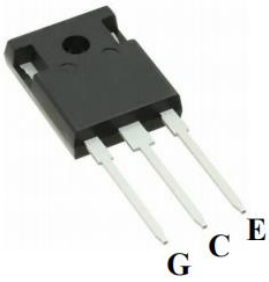
DGW50N65CTL2A

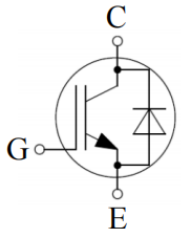
RoHS COMPLIANT



IGBT Discrete

V_{CE}	650	V
I_C	50	A
$V_{CE(SAT)}$ I_C=50A	1.45	V

Circuit



Applications

- Frequency Converters
- AC and DC servo drive amplifier
- Uninterruptible power supply

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 50	A
Diode Forward Current, limited by T_{jmax} T_C= 25°C value limited by bondwire T_C= 100°C	I_F	80 50	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		100	A
Pulsed Collector Current, V_{GE}=15V, tp limited by T_{jmax}	I_{CM}	100	A
Diode Pulsed Current, tp limited by T_{jmax}	I_{Fpuls}	100	A
Short Circuit Withstand Time, V_{GE}= 15V, V_{CC}=400V, V_{CEM}≤650V	T_{sc}	5	μs
Power Dissipation , Tj=175°C, Tc=25°C	P_{tot}	333	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=0.5mA	4.3	4.8	5.3	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		1.45 1.65 1.75	1.75	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	-	2.52	-	nF
Reverse Transfer Capacitance	C_{res}		-	0.05	-	
Gate Charge	Q_G	V_{CC}=400V,I_C=50A, V_{GE}=15V	-	0.25	-	uC
Short Circuit Collector Current	I_{SC}	V_{GE}=15V, tsc≤5us, Vcc=400V	-	285	-	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= 50A T_j= 25°C, T_j= 125°C T_j= 150°C		1.60 1.50 1.40	2.00	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=50A, V_{GE}= -5v~15V, Rg=10Ω, Inductive Load	-	25	-	ns
Rise Time	t_r		-	59	-	ns
Turn-on Energy	E_{on}		-	2.27	-	mJ
Turn-off Delay Time	$t_{d(off)}$		-	106	-	ns
Fall Time	t_f		-	98	-	ns
Turn-off Energy	E_{off}		-	1.09	-	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		-	60	-	ns
Turn-on Energy	E_{on}		-	2.46	-	mJ
Turn-off Delay Time	$t_{d(off)}$		-	112	-	ns
Fall Time	t_f		-	125	-	ns
Turn-off Energy	E_{off}		-	1.36	-	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	-	23	-	ns
Rise Time	t_r		-	61	-	ns
Turn-on Energy	E_{on}		-	2.56	-	mJ
Turn-off Delay Time	$t_{d(off)}$		-	115	-	ns
Fall Time	t_f		-	139	-	ns
Turn-off Energy	E_{off}		-	1.41	-	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=50A,V_R=400V -di/dt=450A/μs,	-	38	-	A
Reverse Recovery Charge	Q_{rr}		-	3.77	-	uC
Diode reverse recovery time	trr		-	174	-	ns
Reverse Recovery Energy	Erec		-	0.94	-	mJ
Dynamic , at Tj= 125℃						
Reverse Recovery Current	I_{rr}	I_F=50A,V_R=400V -di/dt=450A/μs,	-	41	-	A
Reverse Recovery Charge	Q_{rr}		-	5.06	-	uC
Diode reverse recovery time	trr		-	217	-	ns
Reverse Recovery Energy	Erec		-	1.34	-	mJ
Dynamic , at Tj= 150℃						
Reverse Recovery Current	I_{rr}	I_F=50A,V_R=400V -di/dt=450A/μs,	-	43	-	A
Reverse Recovery Charge	Q_{rr}		-	5.71	-	uC
Diode reverse recovery time	trr		-	239	-	ns
Reverse Recovery Energy	Erec		-	1.53	-	mJ

Thermal Resistance

Parameter	Symbol	Max. Value	Unit
IGBT Thermal Resistance, Junction - Case	R_{th}(j-c)	0.45	K/W
Diode Thermal Resistance, Junction - Case	R_{th}(j-c)	1.05	K/W
Thermal Resistance, Junction - Ambient	R_{th}(j-a)	40	K/W

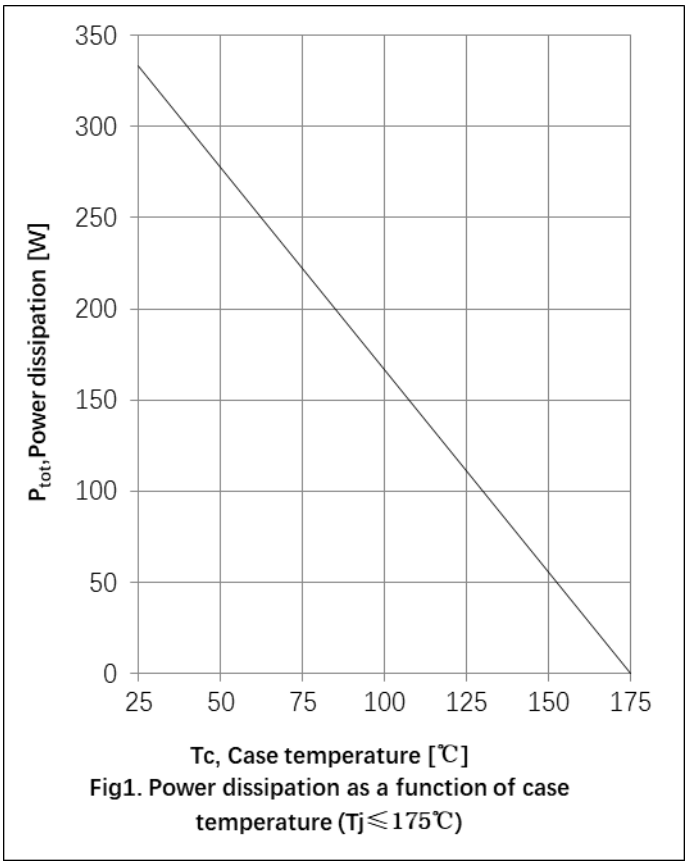


Fig1. Power dissipation as a function of case temperature (Tj≤175℃)

