TSG25N120A

IGBT

DRAWING

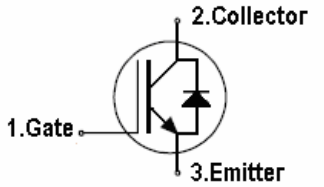
G C E

Features

- 1200V,25A
- $V_{CE(sat)(typ.)}$=2.7V@V_{GE}=15V
- High speed switching
- Higher system efficiency
- Soft current turn-off waveforms

General Description

TS NPT IGBTs offer lower losses and higher energy efficiency for application such as IH (induction heating),UPS, general inverter and other soft switching applications.



Absolute Maximum Ratings

Symbol	Parameter	Spec	Units
V_{CES}	Collector-Emitter Voltage	1200	V
V_{GES}	Gate-Emitter Voltage	±30	V
I_C	Continuous Collector Current (TC=25 ℃)	60	A
	Continuous Collector Current (TC=100℃)	25	A
I_{CM}	Pulsed Collector Current (Note 1)	80	A
I_F	Diode Continuous Forward Current (TC=100 ℃)	25	A
I_{FM}	Diode Maximum Forward Current (Note 1)	80	A
P_D	Maximum Power Dissipation (TC=25 ℃)	160	W
	Maximum Power Dissipation (TC=100℃)	64	W
T_J	Operating Junction Temperature Range	-55 to +150	℃
T_{STG}	Storage Temperature Range	-55 to +150	℃

Notes：

1. Repetitive Rating: Pulse width limited by maximum junction temperature

Thermal Characteristics

Symbol	Parameter	Spec	Units
Rth j-c	Thermal Resistance, Junction to case for IGBT	0.78	℃/ W
Rth j-a	Thermal Resistance, Junction to Ambient	40	℃/ W

Electrical Characteristics (TC=25℃ unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
BV_{CES}	Collector-Emitter Breakdown Voltage	V_{GE}= 0V, I_C= 250uA	1200			V
I_{CES}	Collector-Emitter Leakage Current	V_{CE}= 1200V, V_{GE}= 0V			250	uA
I_{GES}	Gate Leakage Current, Forward	V_{GE}=30V, V_{CE}= 0V			100	nA
	Gate Leakage Current, Reverse	V_{GE}= -30V, V_{CE}= 0V			-100	nA
$V_{GE(th)}$	Gate Threshold Voltage	V_{GE}= V_{CE}, I_C= 250uA	4.5		5.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	V_{GE}=15V, I_C= 25A		2.7	2.9	V
Qg	Total Gate Charge	V_{CC}=600V		92		nC
Qge	Gate-Emitter Charge	V_{GE}=15V		13		nC
Qgc	Gate-Collector Charge	I_C=25A		63		nC
t d(on)	Turn-on Delay Time	V_{CC}=600V		46		ns
t r	Turn-on Rise Time	V_{GE}=15V,I_C=20A		59		ns
t d(off)	Turn-off Delay Time	R_G=28Ω		362		ns
t f	Turn-off Fall Time	Inductive Load		172		ns
Eon	Turn-on Switching Loss	TC=25 ℃		2.11		mJ
Eoff	Turn-off Switching Loss	Energy losses include tail and		1.11		mJ
Ets	Total Switching Loss	diode reverse recovery		3.22		mJ
Cies	Input Capacitance	V_{CE}=30V		35		pF
Coes	Output Capacitance	V_{GE}=0V		105		pF
Cres	Reverse Transfer Capacitance	f = 100kHz		607		pF
R_{Gint}	Integrated gate resistor		1.7	1.8	1.9	Ω

Electrical Characteristics of Diode (TC=25℃ unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
V_F	Diode Forward Voltage	I_F=15A		1.4	2.0	V
t r r	Diode Reverse Recovery Time	V_{CE} = 600V		209		ns
I r r	Diode peak Reverse Recovery Current	I_F=15A		26		A
Qr r	Diode Reverse Recovery Charge	dIF/dt = 500A/us		4374		nC

