DGW25N120CTL

RoHS COMPLIANT

IGBT Discrete

V_{CE}	1200	V
I_C	25	A
VCE(SAT) IC=25A	1.85	V

Circuit

Applications

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

Features

- Low $V_{CE(sat)}$ Trench-FS IGBT technology
- 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	50 25	A
Diode Forward Current, limited by T_{jmax} T_C= 25°C T_C= 100°C	I_F	50 25	A
Continuous Gate-Emitter Voltage	V_{GE}	±20	V
Transient Gate-Emitter Voltage	V_{GE}	±30	V
Turn off Safe Operating Area V_{CE}≤1200V, 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}	IFpuls	100	A
Short Circuit Withstand Time, V_{GE}= 15V, V_{CC}=900V V_{CEM}≤1200V	T_{sc}	10	μs
Power Dissipation , Tj=175°C, Tc=25°C	P_{tot}	326	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=0.8mA	5.1	5.8	6.4	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	V_{GE}=15V, I_C=25A T_j=25°C, T_j=125°C T_j=150°C		1.85 2.20 2.30	2.35	V
Zero Gate Voltage Collector Current	I_{CES}	V_{CE}=1200V, V_{GE}=0V T_j= 25°C, T_j=150°C			0.25 5.00	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	-	1.45	-	nF
Reverse Transfer Capacitance	C_{res}		-	0.05	-	
Gate Charge	Q_G	V_{CC}=960V,I_C=25A, V_{GE}=15V	-	0.20	-	uC
Short Circuit Collector Current	I_{SC}	V_{GE}=15V, tsc≤10us, Vcc=900V,Tj≤150°C	-	110	-	A

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 Diode T_j= 25 unless otherwise specified

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static						
Diode Forward Voltage	V_F	I_F= 25A T_j= 25°C, T_j= 125°C T_j= 150°C		2.00 1.80 1.70		V

■Switching Characteristic, Inductive Load

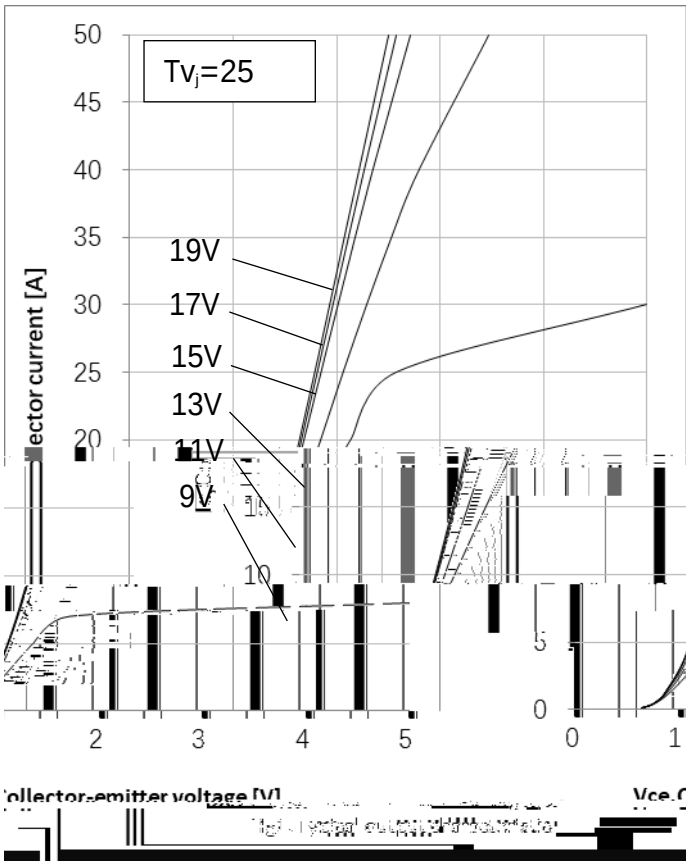
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Dynamic , at T_j= 25						
Turn-on Delay Time	t_d(on)	V_{CC}= 600V, I_C=25A, V_{GE}= -15v~15V, R_g=18Ω	-	158	-	ns
Rise Time	t_r		-	32	-	ns
Turn-on Energy	E_{on}		-	1.8	-	mJ
Turn-off Delay Time	t_d(off)		-	331	-	ns
Fall Time	t_f		-	83	-	ns
Turn-off Energy	E_{off}		-	1.4	-	mJ
Dynamic , at T_j= 125						
Turn-on Delay Time	t_d(on)	V_{CC}= 600V, I_C=25A, V_{GE}= -15v~15V, R_g=18Ω	-	172	-	ns
Rise Time	t_r		-	45	-	ns
Turn-on Energy	E_{on}		-	2.4	-	mJ
Turn-off Delay Time	t_d(off)		-	154	-	ns
Fall Time	t_f		-	212	-	ns
Turn-off Energy	E_{off}		-	2.2	-	mJ
Dynamic , at T_j= 150						
Turn-on Delay Time	t_d(on)	V_{CC}= 600V, I_C=25A, V_{GE}= -15v~15V, R_g=18Ω	-	190	-	ns
Rise Time	t_r		-	48	-	ns
Turn-on Energy	E_{on}		-	2.8	-	mJ
Turn-off Delay Time	t_d(off)		-	165	-	ns
Fall Time	t_f		-	230	-	ns
Turn-off Energy	E_{off}		-	2.4	-	mJ

