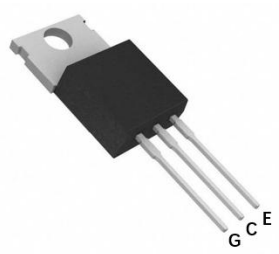
DGP50N65ATS2A

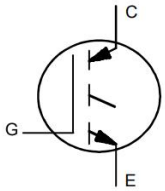
RoHS COMPLIANT



IGBT Discrete

V_{CE}	650	V
I_C	50	A
$V_{CE(SAT)}$ I_C=50A	1.40	V

Circuit



Applications

- Hair removal device

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	 80 60	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		200	A
Pulsed Collector Current, V_{GE}=15V, tp limited by T_{jmax}	I_{CM}	200	A
Power Dissipation , Tj=175°C, Tc=25°C	P_{tot}	283	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=0.50mA	3.8	4.8	5.8	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	V_{GE}=15V, I_C=50A T_j=25°C, T_j=125°C T_j=150°C	1.10	1.40 1.60 1.70	1.70	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	-	2.86	-	nF
Reverse Transfer Capacitance	C_{res}		-	0.02	-	
Gate Charge	Q_G	V_{CC}=520V,I_C=50A, V_{GE}=15V	-	0.14	-	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}=400V, I_C=50A, V_{GE}= -5v~15V, Rg=10Ω, Inductive Load	-	23	-	ns
Rise Time	t_r		-	31	-	ns
Turn-on Energy	E_{on}		-	1.89	-	mJ
Turn-off Delay Time	$t_{d(off)}$		-	83	-	ns
Fall Time	t_f		-	49	-	ns
Turn-off Energy	E_{off}		-	0.55	-	mJ
Total switching energy	Ets		-	2.44	-	mJ
Dynamic , at T_j= 125℃						
Turn-on Delay Time	$t_{d(on)}$	V_{CC}=400V, I_C=50A, V_{GE}= -5v~15V, Rg=10Ω, Inductive Load	-	24	-	ns
Rise Time	t_r		-	38	-	ns
Turn-on Energy	E_{on}		-	1.93	-	mJ
Turn-off Delay Time	$t_{d(off)}$		-	90	-	ns
Fall Time	t_f		-	62	-	ns
Turn-off Energy	E_{off}		-	0.76	-	mJ
Total switching energy	Ets		-	2.69	-	mJ
Dynamic , at T_j= 150℃						
Turn-on Delay Time	$t_{d(on)}$	V_{CC}=400V, I_C=50A, V_{GE}= -5v~15V, Rg=10Ω, Inductive Load	-	25	-	ns
Rise Time	t_r		-	42	-	ns
Turn-on Energy	E_{on}		-	1.99	-	mJ
Turn-off Delay Time	$t_{d(off)}$		-	95	-	ns
Fall Time	t_f		-	70	-	ns
Turn-off Energy	E_{off}		-	0.81	-	mJ
Total switching energy	Ets		-	2.80	-	mJ

Thermal Resistance

Parameter	Symbol	Max. Value	Unit
IGBT Thermal Resistance, Junction - Case	R_{th}(j-c)	0.53	K/W
Thermal Resistance, Junction - Ambient	R_{th}(j-a)	40	K/W

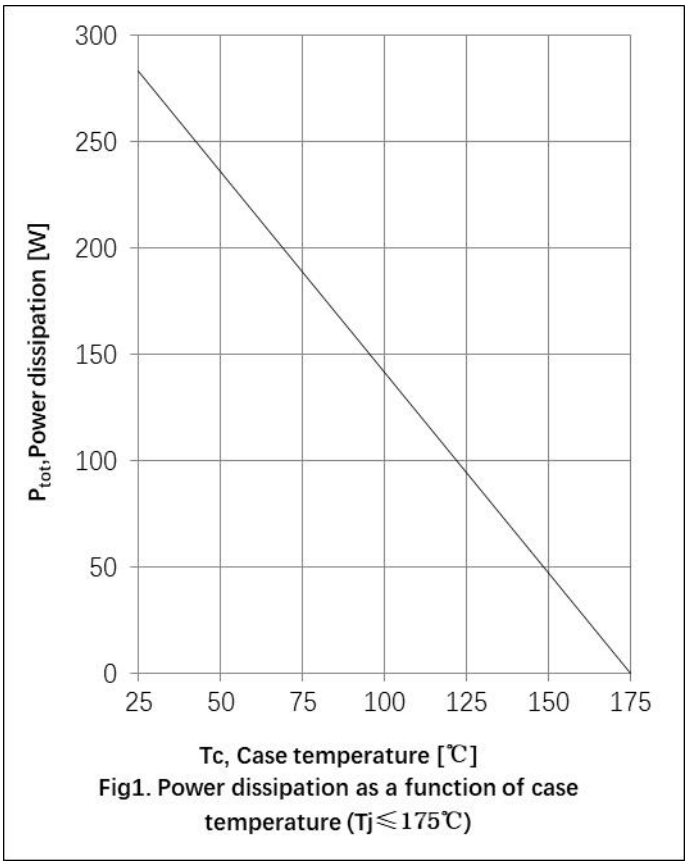


Fig1. Power dissipation as a function of case temperature (Tj≤175℃)

