DGW60N65BTH

RoHS COMPLIANT

IGBT Discrete

V_{CE}	650	V
I_C	60	A
VCE(SAT) IC=60A	2.10	V

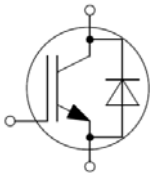
Applications

- High frequency switching application
- Medical applications
- Uninterruptible power supply
- Motion/servo control

Features

- Low switching losses
- Maximum junction temperature 175℃
- Positive temperature coefficient
- High ruggedness, temperature stable
- High short circuit capability(5us)

Circuit



■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 T_C= 100°C	I_C	120 60	A
Diode Forward Current, limited by T_{jmax} T_C= 25°C T_C= 100°C	I_F	60 30	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		240	A
Pulsed Collector Current, V_{GE}=15V, tp limited by T_{jmax}	I_{CM}	240	A
Diode Pulsed Current, tp limited by T_{jmax}	IFpuls	120	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}	395	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=1.0mA	4.5	5.0	5.5	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	V_{GE}=15V, I_C=60A T_j=25°C, T_j=125°C T_j=150°C		2.10 2.40 2.50	2.40	V
Zero Gate Voltage Collector Current	I_{CES}	V_{CE}=650V, V_{GE}=0V T_j= 25°C, T_j=150°C			0.25 4.00	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	-	2.24	-	nF
Reverse Transfer Capacitance	C_{res}		-	0.90	-	
Gate Charge	Q_G	V_{CC}=300V,I_C=60A, V_{GE}=15V	-	0.24	-	uC
Short Circuit Collector Current	I_{SC}	V_{GE}=15V, tsc≤5us, Vcc=400V,Tj≤150°C	-	280	-	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= 60A T_j= 25°C, T_j= 125°C T_j= 150°C		2.00 1.95 1.95	2.50	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}=300V, I_C=60A, V_{GE}= -15v~15V, Rg=20Ω,Ls=60nH	-	32	-	ns
Rise Time	t_r		-	75	-	ns
Turn-on Energy	E_{on}		-	1.90	-	mJ
Turn-off Delay Time	$t_{d(off)}$		-	122	-	ns
Fall Time	t_f		-	49	-	ns
Turn-off Energy	E_{off}		-	0.74	-	mJ
Dynamic , at T_j= 125℃						
Turn-on Delay Time	$t_{d(on)}$	V_{CC}=300V, I_C=60A,, V_{GE}= -15v~15V, Rg=20Ω,Ls=60nH	-	43	-	ns
Rise Time	t_r		-	85	-	ns
Turn-on Energy	E_{on}		-	2.93	-	mJ
Turn-off Delay Time	$t_{d(off)}$		-	235	-	ns
Fall Time	t_f		-	62	-	ns
Turn-off Energy	E_{off}		-	1.18	-	mJ
Dynamic , at T_j= 150℃						
Turn-on Delay Time	$t_{d(on)}$	V_{CC}=300V, I_C=60A,, V_{GE}= -15v~15V, Rg=20Ω,Ls=60nH	-	46	-	ns
Rise Time	t_r		-	89	-	ns
Turn-on Energy	E_{on}		-	3.18	-	mJ
Turn-off Delay Time	$t_{d(off)}$		-	248	-	ns
Fall Time	t_f		-	65	-	ns
Turn-off Energy	E_{off}		-	1.36	-	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=60A,V_R=300V di/dt= -366A/μs,	-	5.0	-	A
Reverse Recovery Charge	Q_{rr}		-	0.12	-	uC
Diode reverse recovery time	trr		-	45	-	ns
Reverse Recovery Energy	Erec		-	0.04		mJ
Dynamic , at Tj= 125℃						
Reverse Recovery Current	I_{rr}	I_F=60A,V_R=300V di/dt= -366A/μs,	-	7.2	-	A
Reverse Recovery Charge	Q_{rr}		-	0.25	-	uC
Diode reverse recovery time	trr		-	80	-	ns
Reverse Recovery Energy	Erec		-	0.08		mJ
Dynamic , at Tj= 150℃						
Reverse Recovery Current	I_{rr}	I_F=60A,V_R=300V di/dt= -366A/μs,	-	8.4	-	A
Reverse Recovery Charge	Q_{rr}		-	0.29	-	uC
Diode reverse recovery time	trr		-	90	-	ns
Reverse Recovery Energy	Erec		-	0.09		mJ