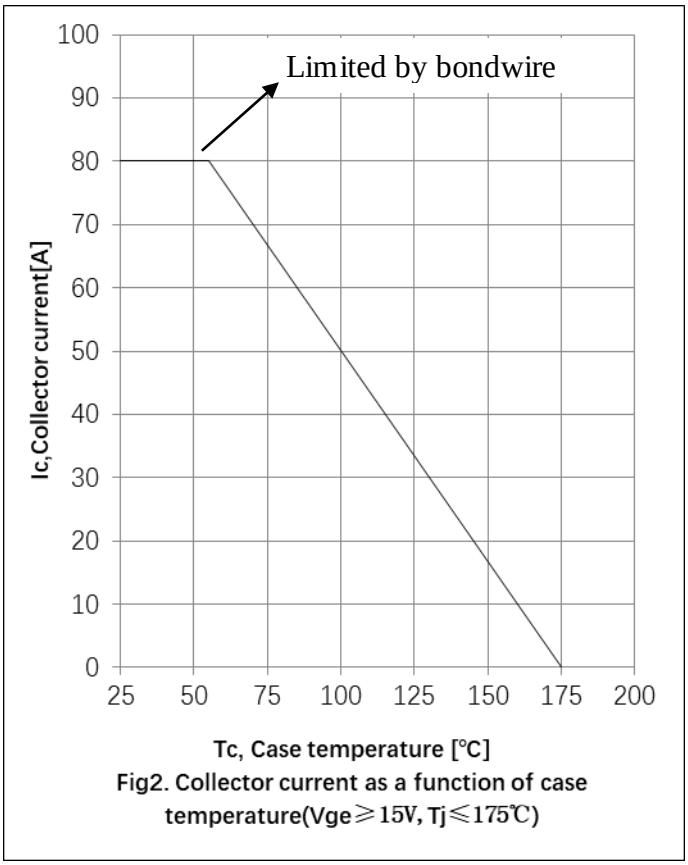


Fig2. Collector current as a function of case temperature(Vge≥15V, Tj≤175℃)

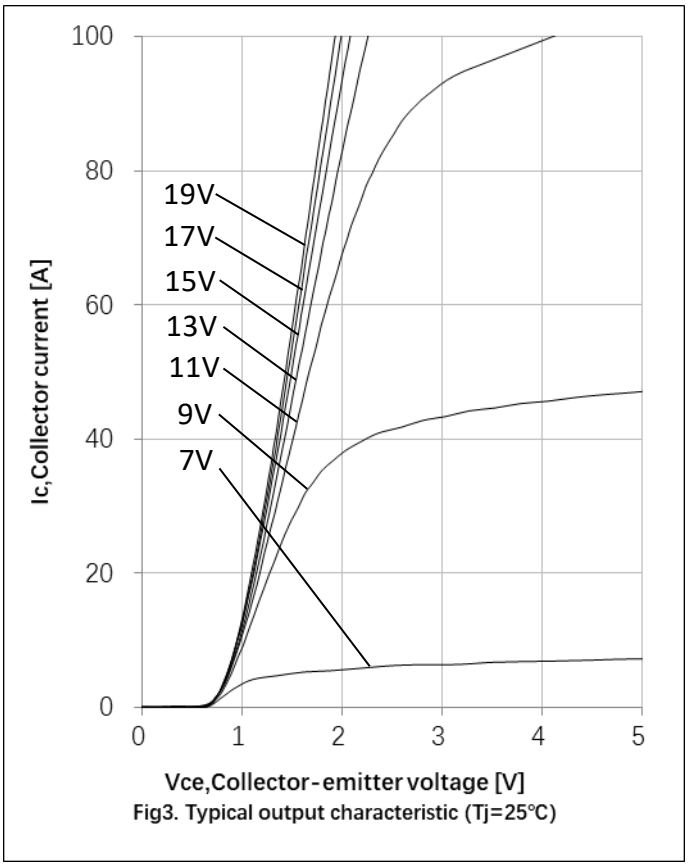


Fig3. Typical output characteristic (Tj=25℃)

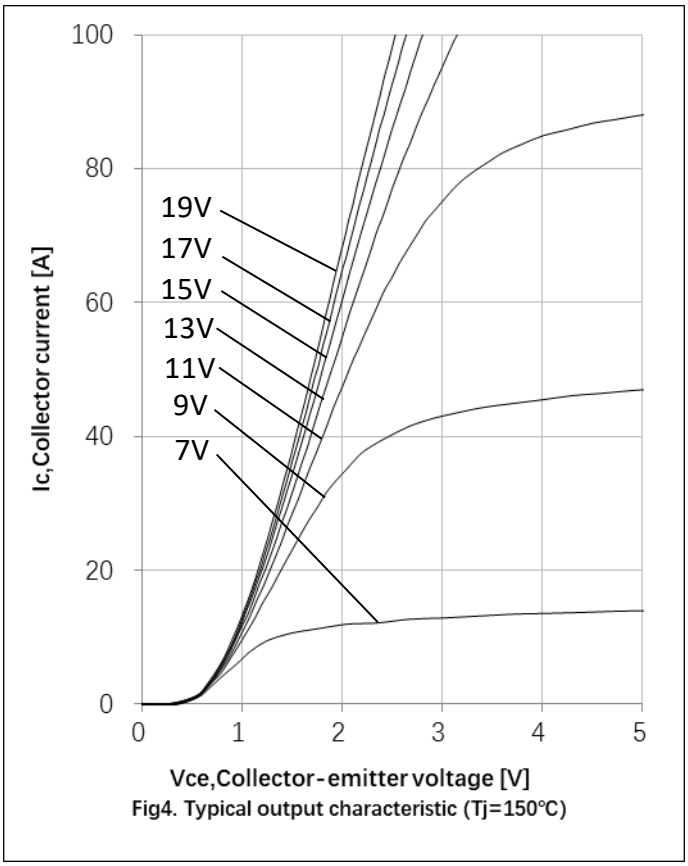


Fig4. Typical output characteristic (Tj=150℃)

