DGQ160N65CTS2A

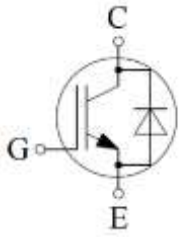
RoHS COMPLIANT



IGBT Discrete

V_{CE}	650	V
I_C	160	A
$V_{CE(SAT)}$ I_C=160A	1.55	V

Circuit



Applications

- Energy storage inverter
- Uninterruptible power supplies
- Solar inverters

Features

- High speed smooth switching device for hard & soft switching
- Maximum junction temperature 175℃
- Positive temperature coefficient
- High ruggedness, temperature stable

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	180 160	A
Diode Forward Current, limited by T_{jmax} T_C= 25°C value limited by bondwire T_C= 100°C	I_F	180 160	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		360	A
Pulsed Collector Current, V_{GE}=15V, tp limited by T_{jmax}	I_{CM}	360	A
Diode Pulsed Current, tp limited by T_{jmax}	I_{Fpuls}	360	A
Power Dissipation , Tj=175°C, Tc=25°C	P_{tot}	714	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=1mA	3.2	4.0	4.8	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	V_{GE}=15V, I_C=160A T_j=25°C, T_j=125°C T_j=150°C		1.55 1.75 1.85	1.85	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			100	nA

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Dynamic						
Input Capacitance	C_{ies}	V_{CE}= 25V, V_{GE}= 0V, f = 1MHz	-	6.93	-	nF
Reverse Transfer Capacitance	C_{res}		-	0.07	-	
Gate Charge	Q_G	V_{CC}=400V,I_C=160A, V_{GE}=-5V~+15V	-	0.35	-	uC

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= 160A T_j= 25°C, T_j= 125°C T_j= 150°C		2.10 1.95 1.90	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=160A, V_{GE}= -5v~15V, Rg=10Ω Inductive Load	-	47	-	ns
Rise Time	t_r		-	103	-	ns
Turn-on Energy	E_{on}		-	5.75	-	mJ
Turn-off Delay Time	$t_{d(off)}$		-	210	-	ns
Fall Time	t_f		-	74	-	ns
Turn-off Energy	E_{off}		-	3.69	-	mJ
Dynamic , at T_j= 125℃						
Turn-on Delay Time	$t_{d(on)}$	V_{CC}=400V， I_C=160A, V_{GE}= -5v~15V, Rg=10Ω Inductive Load	-	42	-	ns
Rise Time	t_r		-	109	-	ns
Turn-on Energy	E_{on}		-	8.36	-	mJ
Turn-off Delay Time	$t_{d(off)}$		-	214	-	ns
Fall Time	t_f		-	75	-	ns
Turn-off Energy	E_{off}		-	4.42	-	mJ
Dynamic , at T_j= 150℃						
Turn-on Delay Time	$t_{d(on)}$	V_{CC}=400V， I_C=160A, V_{GE}= -5v~15V, Rg=10Ω Inductive Load	-	41	-	ns
Rise Time	t_r		-	113	-	ns
Turn-on Energy	E_{on}		-	9.08	-	mJ
Turn-off Delay Time	$t_{d(off)}$		-	217	-	ns
Fall Time	t_f		-	76	-	ns
Turn-off Energy	E_{off}		-	4.67	-	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=160A, V_R=400V -di/dt=1200A/μs,	-	30	-	A
Reverse Recovery Charge	Q_{rr}		-	1.05	-	uC
Diode reverse recovery time	trr		-	55	-	ns
Reverse Recovery Energy	Erec		-	0.15	-	mJ
Dynamic , at Tj= 125℃						
Reverse Recovery Current	I_{rr}	I_F=160A, V_R=400V -di/dt=1200A/μs,	-	69	-	A
Reverse Recovery Charge	Q_{rr}		-	4.97	-	uC
Diode reverse recovery time	trr		-	104	-	ns
Reverse Recovery Energy	Erec		-	0.88	-	mJ
Dynamic , at Tj= 150℃						
Reverse Recovery Current	I_{rr}	I_F=160A, V_R=400V -di/dt=1200A/μs,	-	89	-	A
Reverse Recovery Charge	Q_{rr}		-	6.93	-	uC
Diode reverse recovery time	trr		-	131	-	ns
Reverse Recovery Energy	Erec		-	1.27	-	mJ

Thermal Resistance

Parameter	Symbol	Max. Value	Unit
IGBT Thermal Resistance, Junction - Case	R_{th}(j-c)	0.21	K/W
Diode Thermal Resistance, Junction - Case	R_{th}(j-c)	0.25	K/W
Thermal Resistance, Junction - Ambient	R_{th}(j-a)	40	K/W

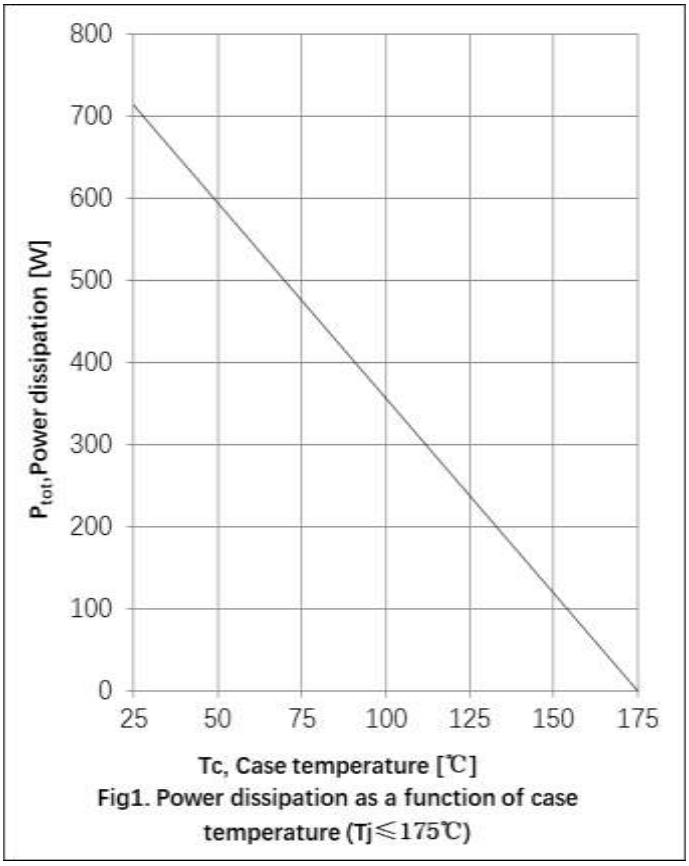


Fig1. Power dissipation as a function of case temperature (Tj≤175℃)