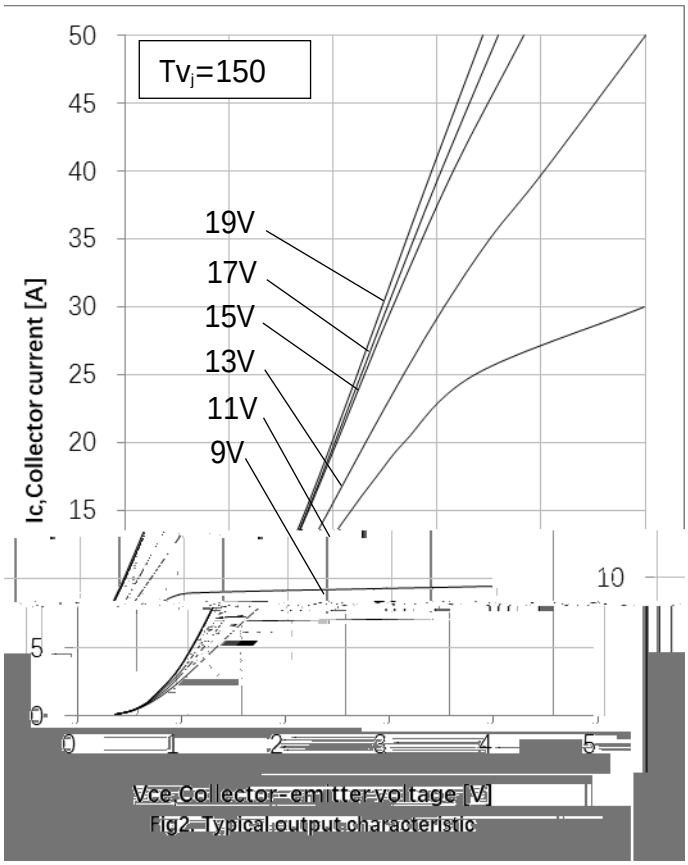
■Electrical Characteristics of the DIODE