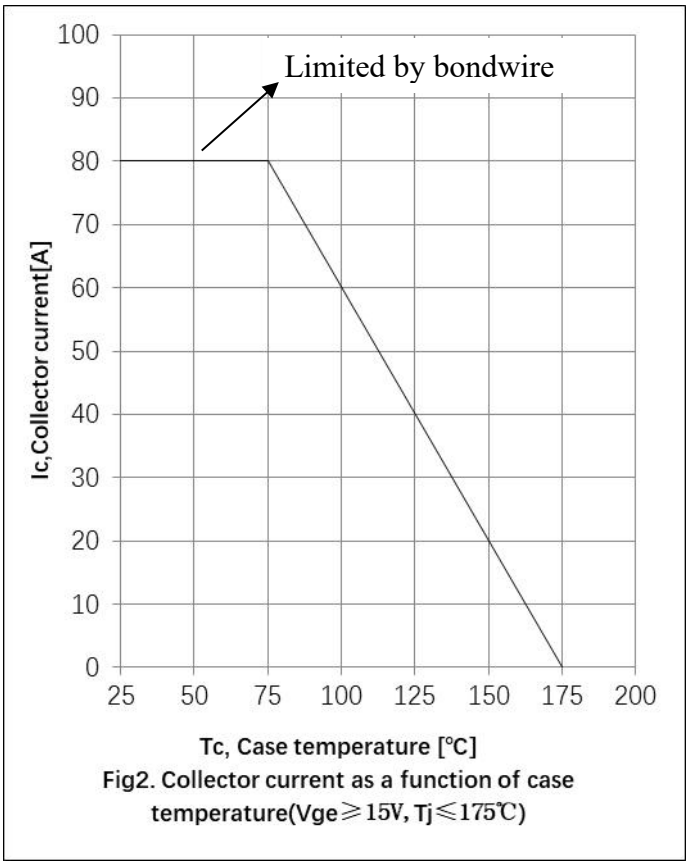


Fig2. Collector current as a function of case temperature(Vge≥15V, Tj≤175℃)

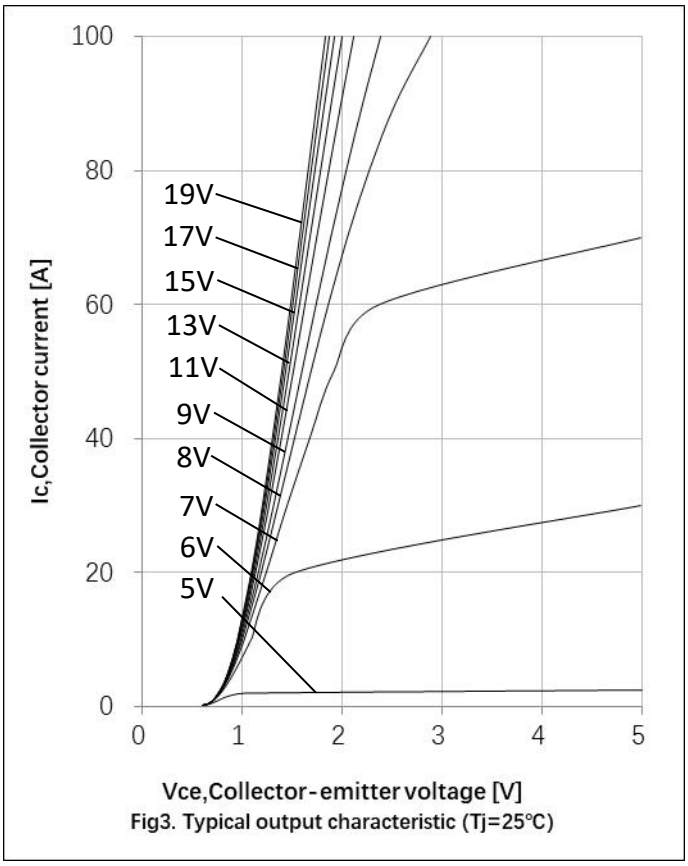


Fig3. Typical output characteristic (Tj=25℃)