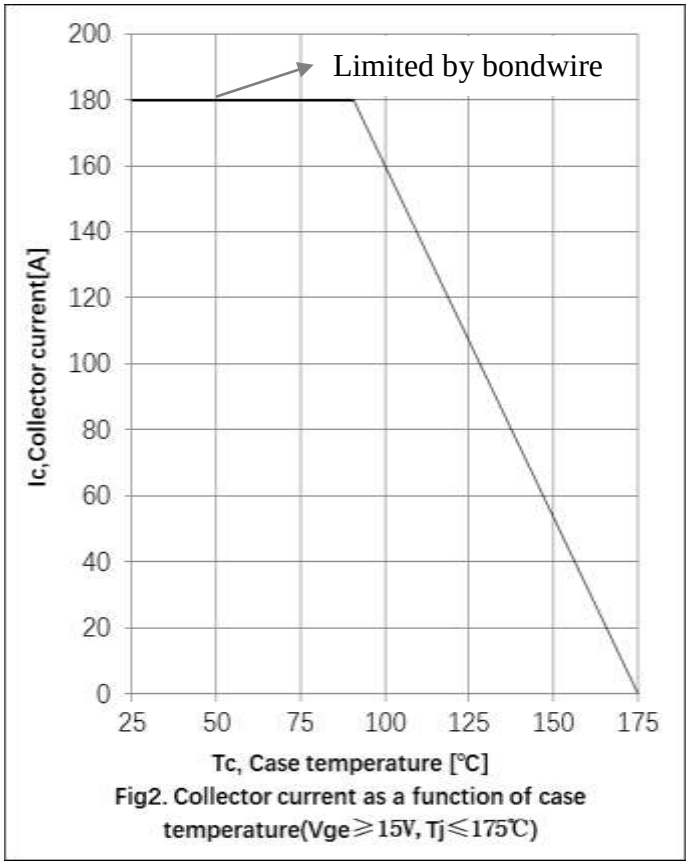


Fig2. Collector current as a function of case temperature(Vge≥15V, Tj≤175℃)

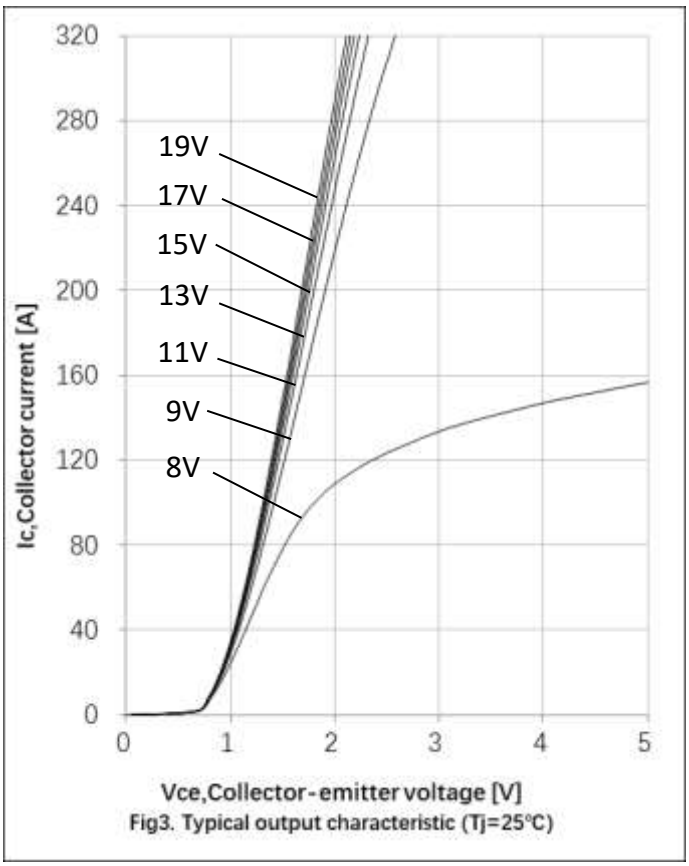


Fig3. Typical output characteristic (Tj=25℃)

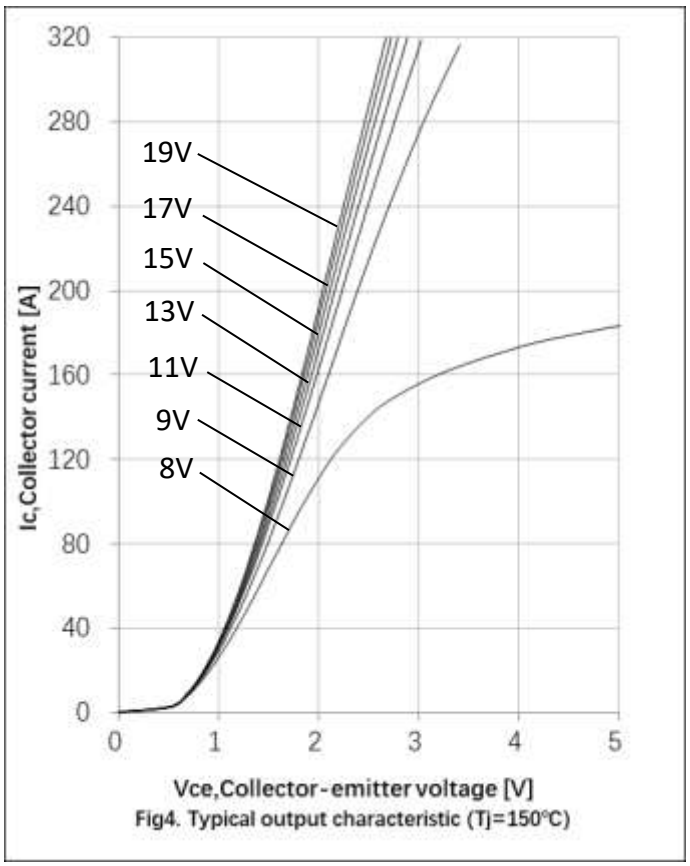


Fig4. Typical output characteristic (Tj=150℃)