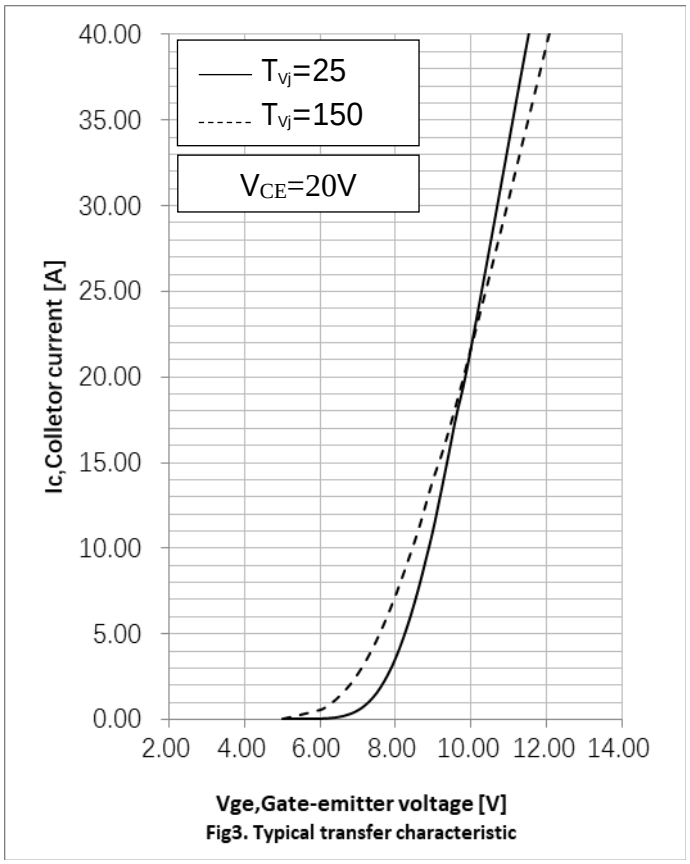
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Dynamic , at T_j= 25						
Diode Forward Voltage	V_{FM}	I_F= 25A	-	2.10	-	V
Reverse Recovery Current	I_{rr}	I_F=25A, V_R=600V, -di/dt=1700A/μs,	-	48.5	-	A
Reverse Recovery Charge	Q_{rr}		-	2.52	-	uC
Reverse Recovery Energy	Erec		-	0.94		mJ
Dynamic , at Tj= 125						
Reverse Recovery Current	I_{rr}	I_F=25A, V_R=600V, -di/dt=1700A/μs,	-	50.0	-	A
Reverse Recovery Charge	Q_{rr}		-	5.08	-	uC
Reverse Recovery Energy	Erec		-	1.75		mJ
Dynamic , at Tj= 150						
Reverse Recovery Current	I_{rr}	I_F=25A, V_R=600V, -di/dt=1700A/μs,	-	51.2	-	A
Reverse Recovery Charge	Q_{rr}		-	5.25	-	uC
Reverse Recovery Energy	Erec		-	1.96		mJ

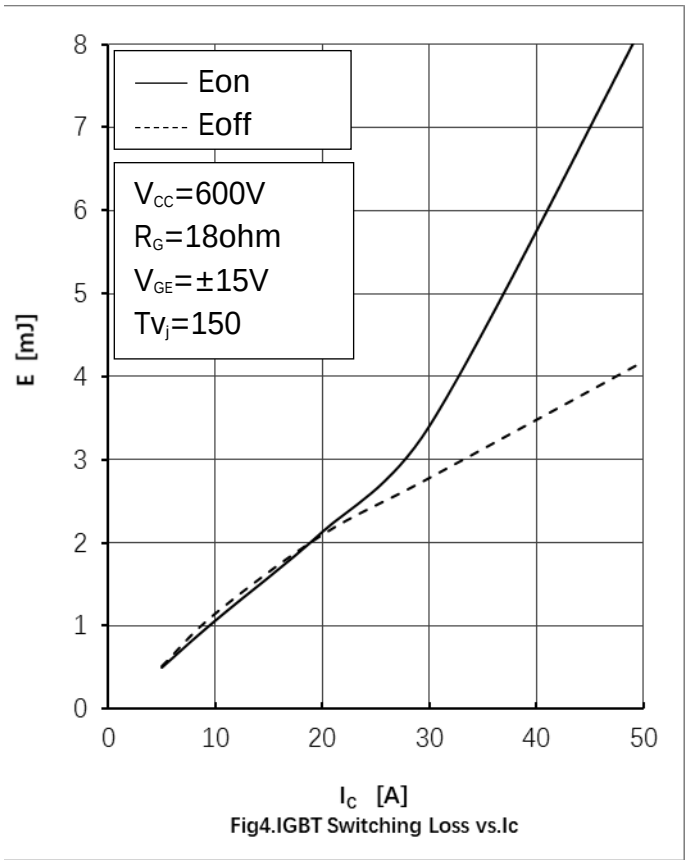
■Thermal Resistance

Parameter	Symbol	Max. Value	Unit
IGBT Thermal Resistance, Junction - Case	R_{th}(j-c)	0.46	K/W
Diode Thermal Resistance, Junction - Case	R_{th}(j-c)	1.00	K/W
Thermal Resistance, Junction - Ambient	R_{th}(j-a)	40	K/W


Tvj=25
19V
17V
15V
13V
11V
9V
lector current [A]
50
45
40
35
30
25
20
10
5
0
2
3
4
5
0
1
ollector-emitter voltage [V]
Vce.C


Tvj=150
19V
17V
15V
13V
11V
9V
Ic,Collector current [A]
50
45
40
35
30
25
20
15
10
5
0
0
1
2
3
4
5
Vce,Collector-emitter voltage [V]
Fig2. Typical output characteristic