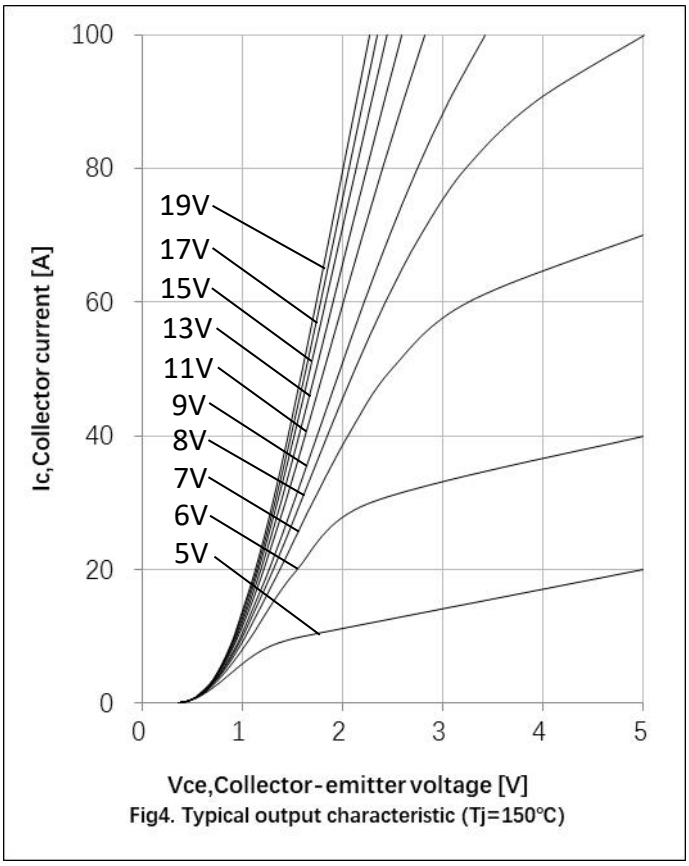


Fig4. Typical output characteristic (Tj=150℃)

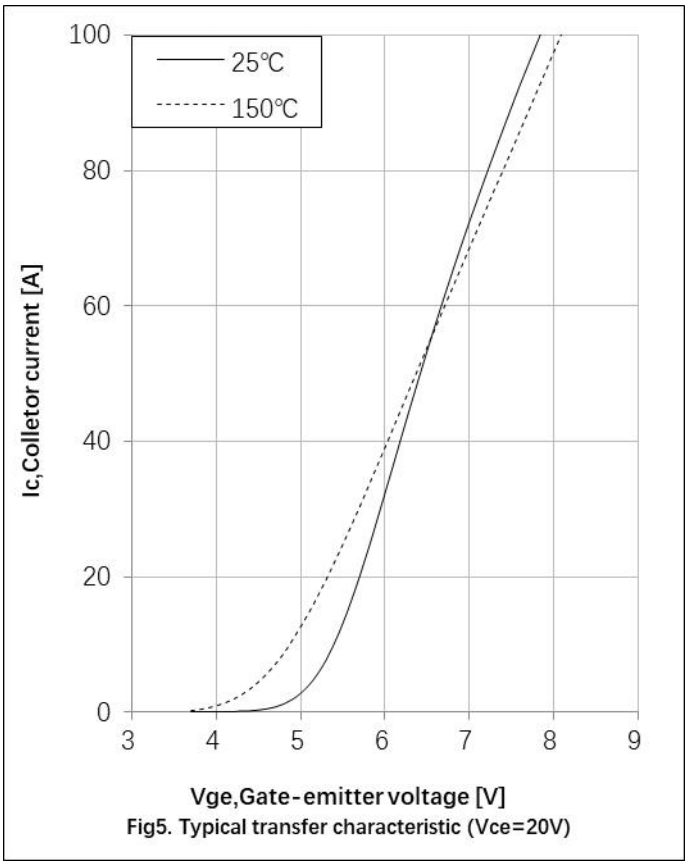


Fig5. Typical transfer characteristic (Vce=20V)