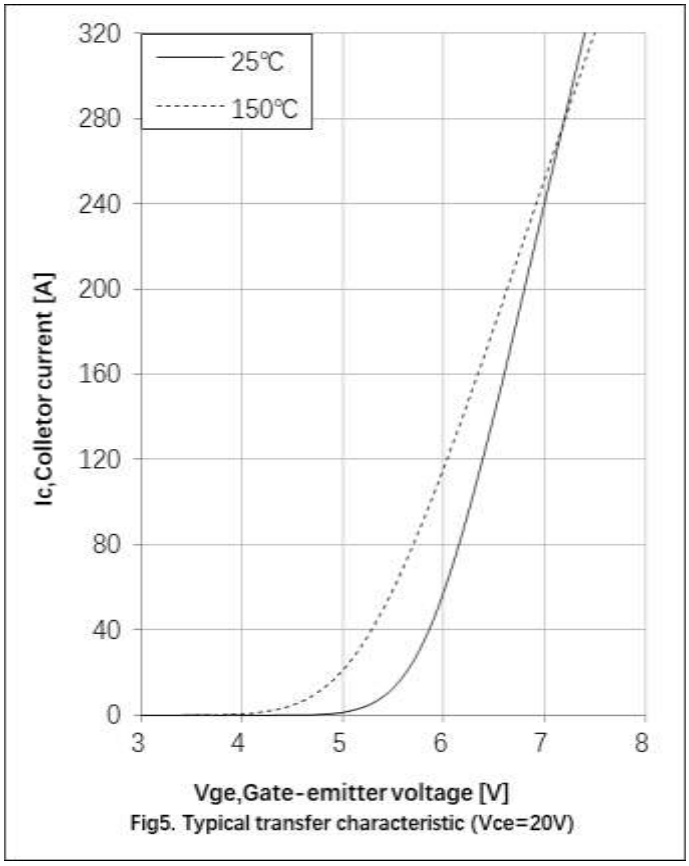


Fig5. Typical transfer characteristic (Vce=20V)

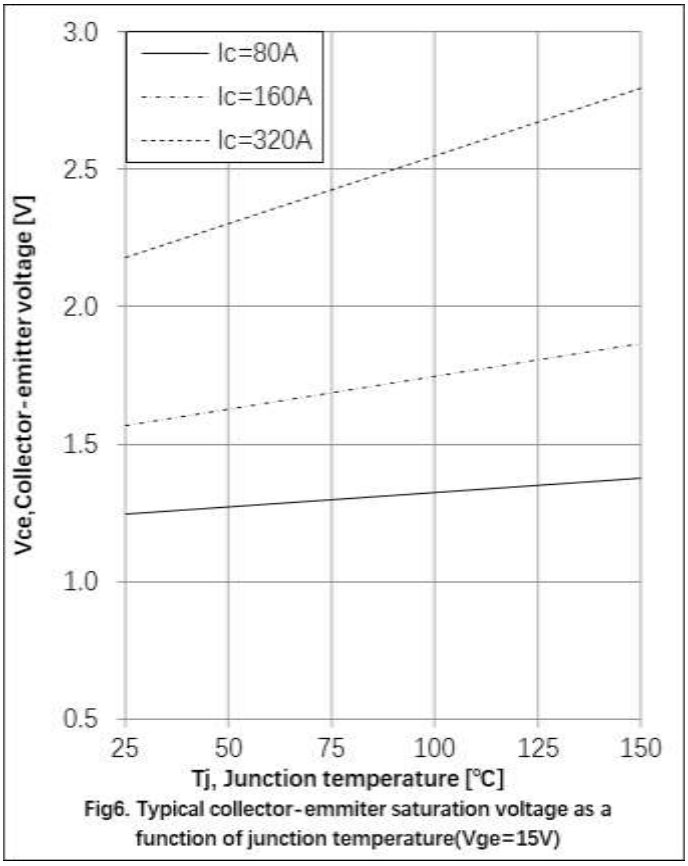


Fig6. Typical collector-emmiter saturation voltage as a function of junction temperature(Vge=15V)