■Thermal Resistance

Parameter	Symbol	Max. Value	Unit
IGBT Thermal Resistance, Junction - Case	R_{th}(j-c)	0.38	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

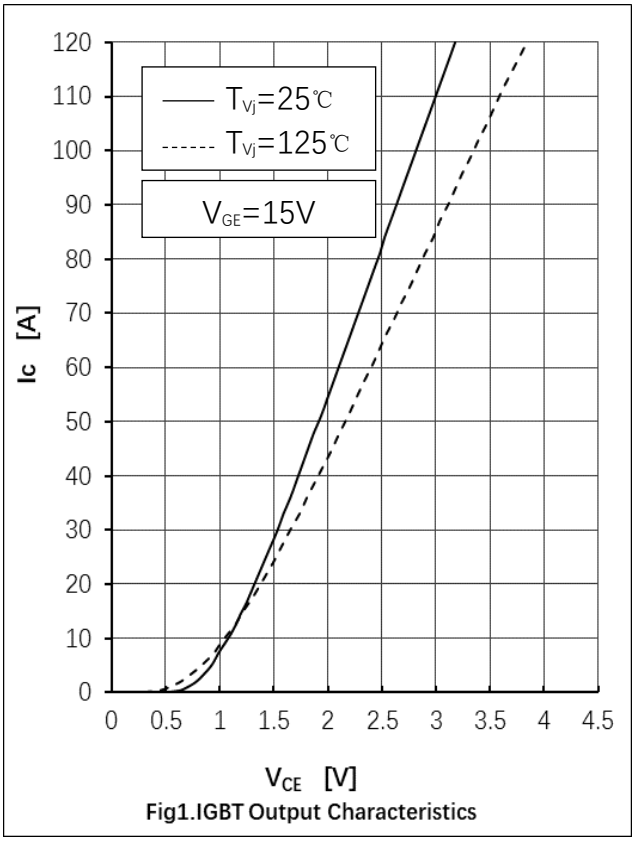