Tvj=25
Tvj=150
VCE=20V
Ic,Colletor current [A]
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
Vge,Gate-emitter voltage [V]
Fig3. Typical transfer characteristic


Eon
Eoff
VCC=600V
RG=18ohm
VGE=±15V
Tvj=150
E [mJ]
8
7
6
5
4
3
2
1
0
0
10
20
30
40
50
Ic [A]
Fig4.IGBT Switching Loss vs.Ic

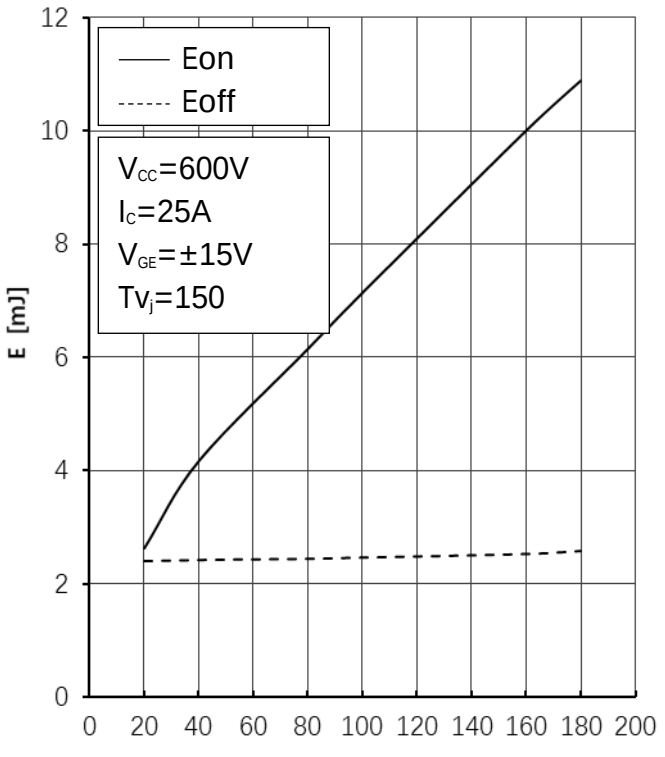


Fig5.IGBT Switching Loss vs.Rg

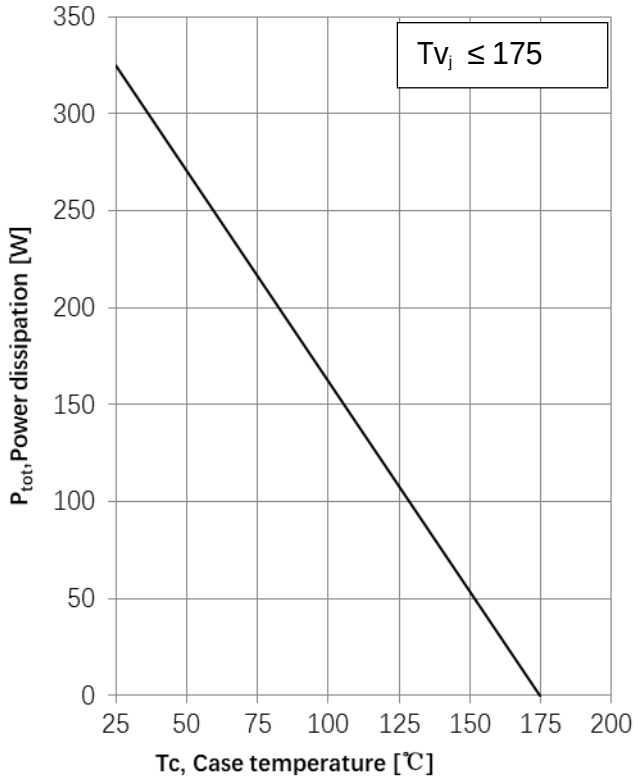


Fig6. Power dissipation as a function of case temperature (Tj≤175℃)