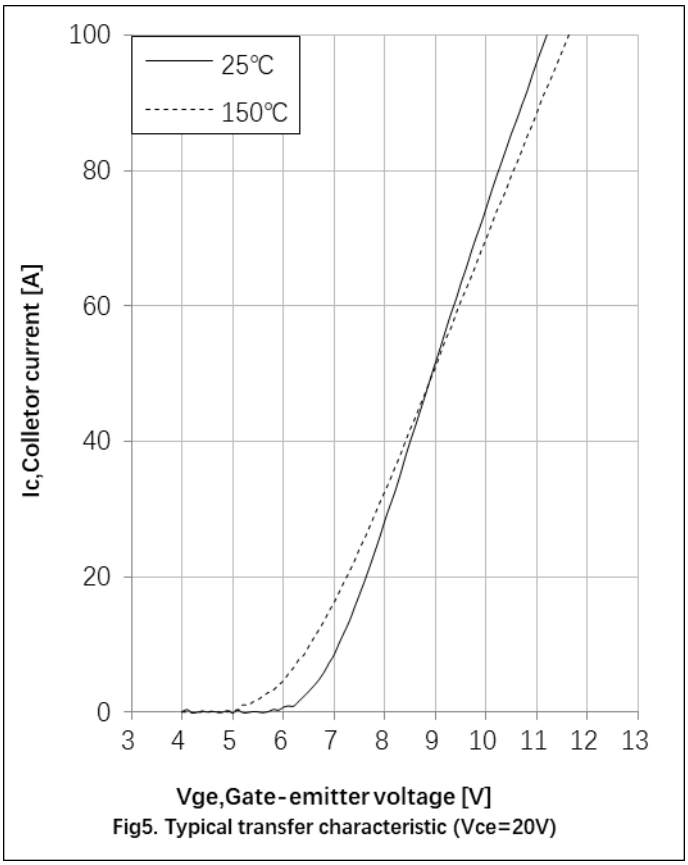


Fig5. Typical transfer characteristic (Vce=20V)

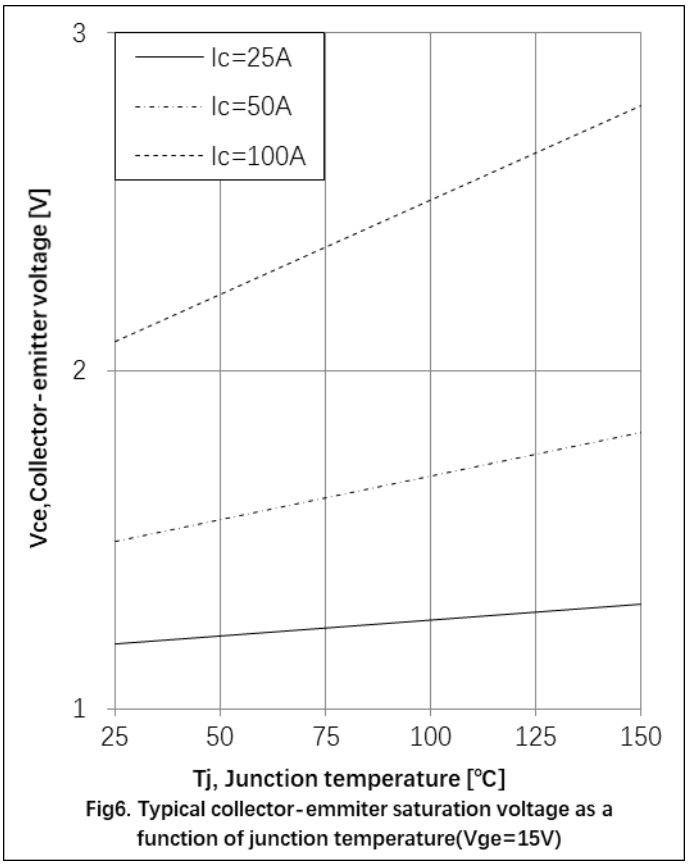


Fig6. Typical collector-emmiter saturation voltage as a function of junction temperature(Vge=15V)