Fig1.IGBT Output Characteristics

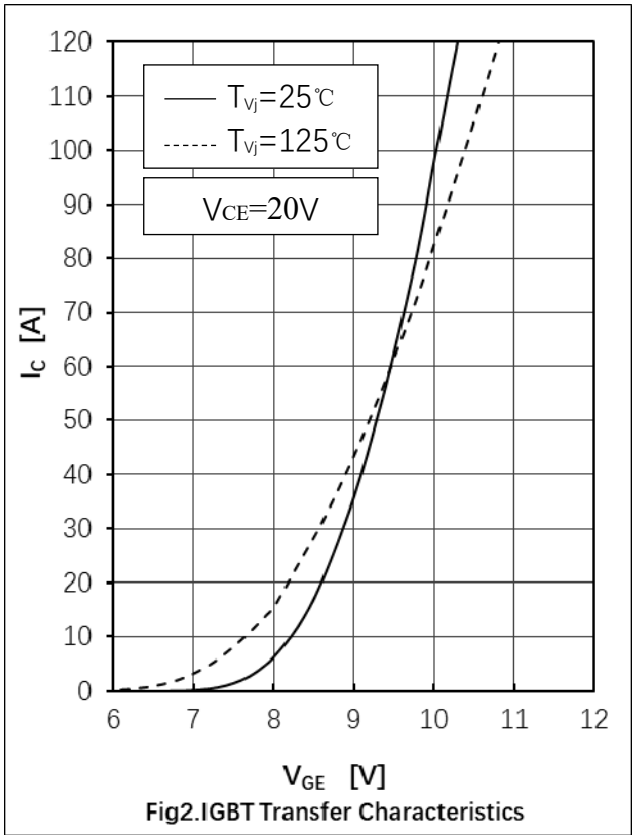


Fig2.IGBT Transfer Characteristics

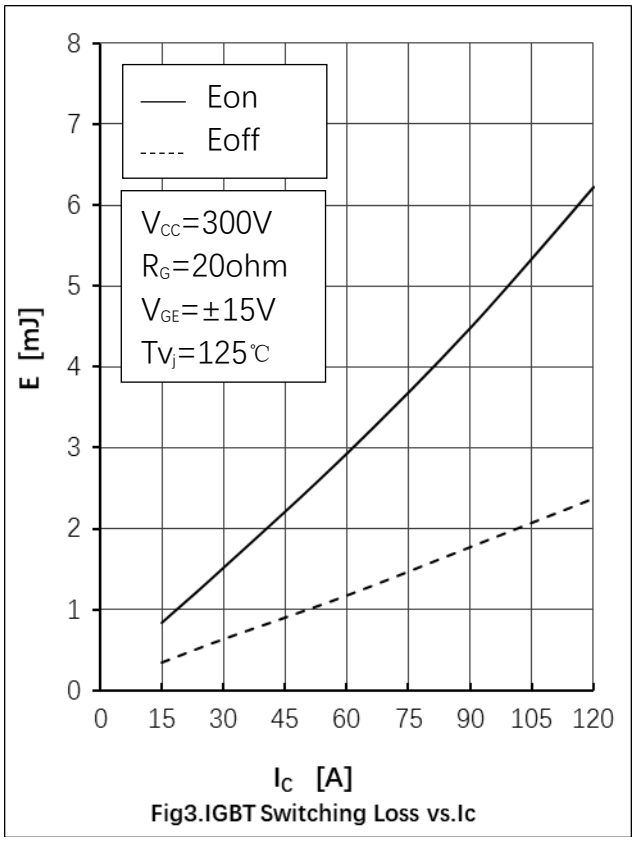


Fig3.IGBT Switching Loss vs.Ic