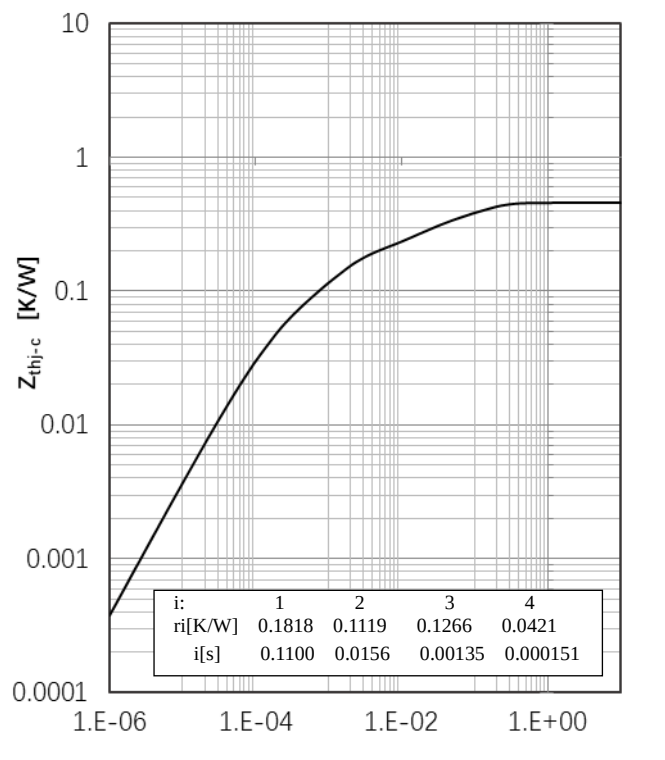


Fig 7. IGBT Transient Thermal Impedance

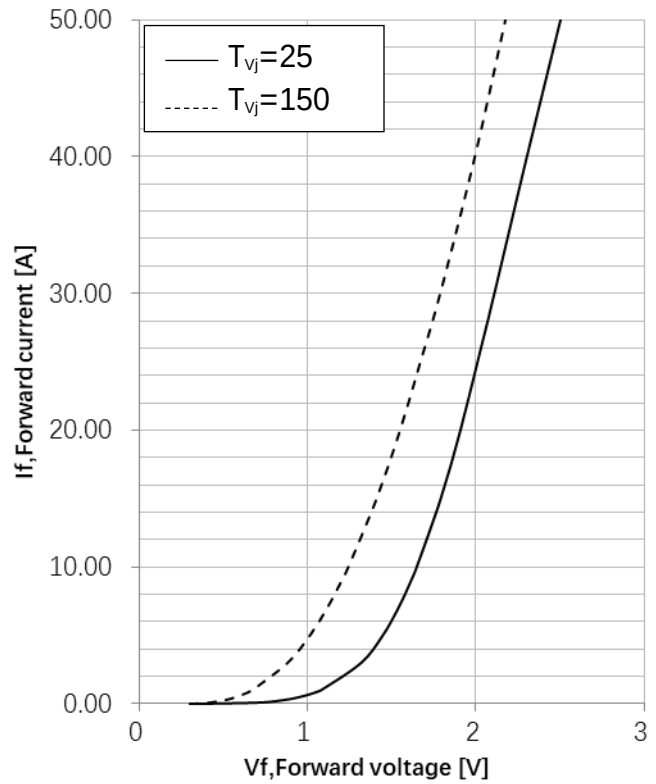


Fig8. diode forawrd current as a function of foraward voltage

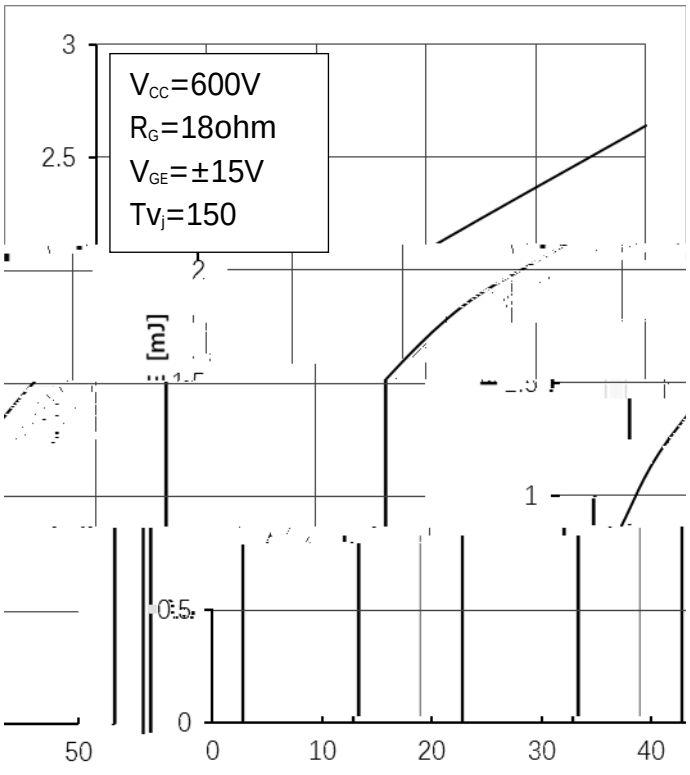