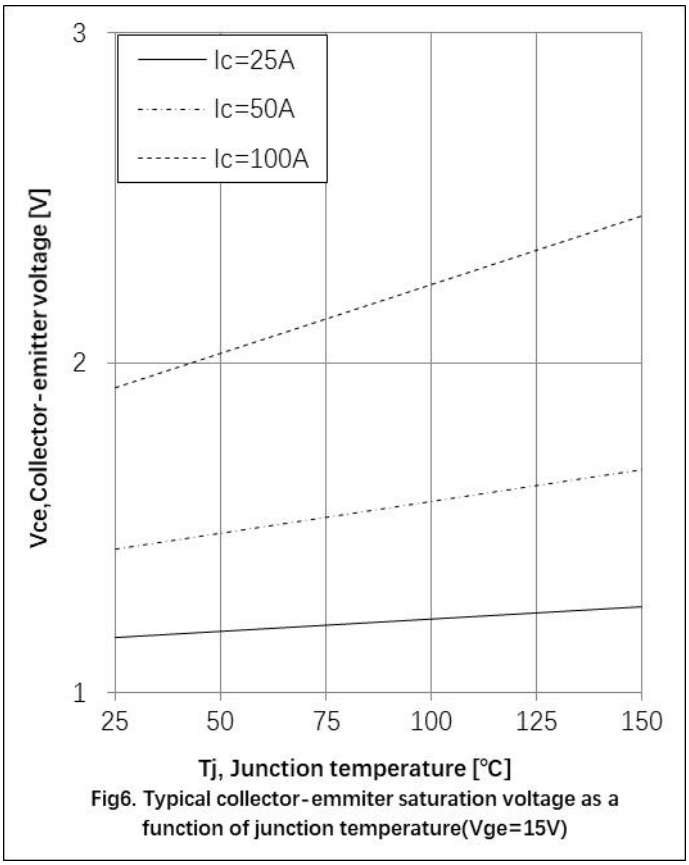


Fig6. Typical collector-emmiter saturation voltage as a function of junction temperature(Vge=15V)