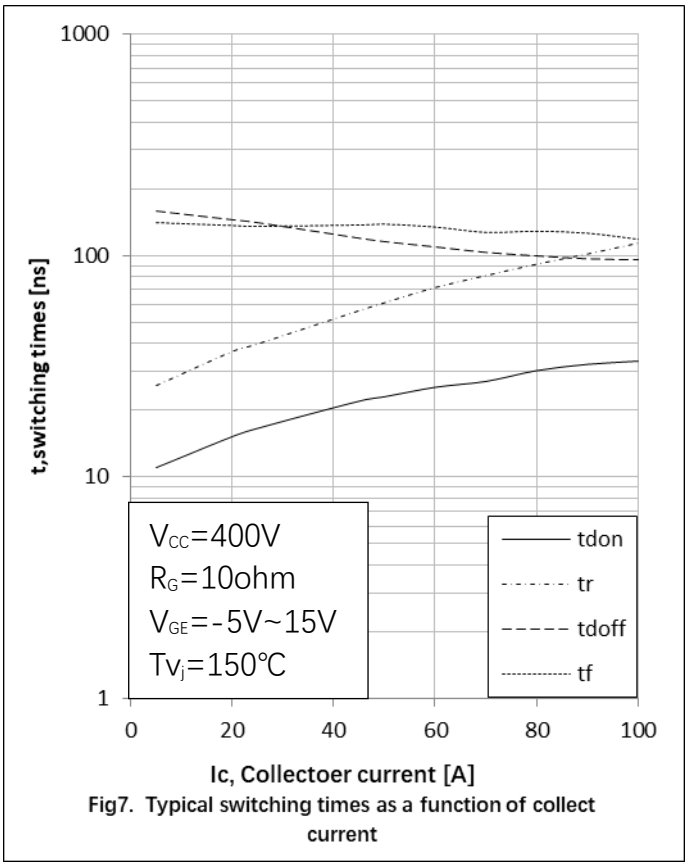


Fig7. Typical switching times as a function of collect current

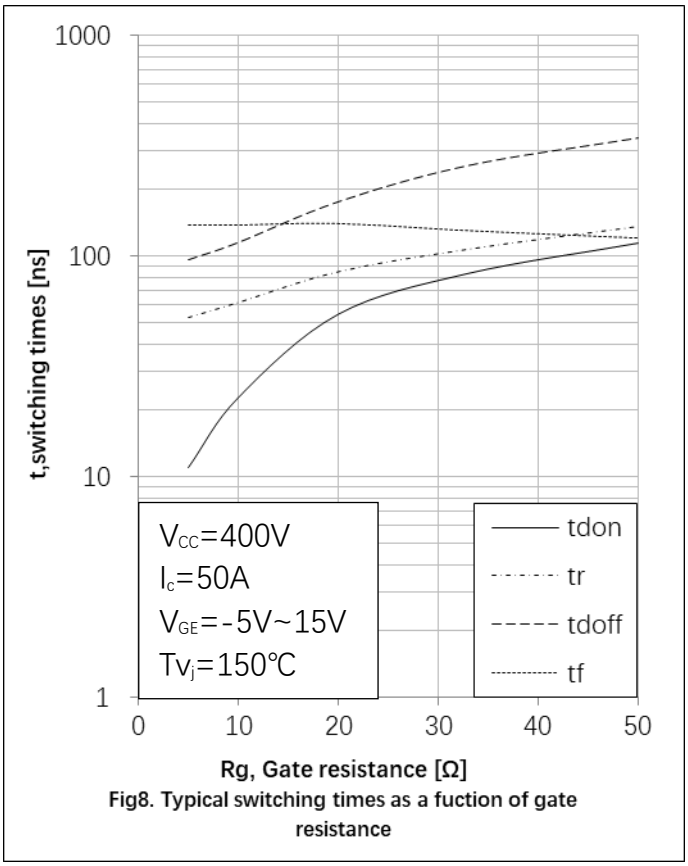


Fig8. Typical switching times as a fuction of gate resistance

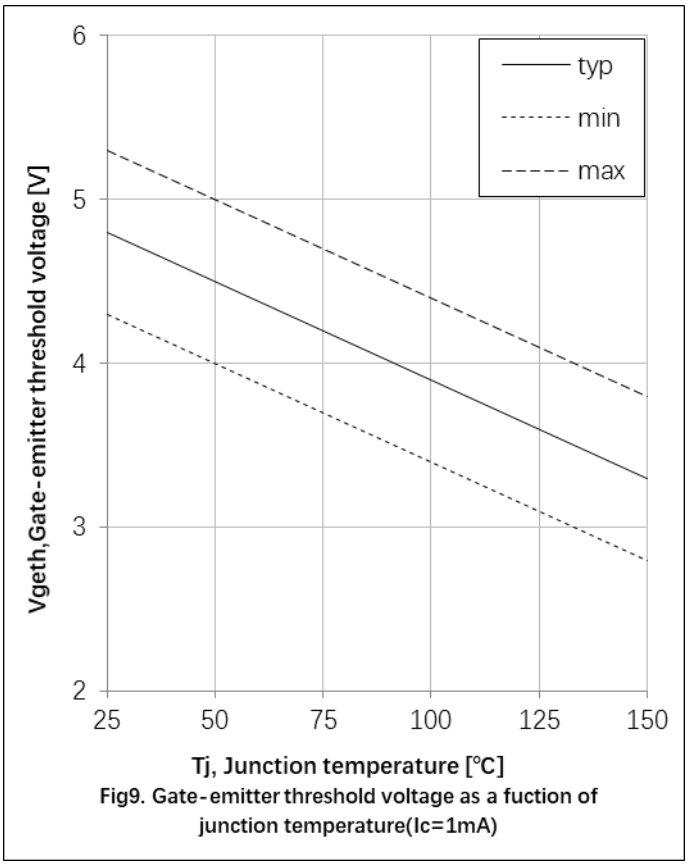


Fig9. Gate-emitter threshold voltage as a fuction of junction temperature(Ic=1mA)