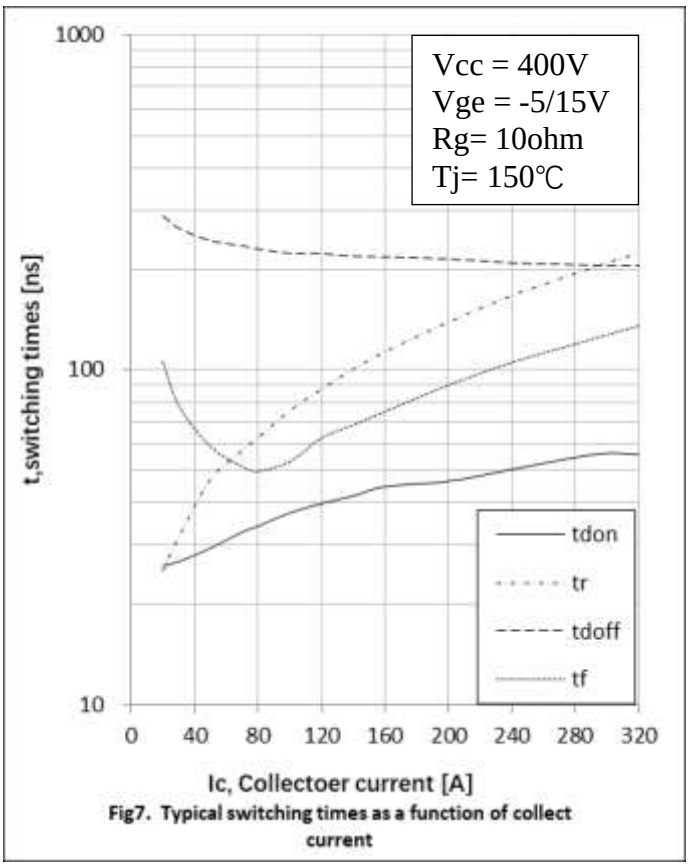


Fig7. Typical switching times as a function of collect current

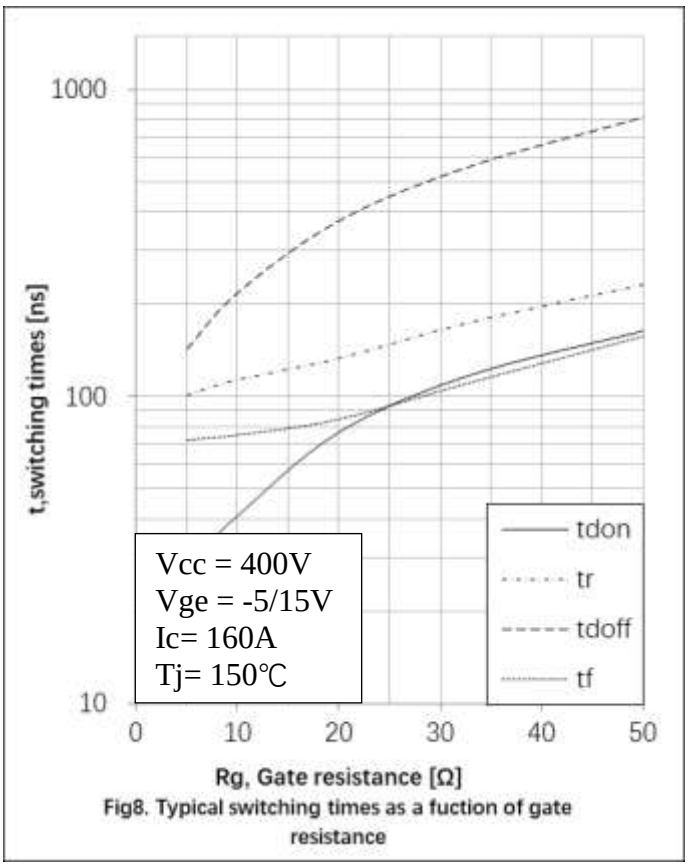


Fig8. Typical switching times as a fuction of gate resistance

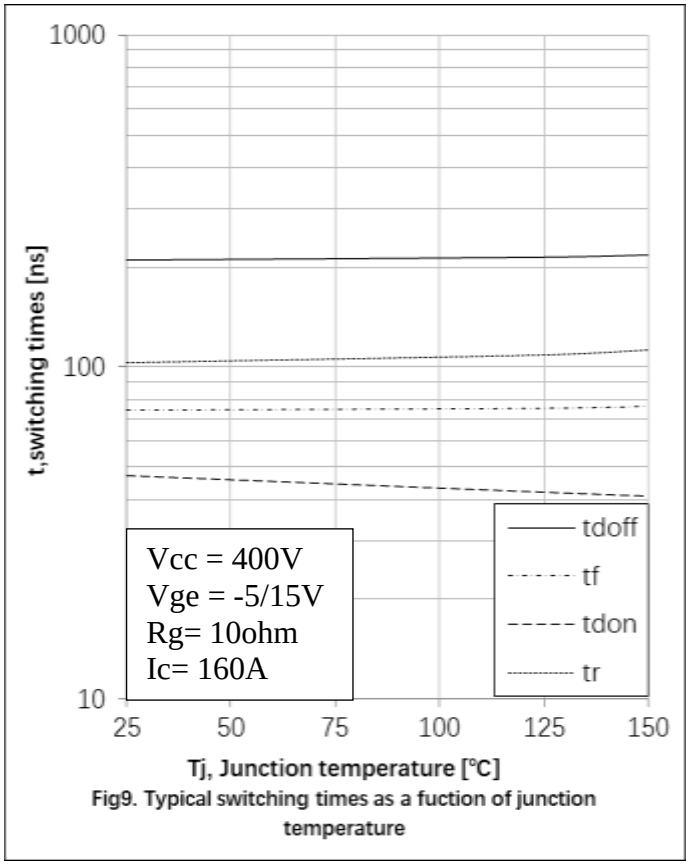


Fig9. Typical switching times as a fuction of junction temperature

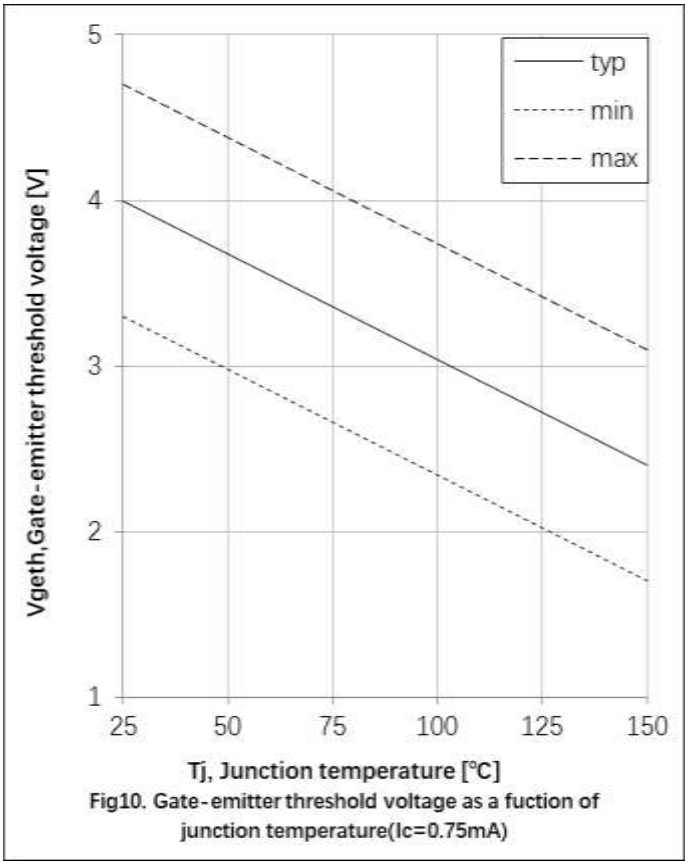


Fig10. Gate-emitter threshold voltage as a fuction of junction temperature(Ic=0.75mA)