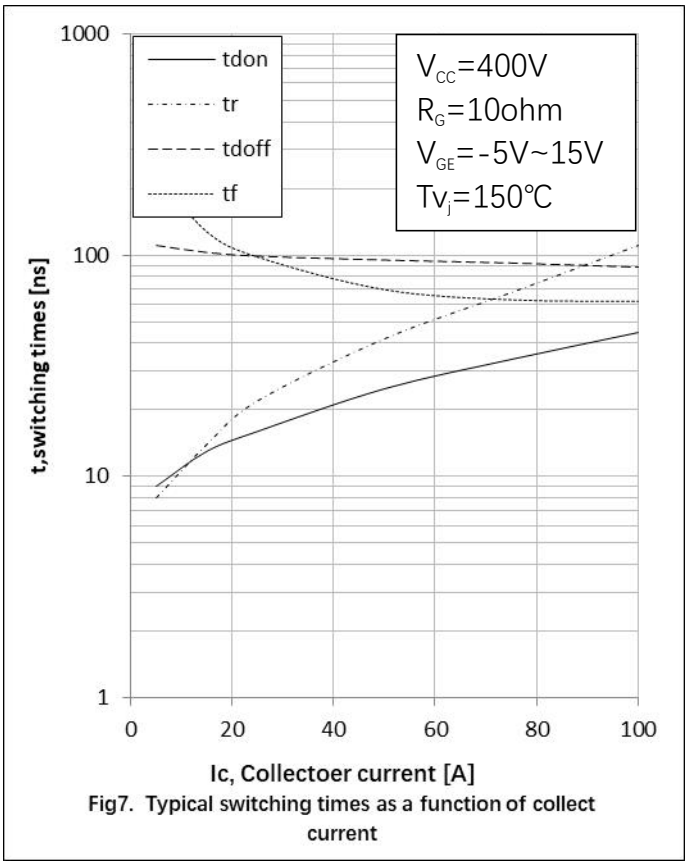


Fig7. Typical switching times as a function of collect current

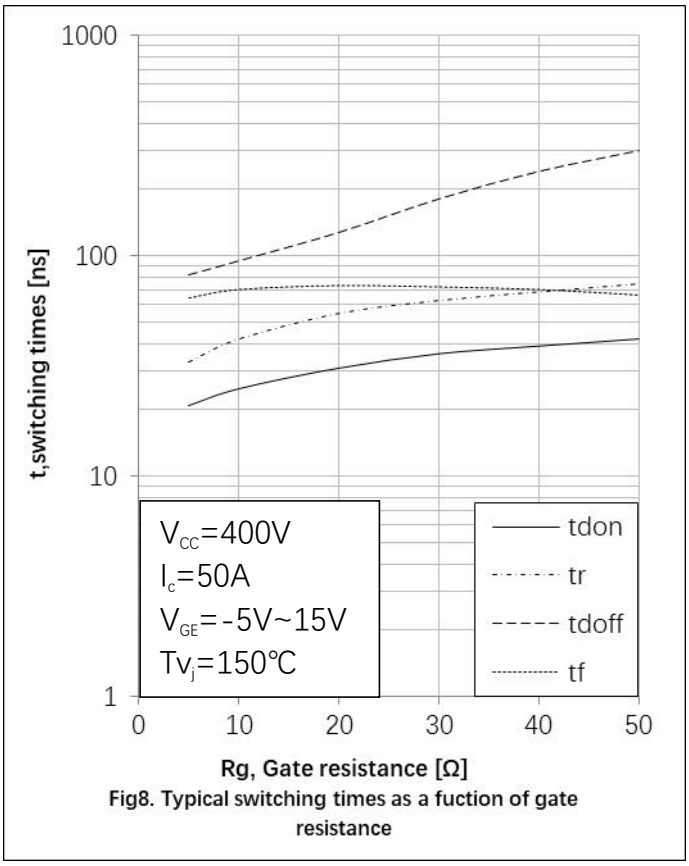


Fig8. Typical switching times as a fuction of gate resistance

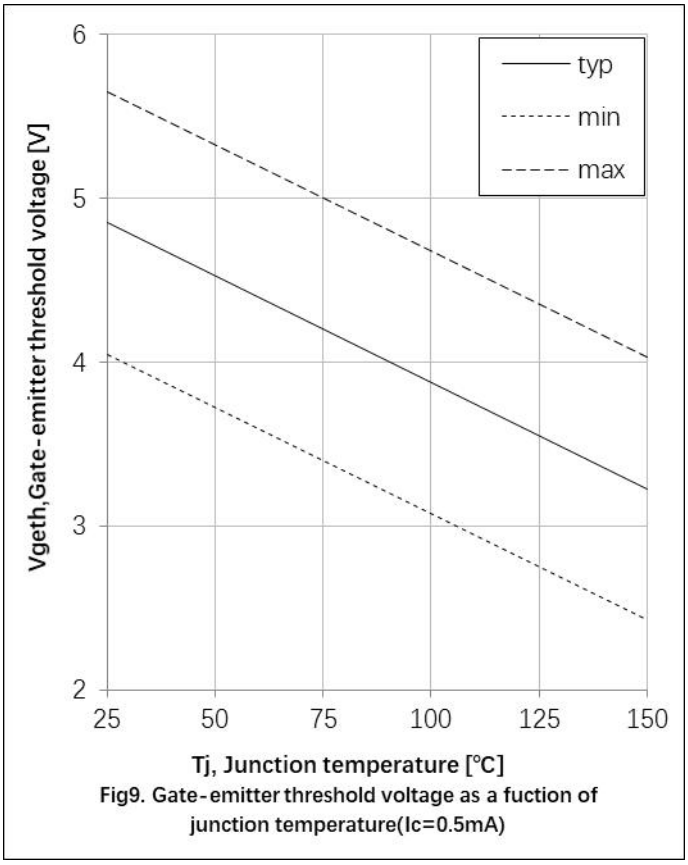


Fig9. Gate-emitter threshold voltage as a fuction of junction temperature(Ic=0.5mA)