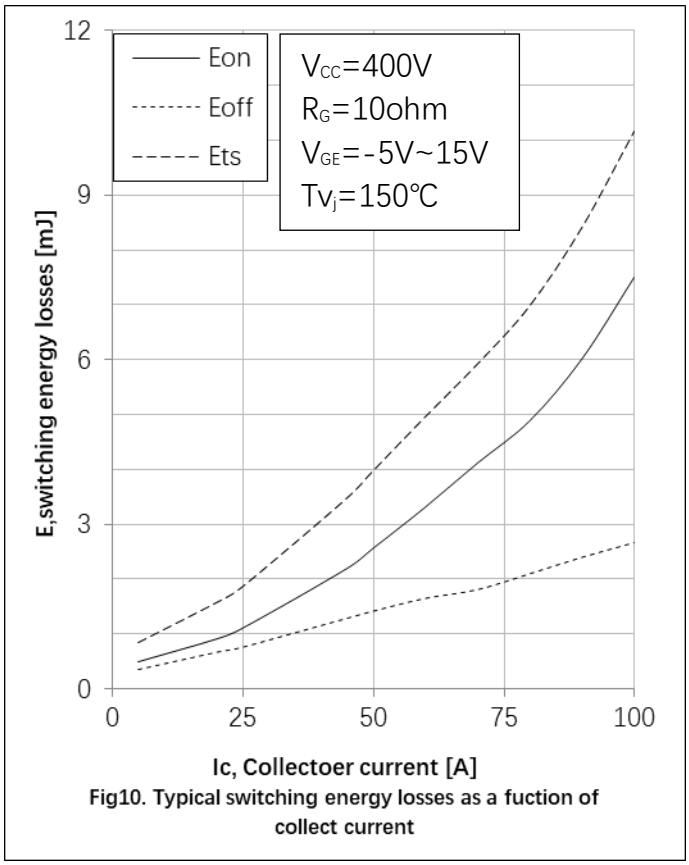


Fig10. Typical switching energy losses as a fuction of collect current

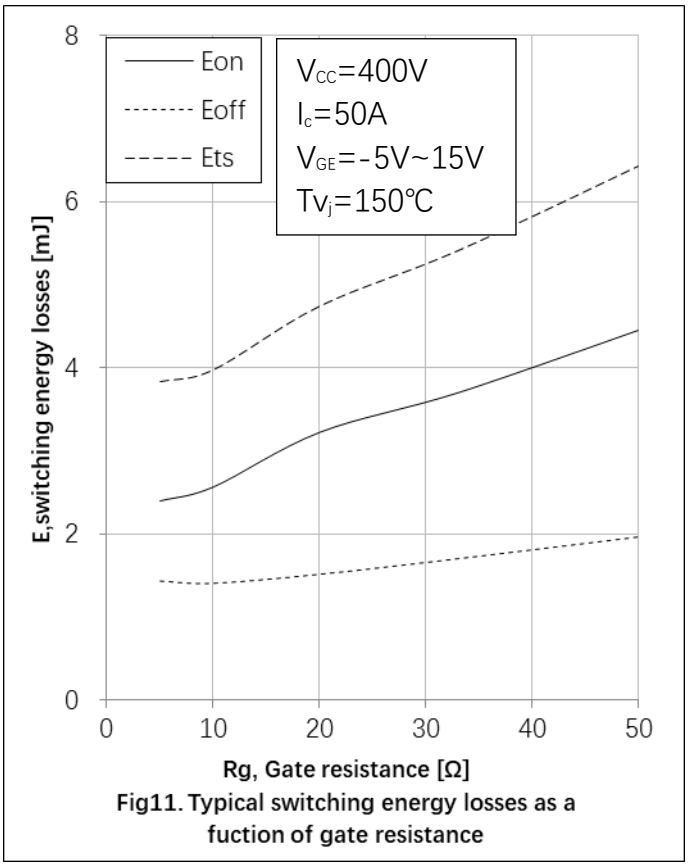


Fig11. Typical switching energy losses as a fuction of gate resistance

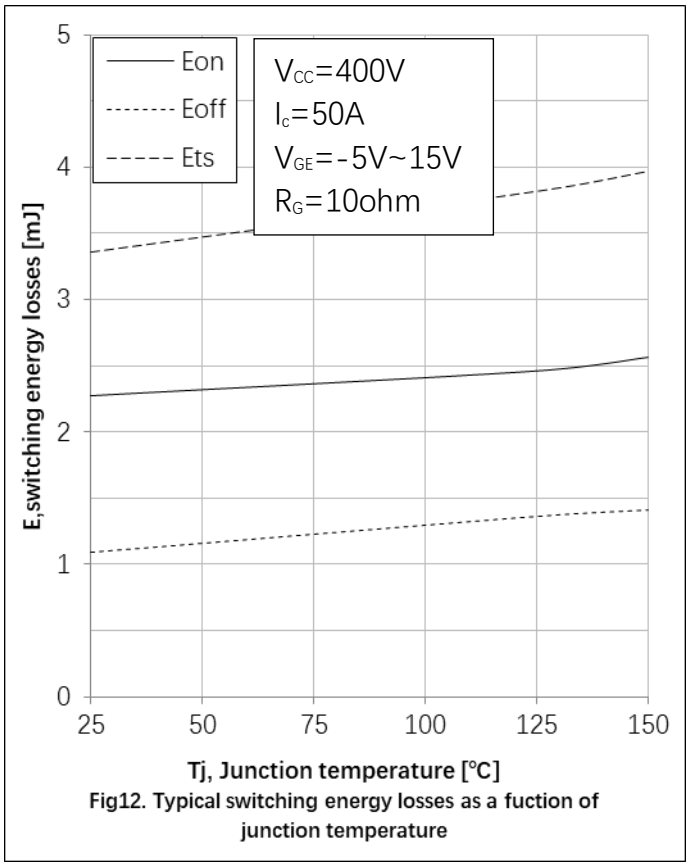


Fig12. Typical switching energy losses as a fuction of junction temperature