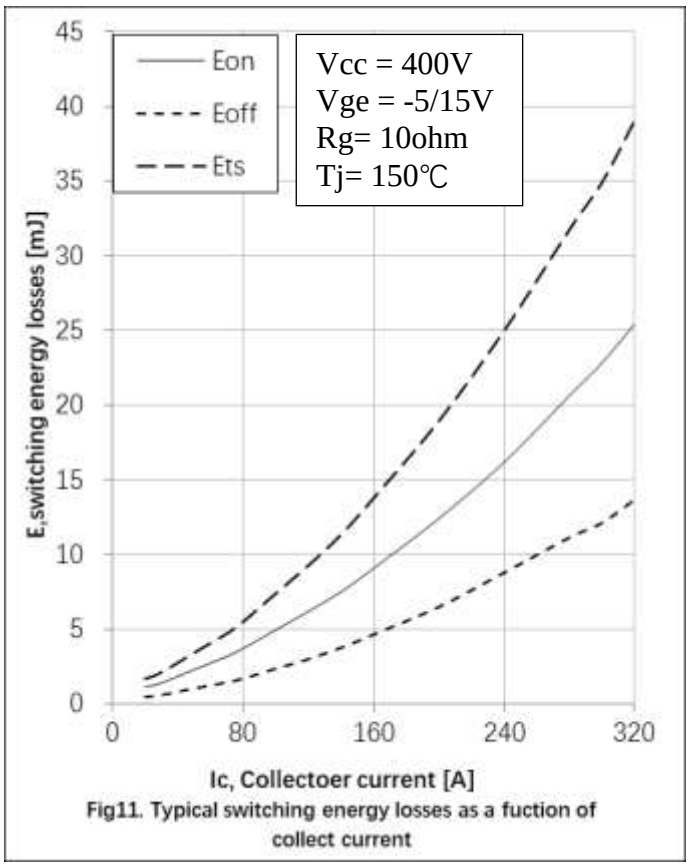


Fig11. Typical switching energy losses as a fuction of collect current

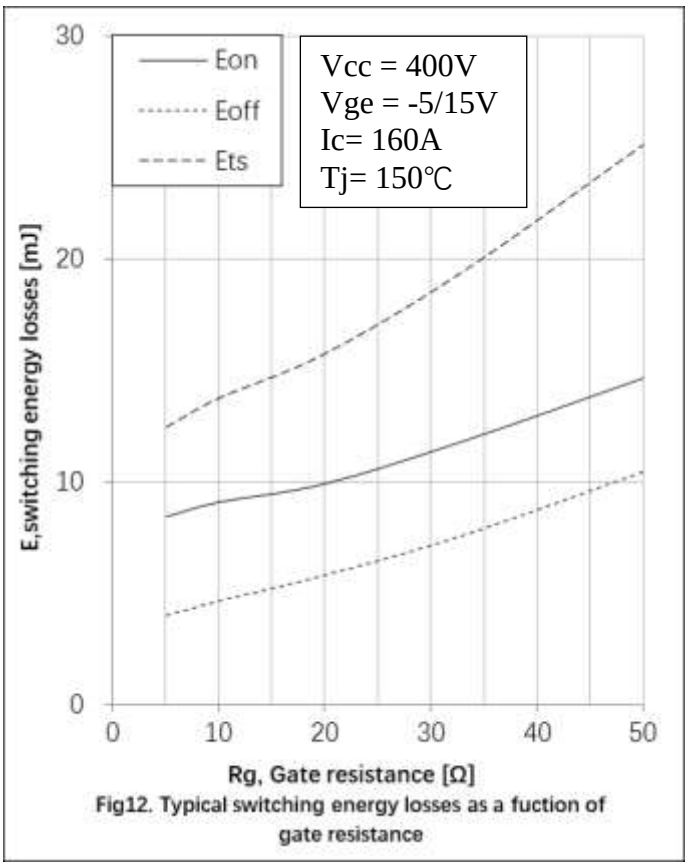


Fig12. Typical switching energy losses as a fuction of gate resistance

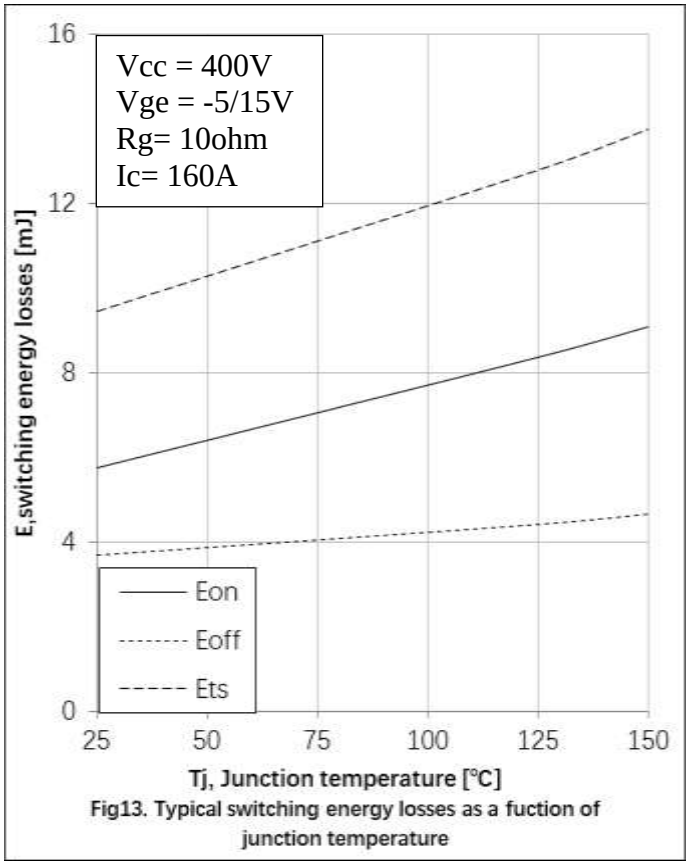


Fig13. Typical switching energy losses as a fuction of junction temperature

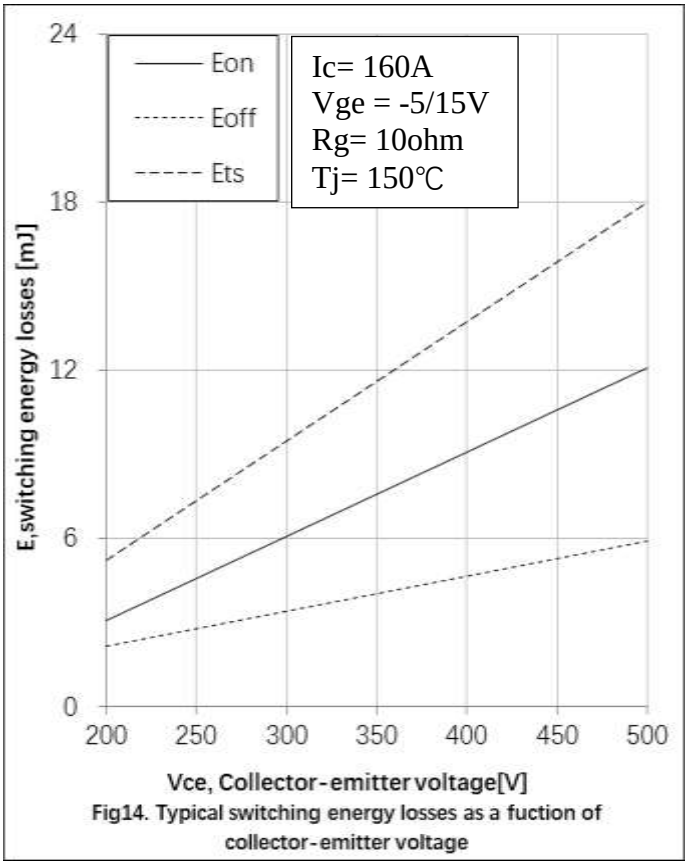


Fig14. Typical switching energy losses as a fuction of collector-emitter voltage