Fig9.Diode Switching Loss(Erec) vs.I_F

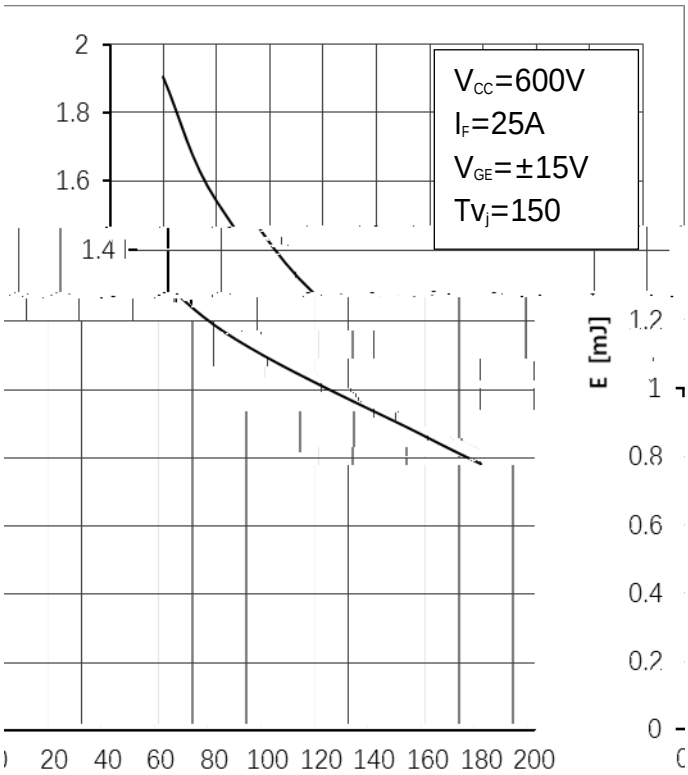


Fig10.Diode Switching Loss(Erec) vs.Rg

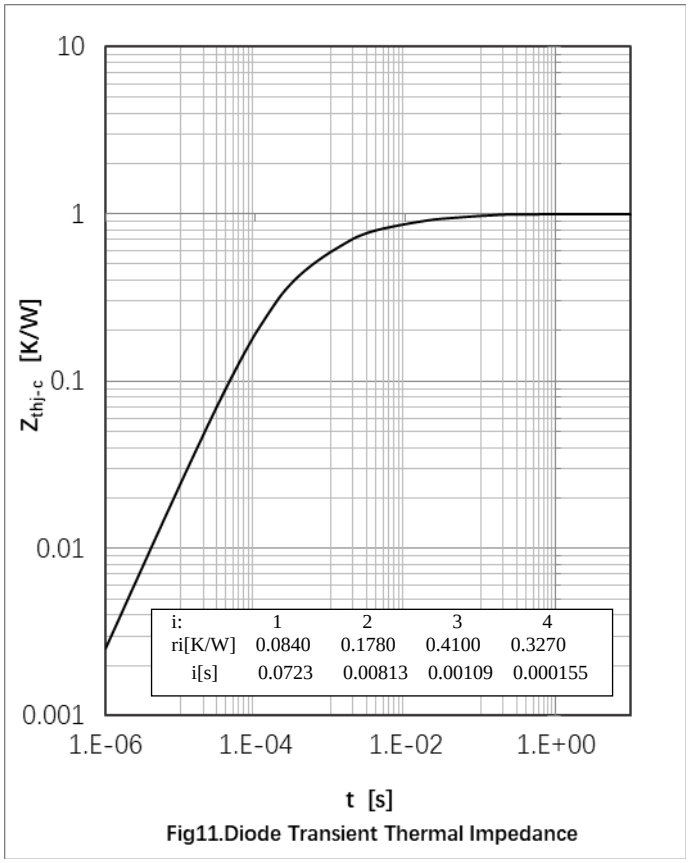


Fig11.Diode Transient Thermal Impedance

■Circuit Diagram

■Package Outline Information

CASE: TO 247