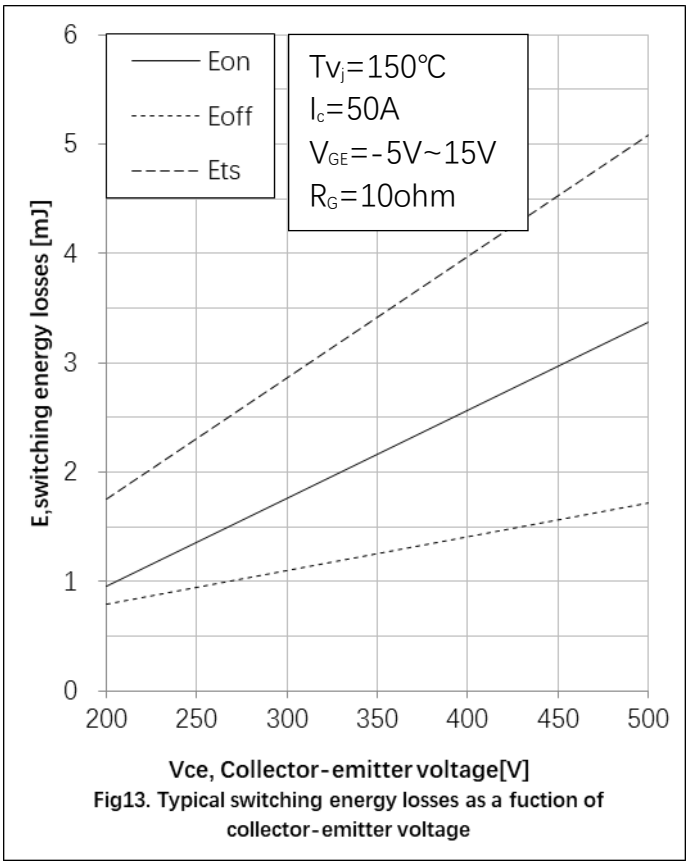


Fig13. Typical switching energy losses as a fuction of collector-emitter voltage

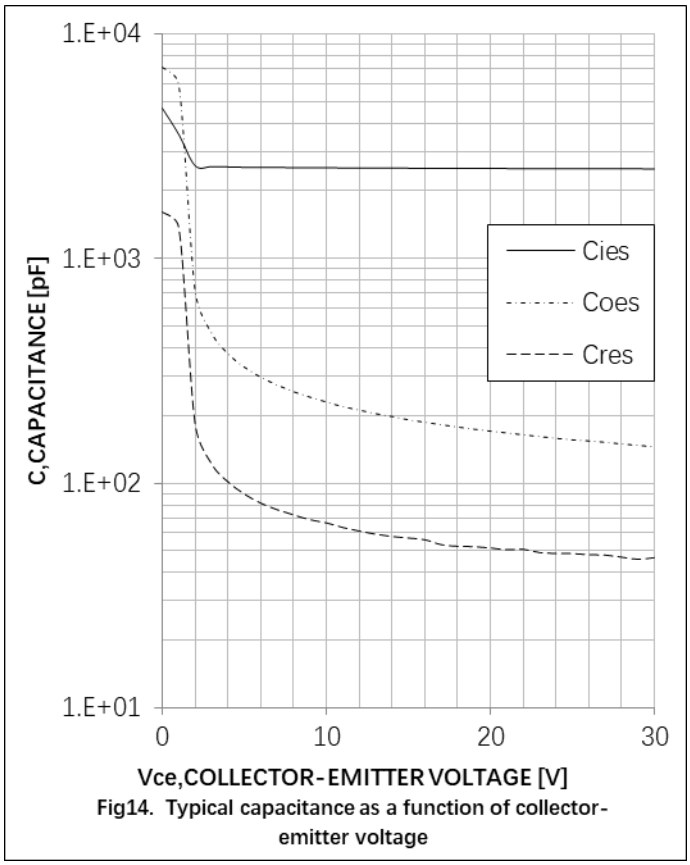


Fig14. Typical capacitance as a function of collector-emitter voltage

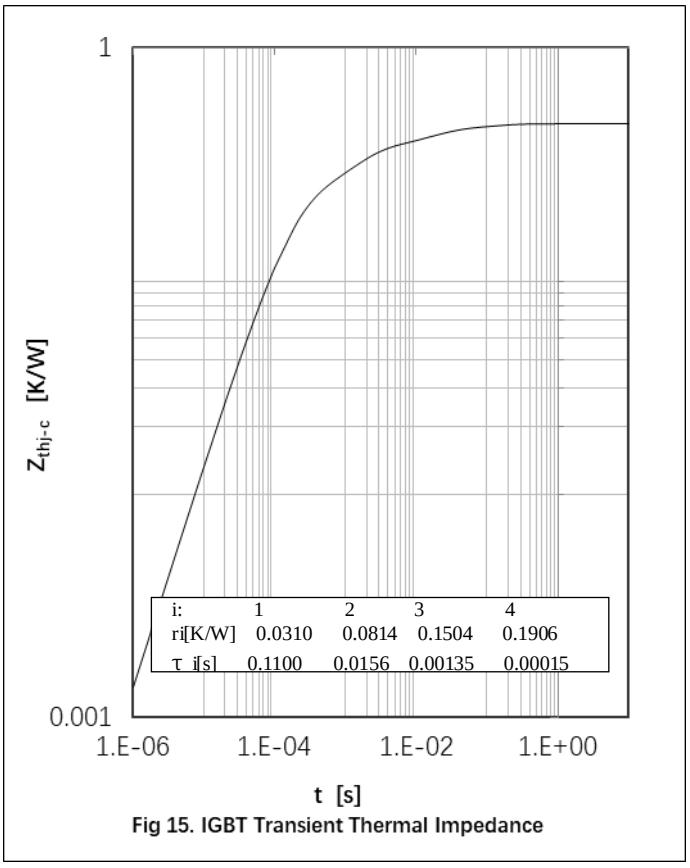


Fig 15. IGBT Transient Thermal Impedance