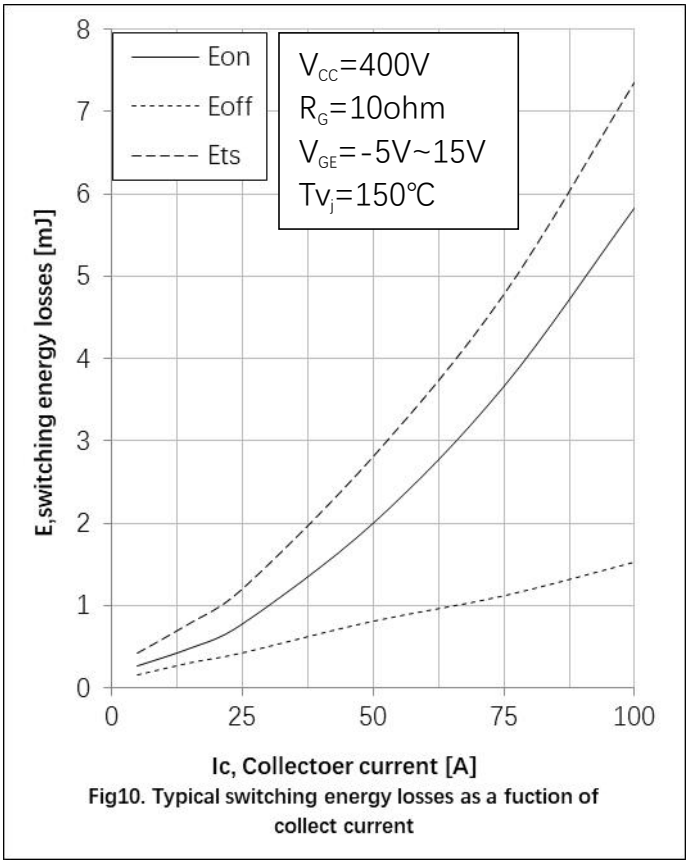


Fig10. Typical switching energy losses as a fuction of collect current

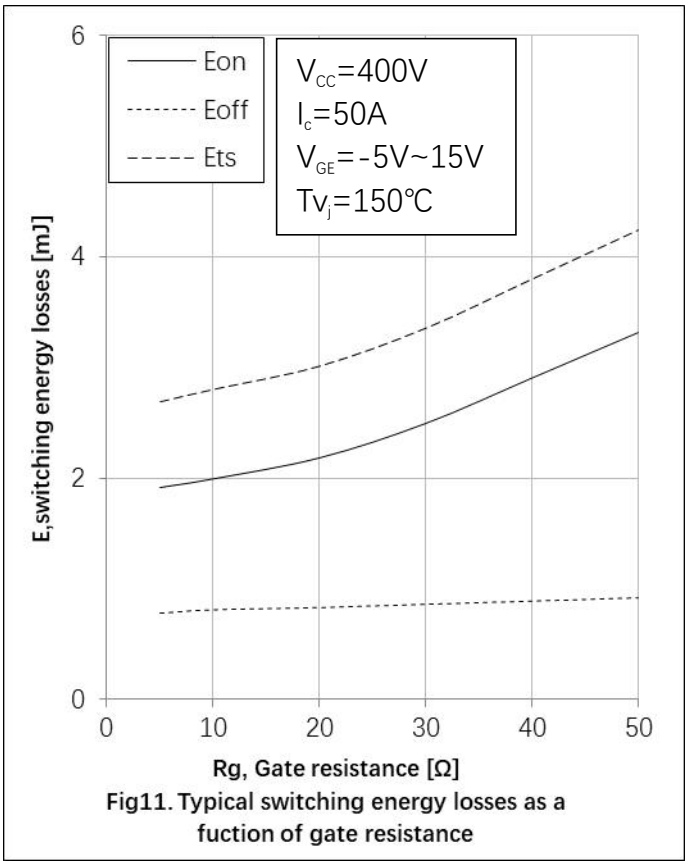


Fig11. Typical switching energy losses as a fuction of gate resistance

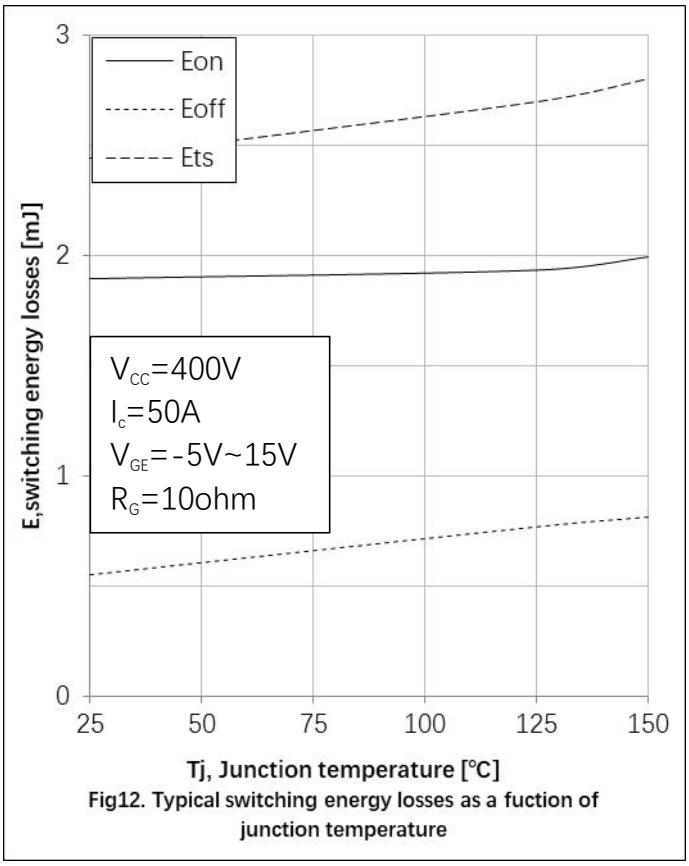


Fig12. Typical switching energy losses as a fuction of junction temperature

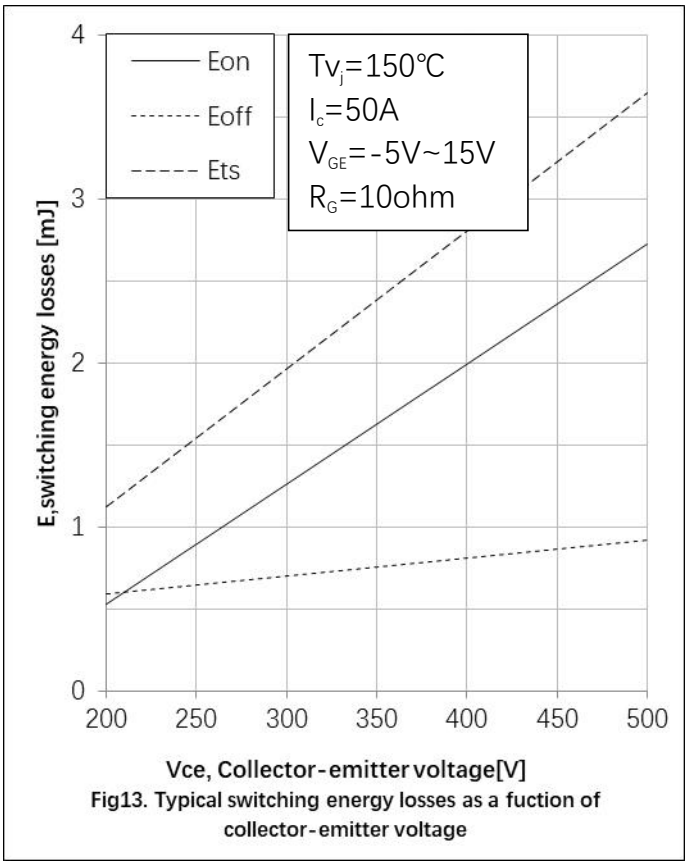