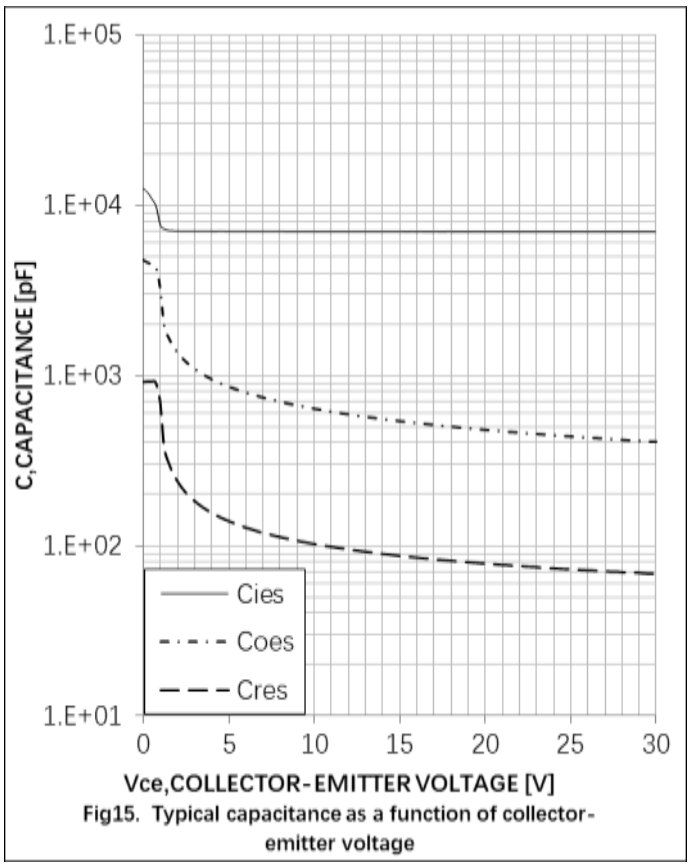


Fig15. Typical capacitance as a function of collector-emitter voltage

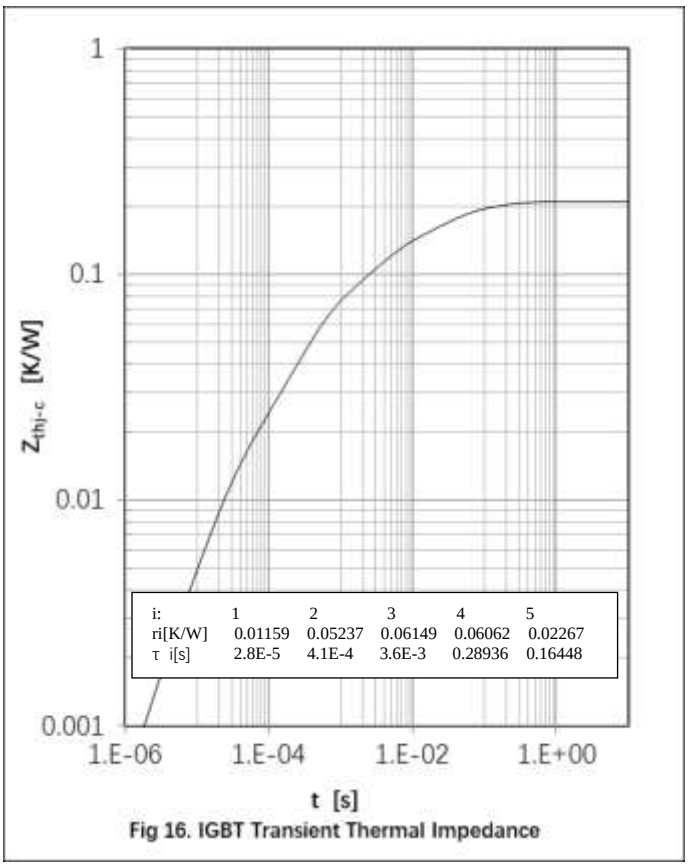


Fig 16. IGBT Transient Thermal Impedance

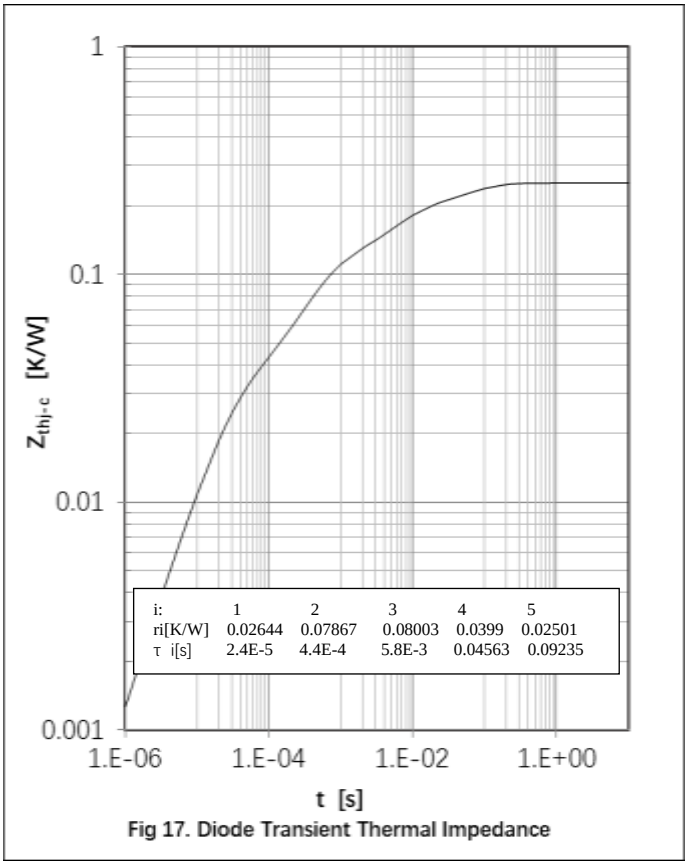


Fig 17. Diode Transient Thermal Impedance

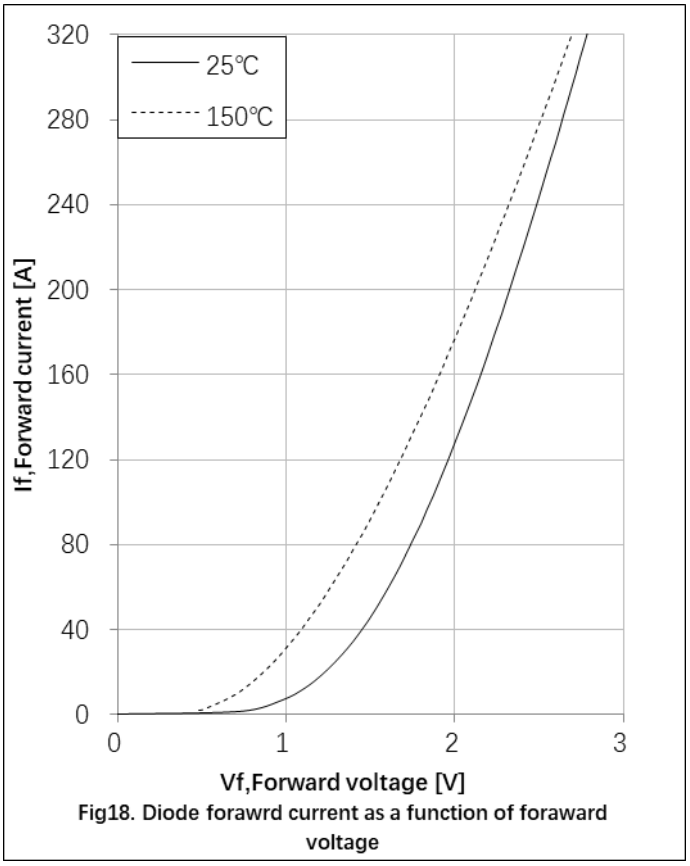


Fig18. Diode forawrd current as a function of foraward voltage

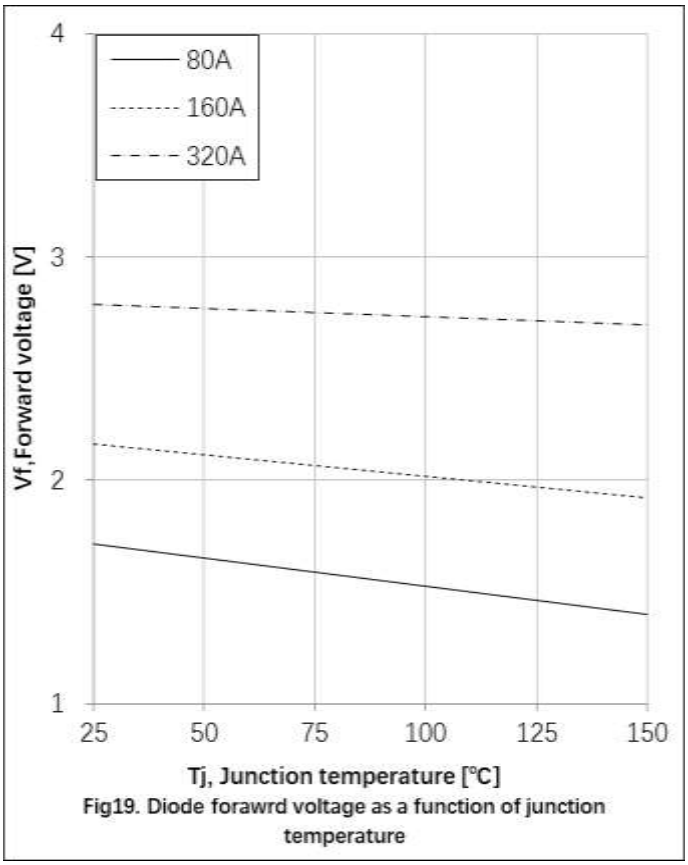