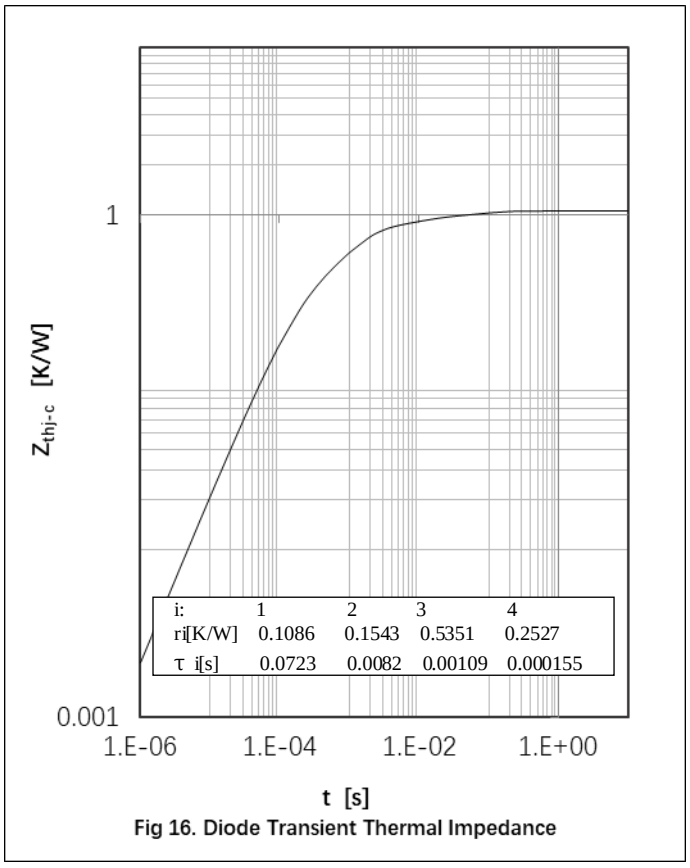


Fig 16. Diode Transient Thermal Impedance

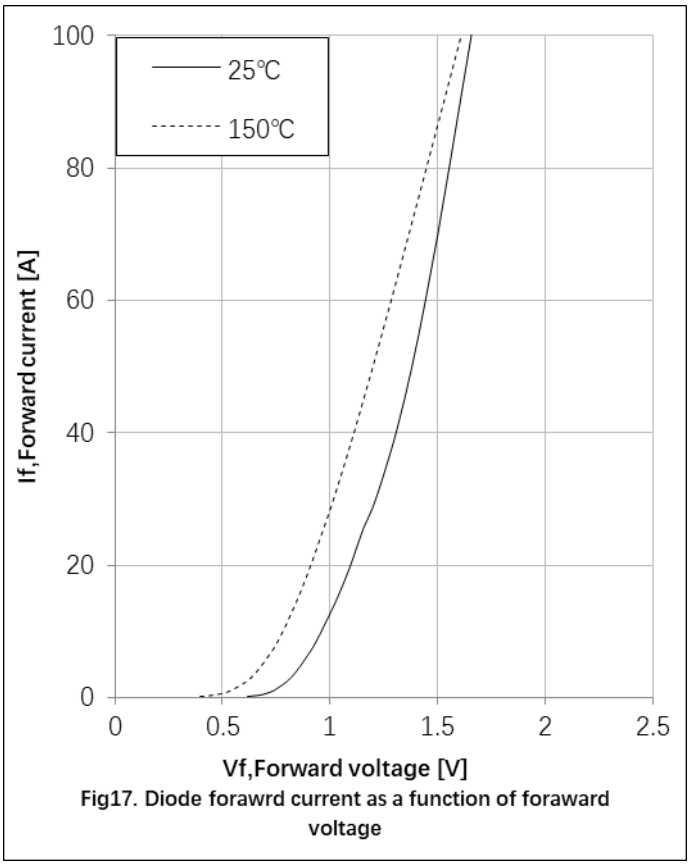


Fig17. Diode forawrd current as a function of foraward voltage

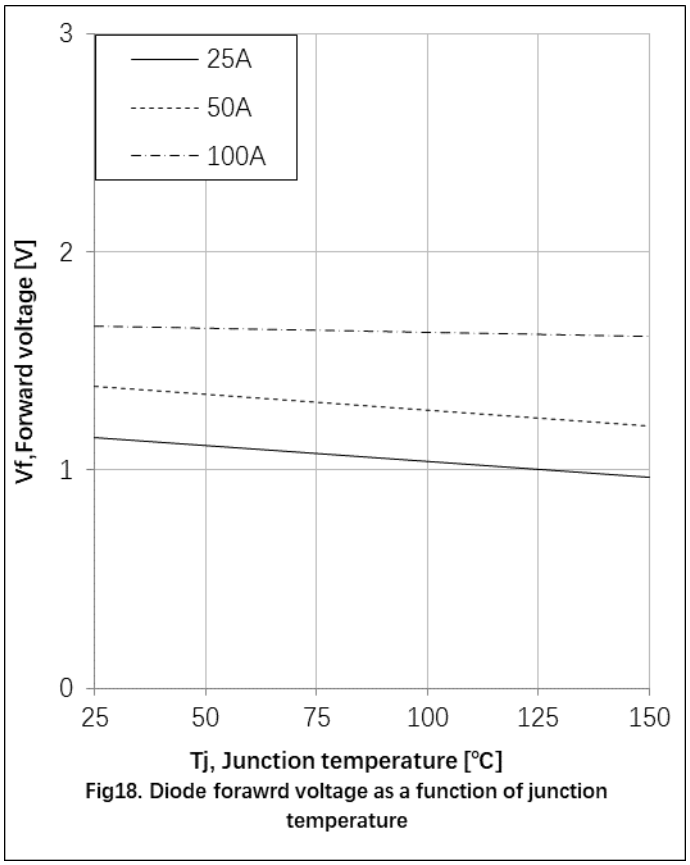
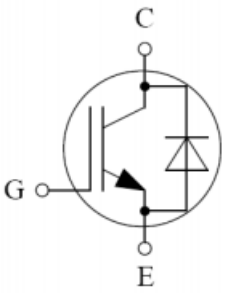
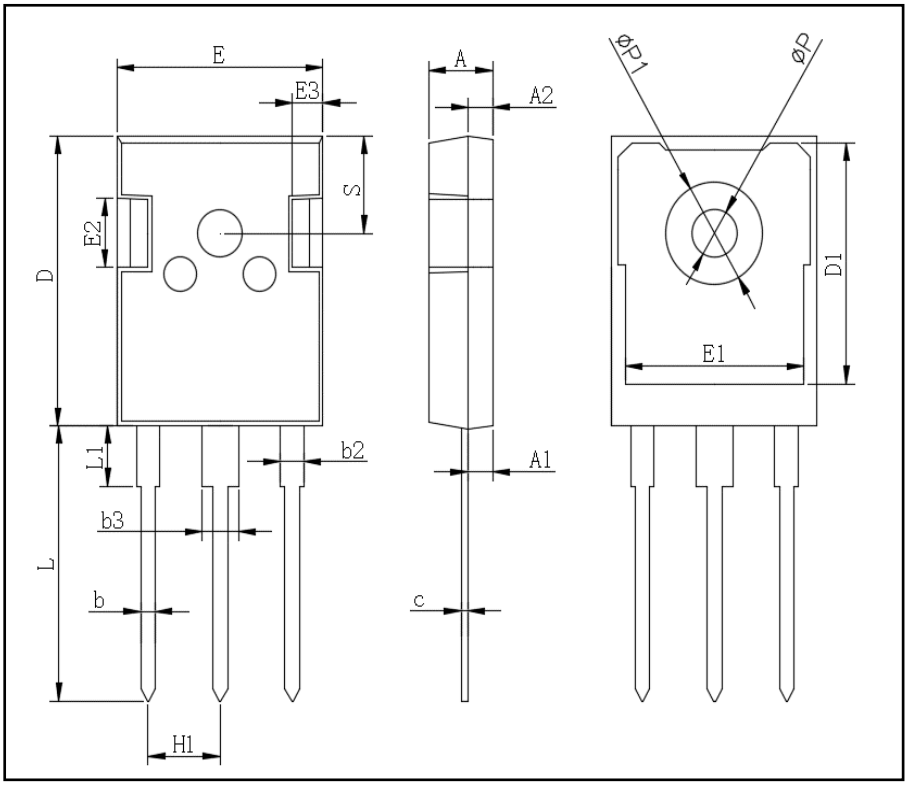


