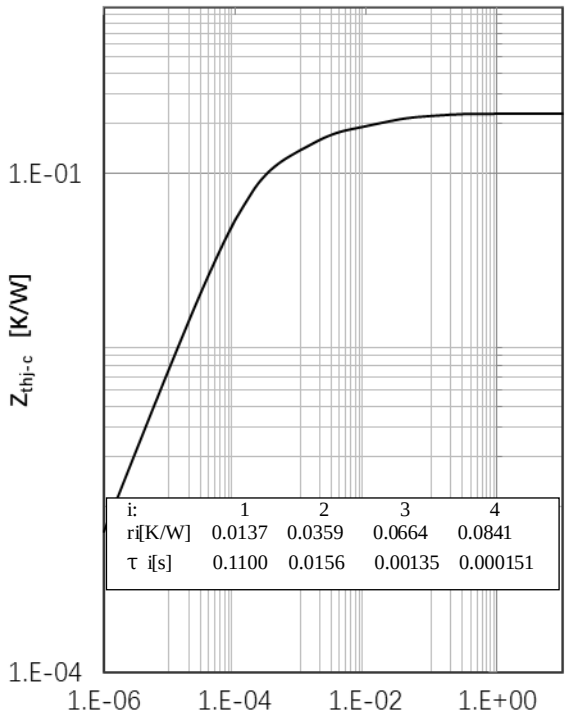


Fig 13. IGBT Transient Thermal Impedance

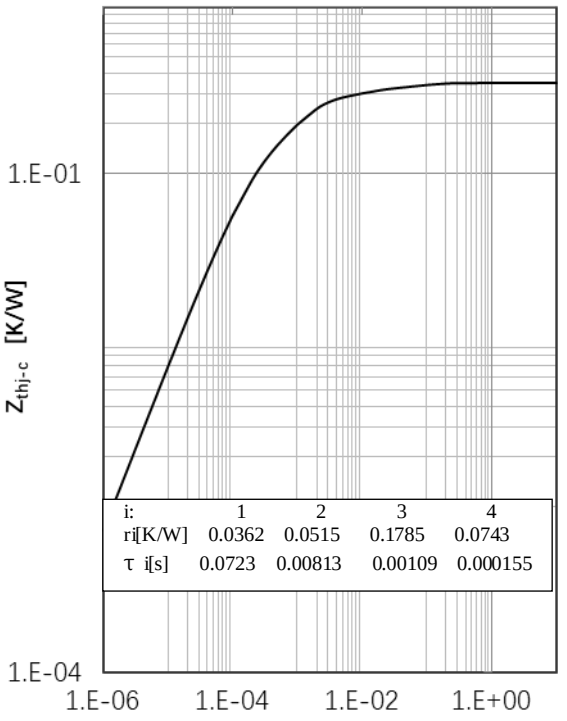


Fig 14. Diode Transient Thermal Impedance

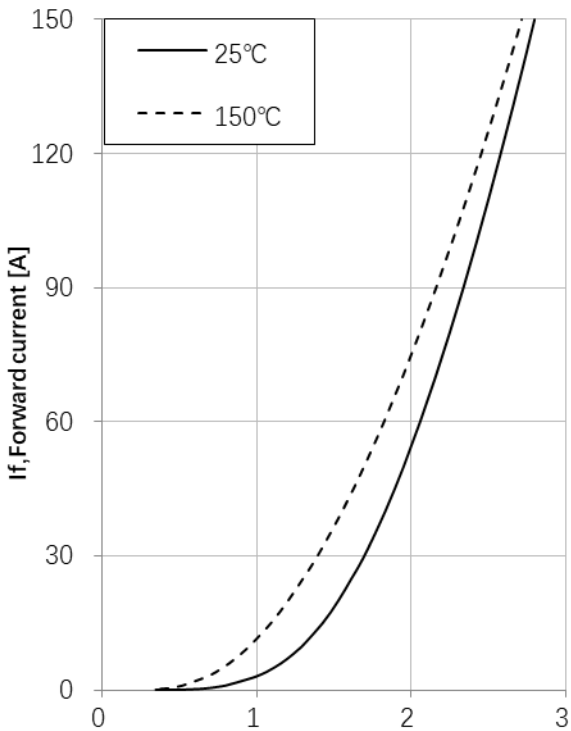


Fig15. Diode forawrd current as a function of foraward voltage

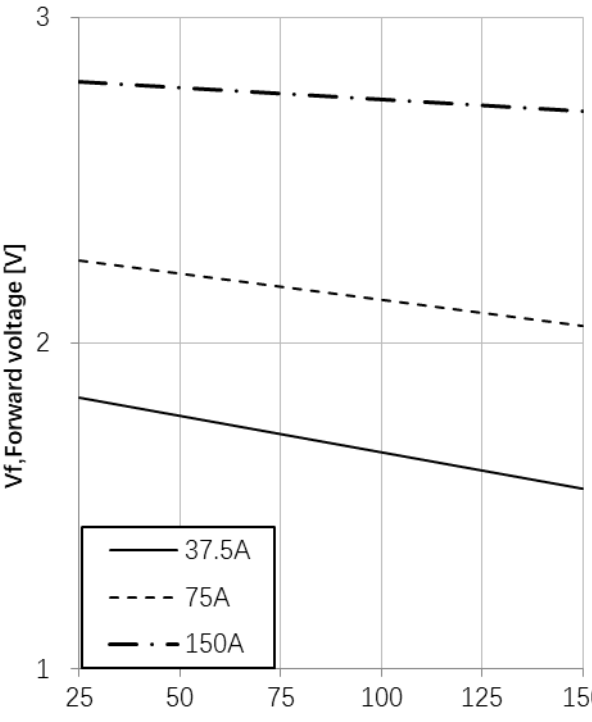
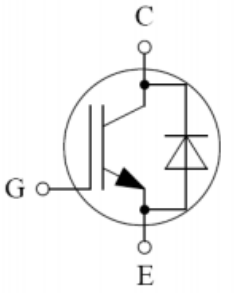
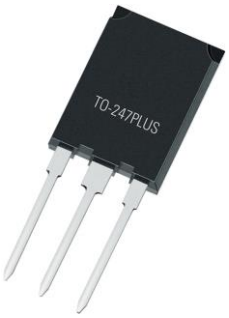


Fig16. Typical diode foraward voltage as a function of junction temperature

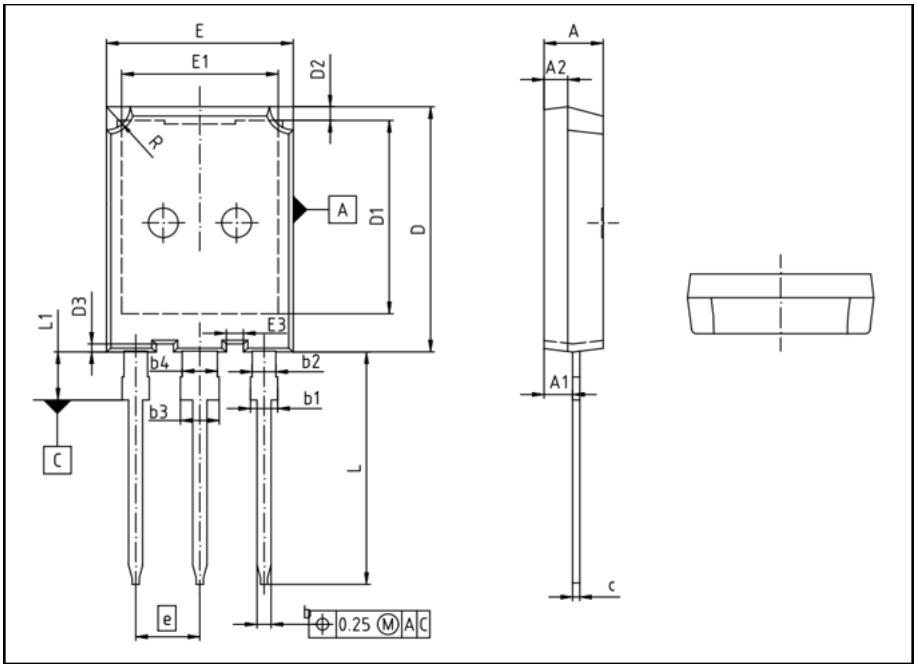
Circuit Diagram





- **Package Outline Information**

CASE: TO 247plus



DIM	MILLIMETERS	
	MIN	MAX
A	4.90	5.10
A1	2.31	2.51
A2	1.90	2.10
b	1.16	1.26
b1	1.86	2.16
b2	1.96	2.06
c	0.58	0.64
D	20.90	21.10
D1	16.25	16.85
D2	1.05	1.35
D3	0.58	0.78
E	15.70	15.90
E1	13.10	13.50
E3	1.35	1.55
e	5.44(BSC)	
L	19.78	20.08
L1	4.03	4.23
R	1.90	2.10

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IGBTs is the device which is sensitive to the static electricity, it is necessary to protect the device from being damaged by the static electricity when using it.

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