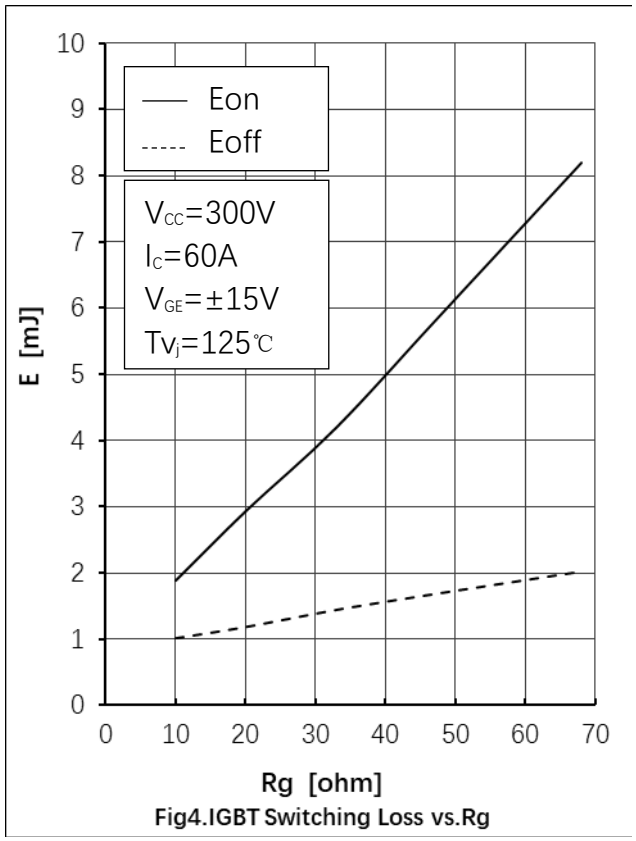


Fig4.IGBT Switching Loss vs.Rg

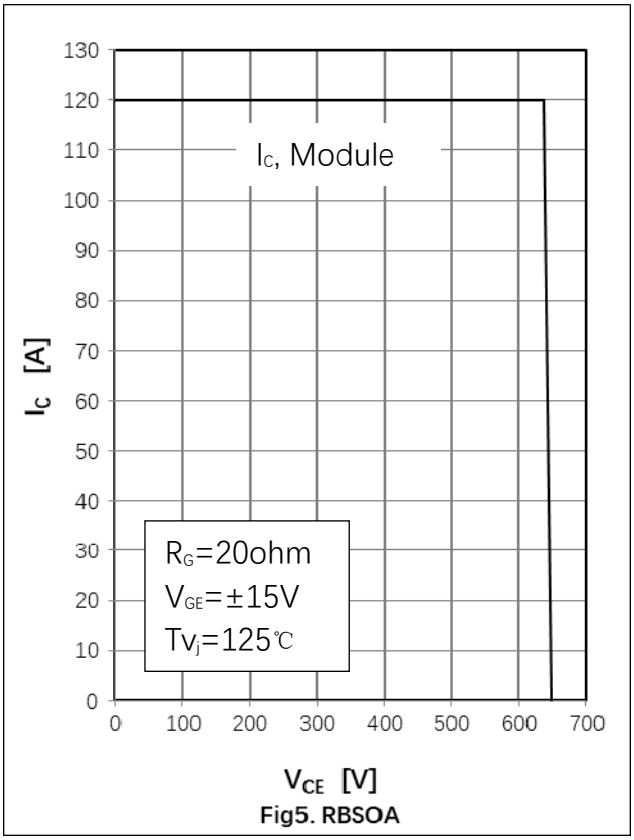


Fig5. RBSOA

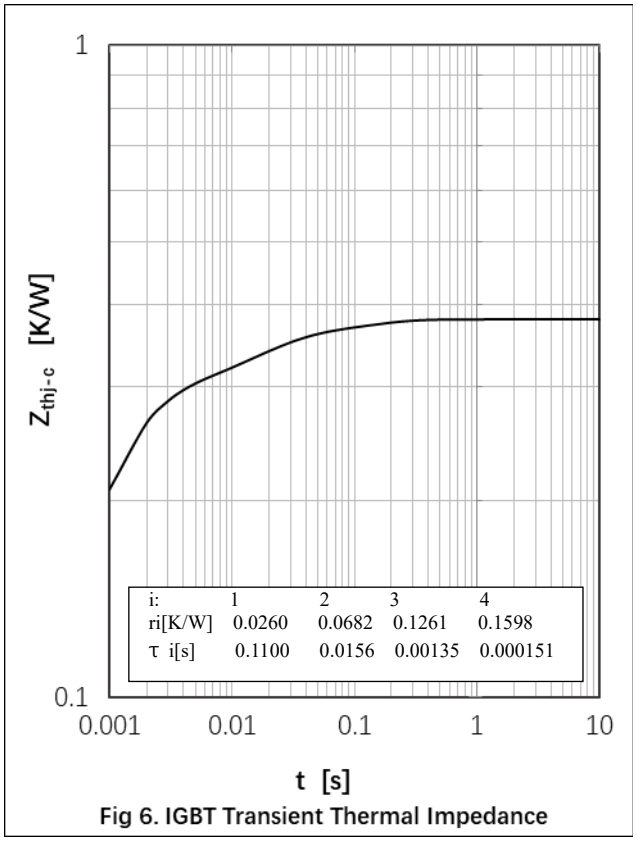


Fig 6. IGBT Transient Thermal Impedance