Fig18. Diode forawrd voltage as a function of junction temperature

Circuit Diagram

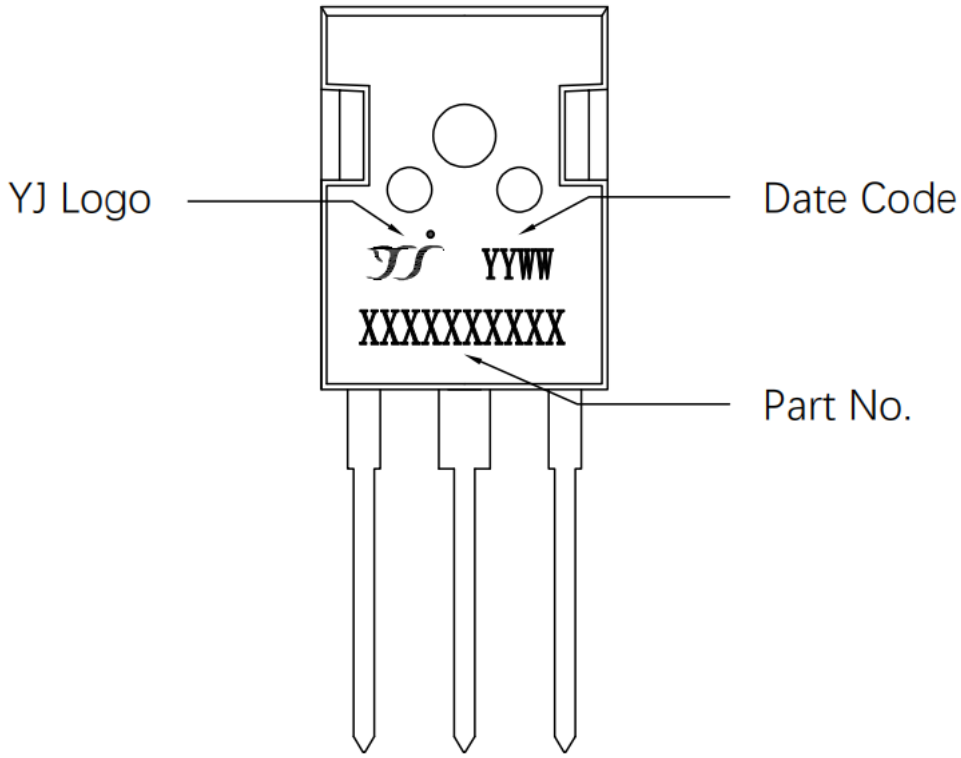


Package Outline Information



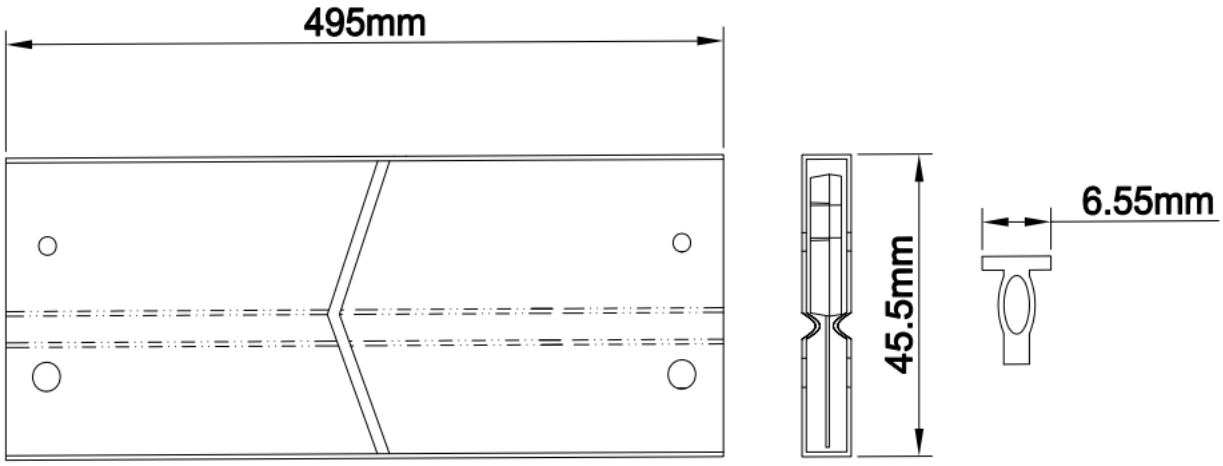
TO-247AB		
Dim	Min	Max
A	4.80	5.20
A1	2.21	2.61
A2	1.85	2.15
b	1.0	1.4
b2	1.91	2.21
C	0.5	0.7
D	20.70	21.30
D1	16.25	16.85
E	15.50	16.10
E1	13.0	13.6
E2	4.80	5.20
E3	2.30	2.70
L	19.62	20.22
L1	-	4.30
ΦP	3.40	3.80
ΦP1	-	7.30
S	6.15TYP	
H1	5.44TYP	
b3	2.80	3.20

Marking Information



Package Parameters

Base Part Number	Package Type	Standard Pack		Orderable Part Number
		Form	Quantity	
DGW50N65CTL2A	TO-247	Tube	30	DGW50N65CTL2A



Disclaimer

The information presented in this document is for reference only. Yangzhou Yangjie Electronic Technology Co., Ltd. reserves the right to make changes without notice for the specification of the products displayed herein to improve reliability, function or design or otherwise.

The product listed herein is designed to be used with ordinary electronic equipment or devices, and not designed to be used with equipment or devices which require high level of reliability and the malfunction of with would directly endanger human life (such as aerospace machinery, nuclear-reactor controllers, fuel controllers and other safety devices), Yangjie or anyone on its behalf, assumes no responsibility or liability for any damages resulting from such improper use of sale.

This publication supersedes & replaces all information previously supplied. For additional information, please visit our website http:// www.21yangjie.com , or consult your nearest Yangjie's sales office for further assistance.