Fig19. Diode forawrd voltage as a function of junction temperature

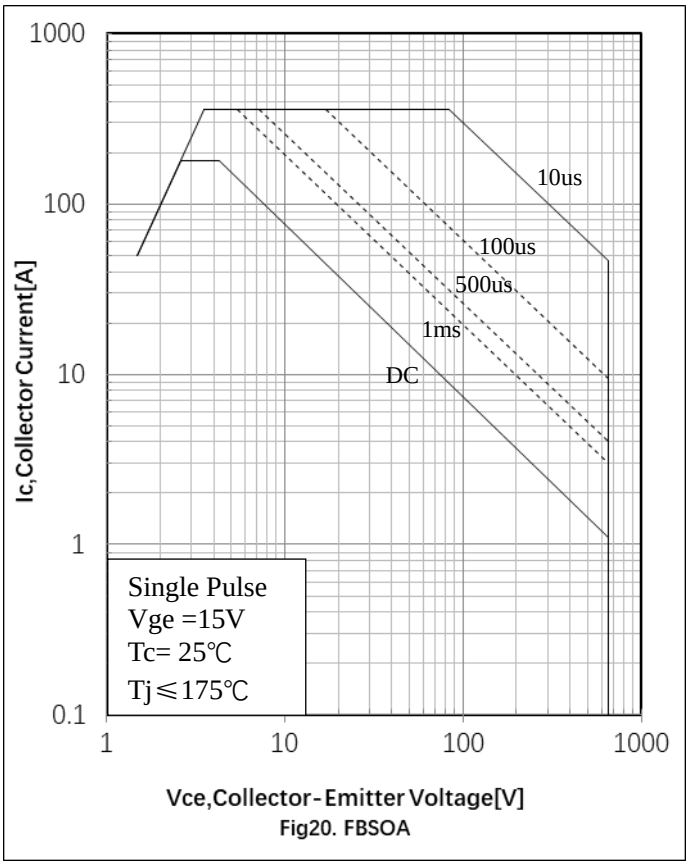
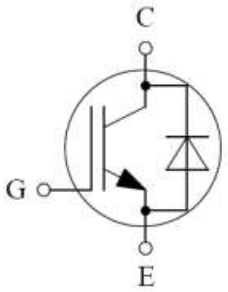


Fig20. FBSOA

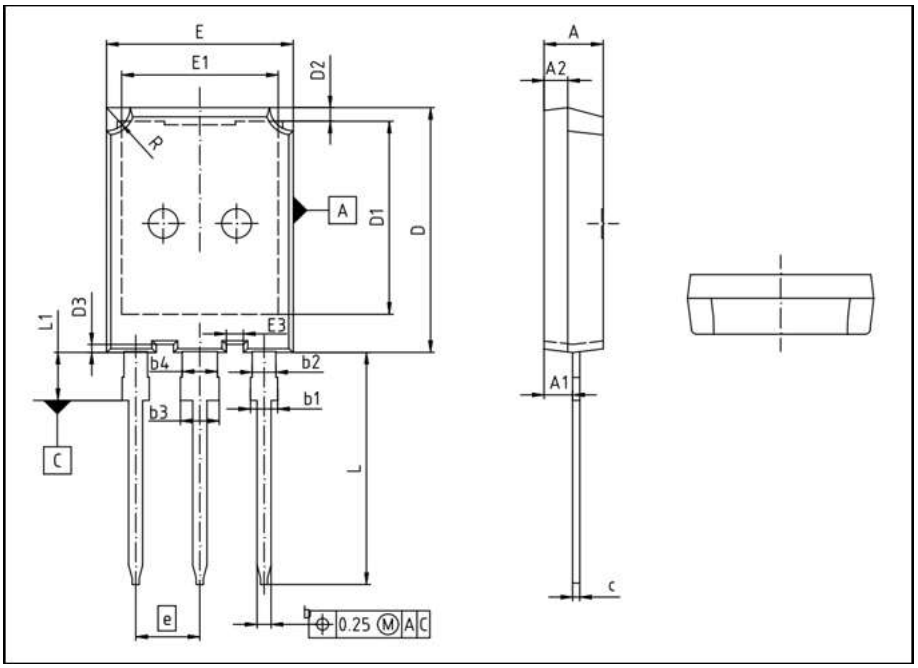
Circuit Diagram





- **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

Notice

All products, product specifications and data are subject to change without notice to improve reliability, function or design or otherwise.Information contained herein is intended to provide a product description only. No license, express or implied, to any intellectual property rights is granted by this document. Except as provided in STARSEA's terms and conditions of sale for such products, STARSEA assumes no liability whatsoever, and disclaims any express or implied warranty, relating to sale and/or use of STARSEA products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright, or other intellectual property right.