Fig13. Typical switching energy losses as a fuction of collector-emitter voltage

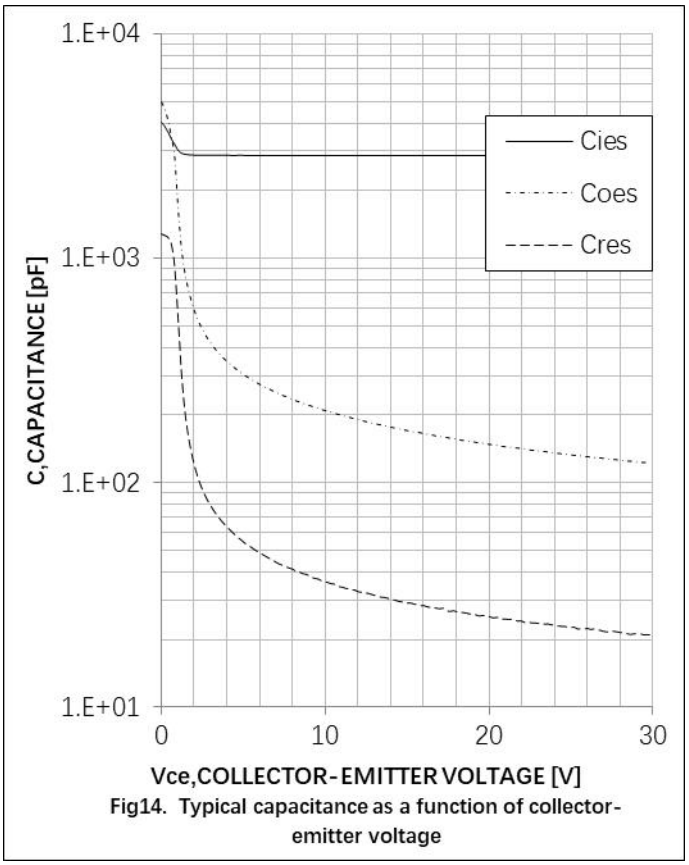


Fig14. Typical capacitance as a function of collector-emitter voltage

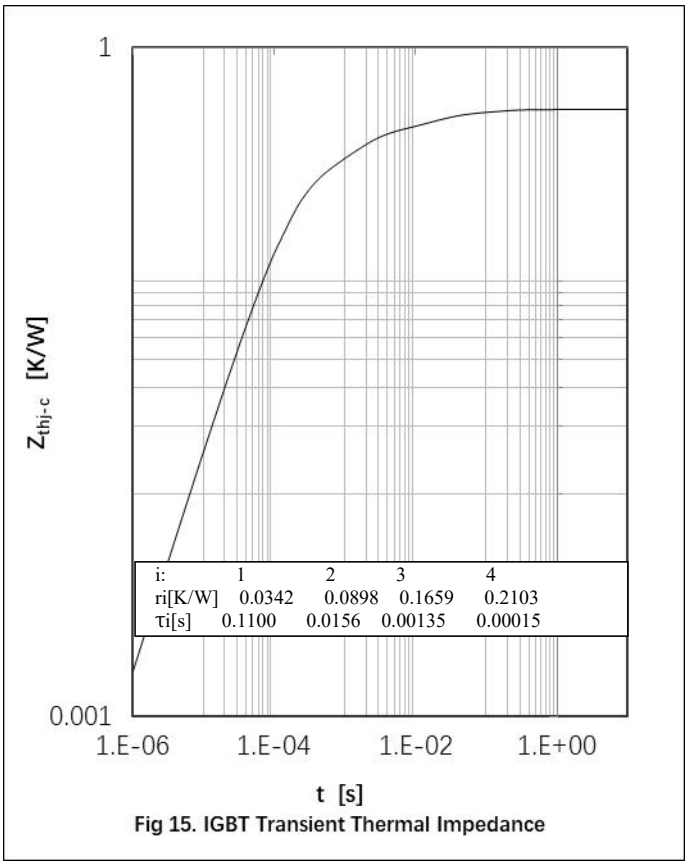


Fig 15. IGBT Transient Thermal Impedance

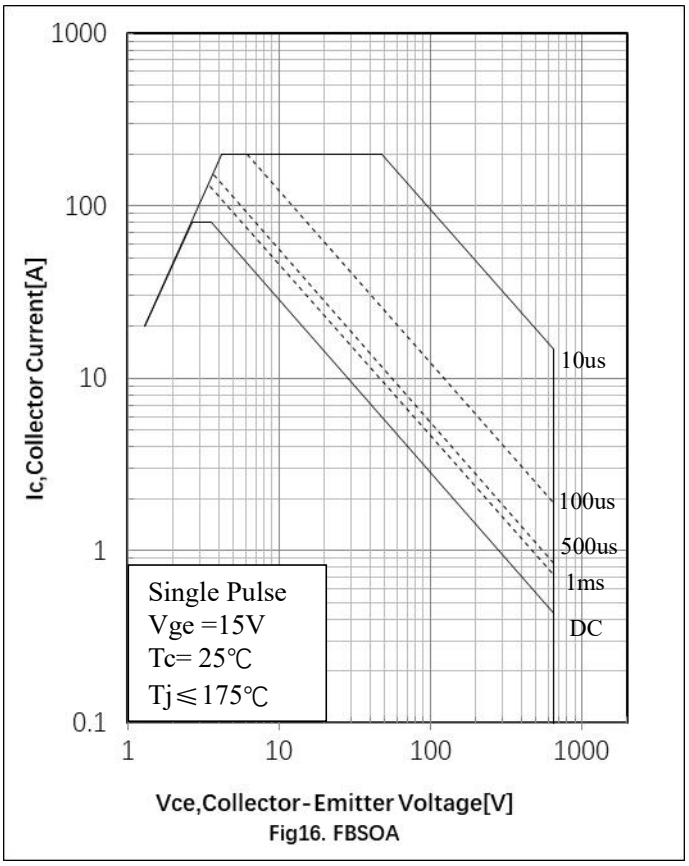
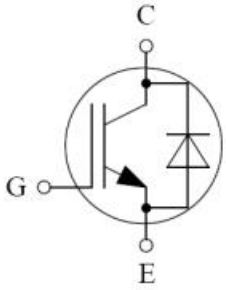
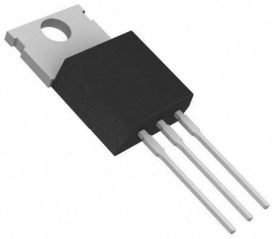


Fig16. FBSOA