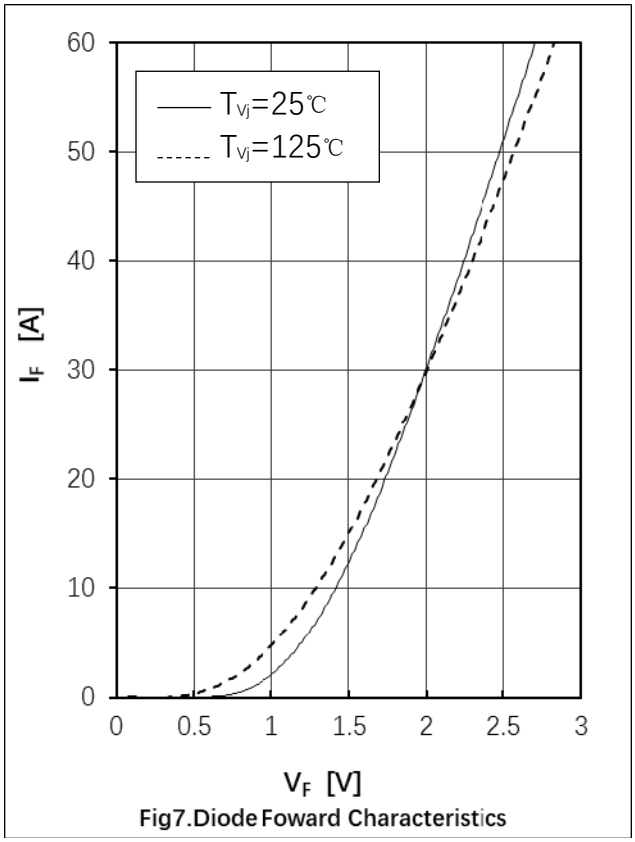


Fig7.Diode Foward Characteristics

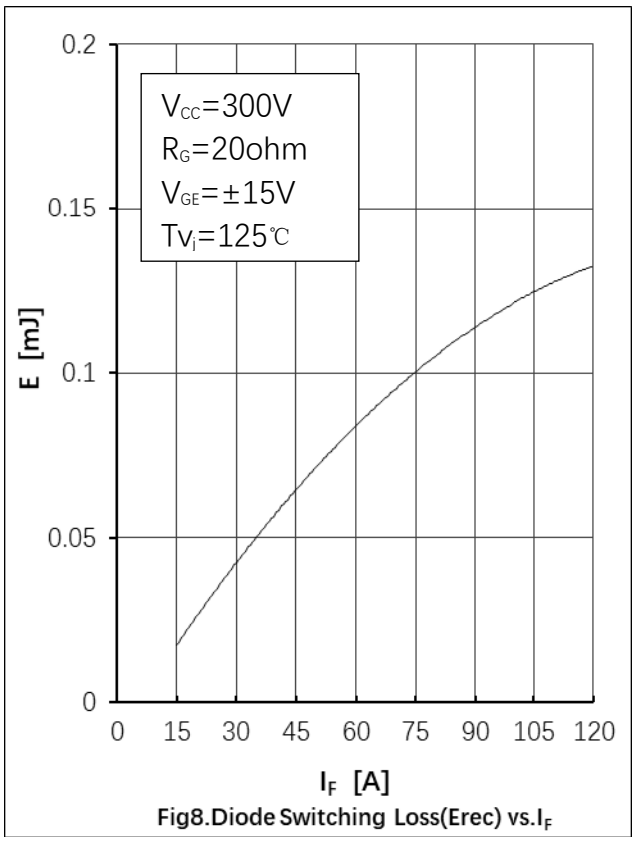


Fig8.Diode Switching Loss(Erec) vs.I_F

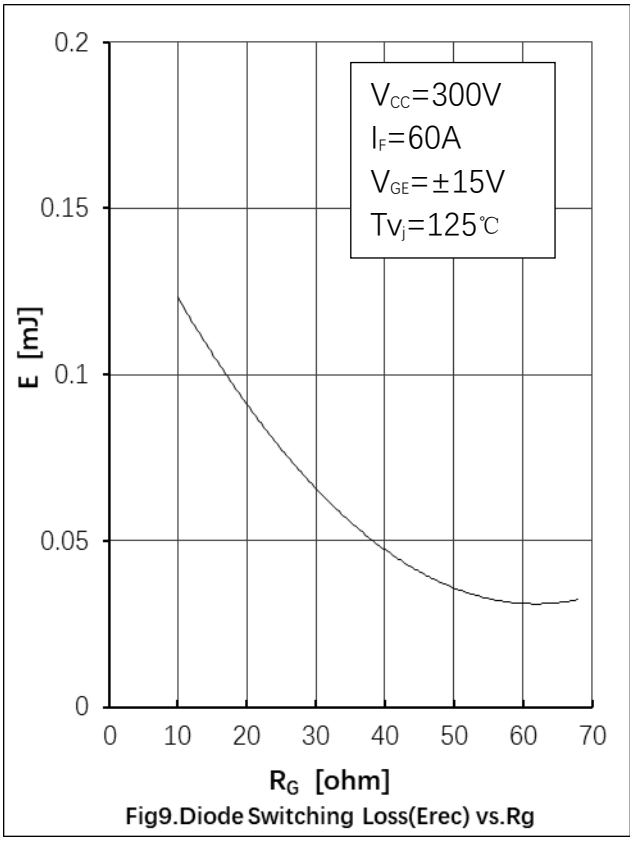