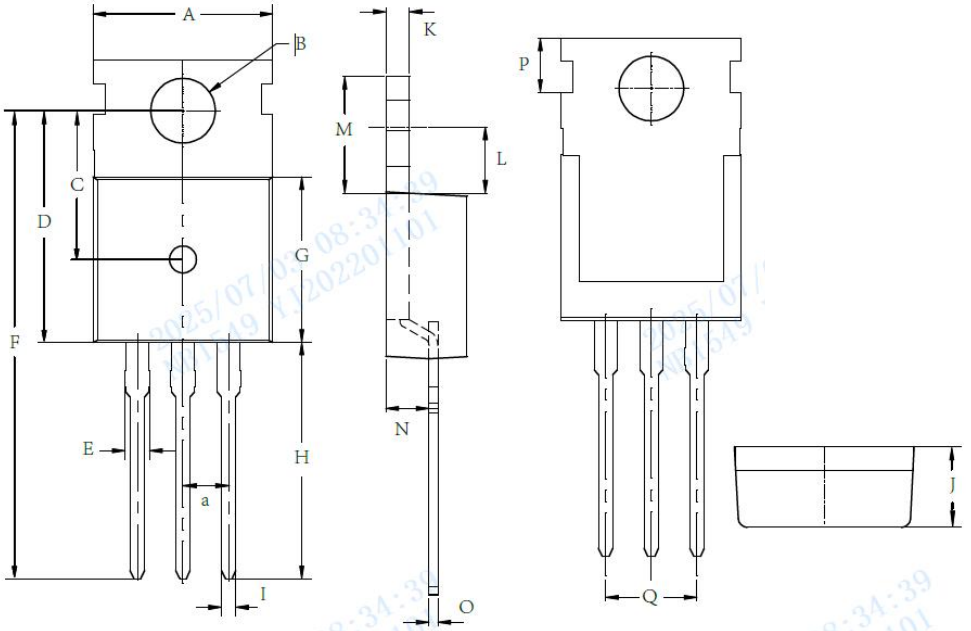
Circuit Diagram





Package Outline Information

CASE: TO-220 package information



SYMBOL	MIN	MAX
A	9.9	10.1
B	3.6	3.68
C	8.06	8.46
D	12.67	13.07
E	1.28	1.42
F	25.7	26.3
G	9	9.4
H	12.93	13.33
I	0.71	0.91
J	4.3	4.7
K	1.285	1.315
L	3.47	3.87
M	6.27	6.67
N	2.2	2.6
O	0.485	0.515
P	2.8	3.2
Q	TYP5.08	
a	2.51	2.57

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