Fig9.Diode Switching Loss(Erec) vs.Rg

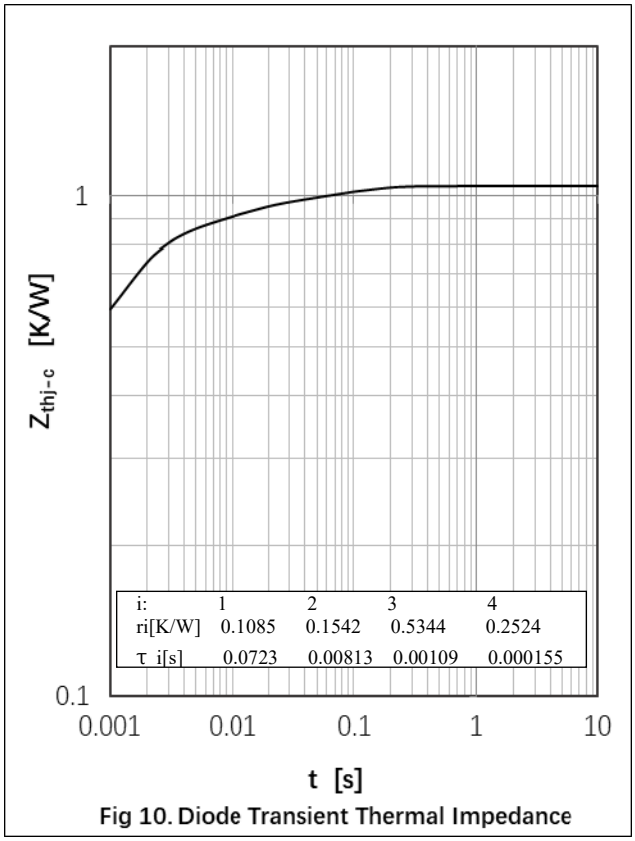
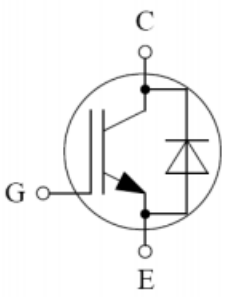


Fig 10. Diode Transient Thermal Impedance

■Circuit Diagram



■Package Outline Information

CASE: TO 247