Typical Characteristics

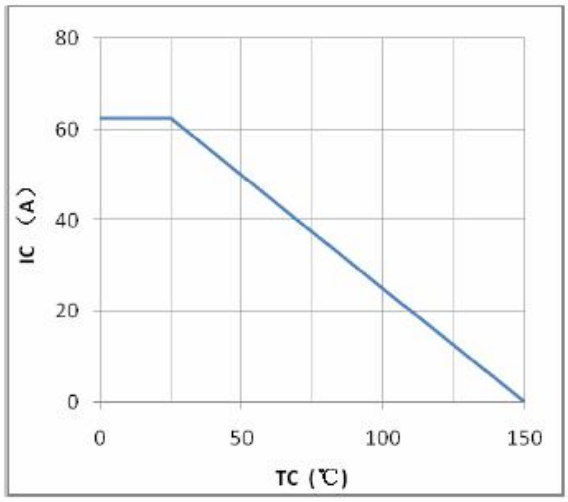


Figure1:maximum DC collector current VS. case temprature

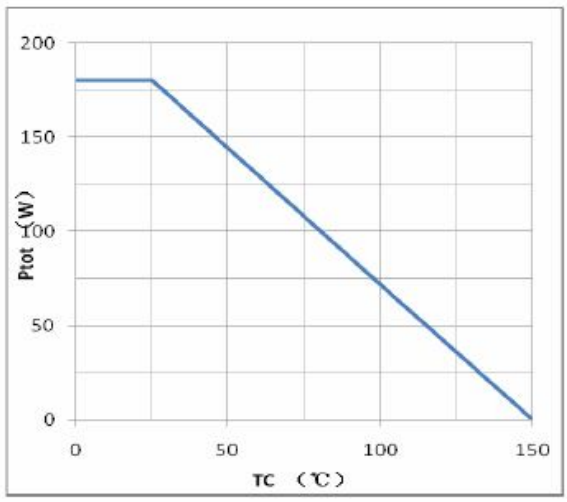


Figure2:power dissipation VS. case temprature

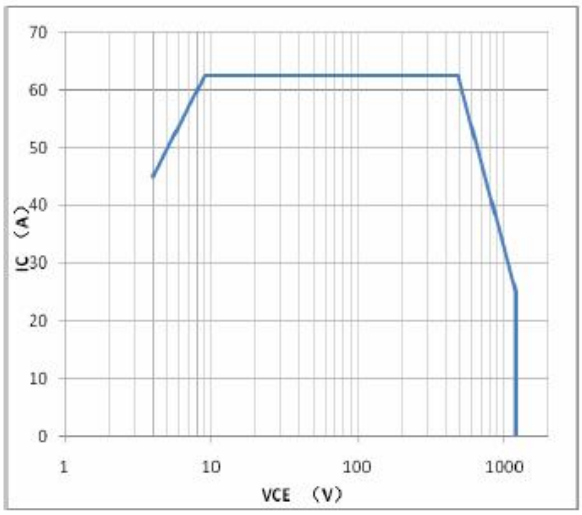


Figure3:reverse bias SOA,TJ=150℃,VGE=15V

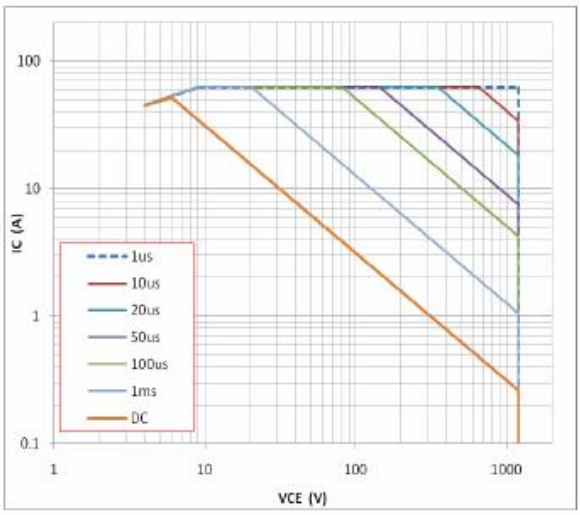


Figure4:forward SOA,TC=25℃,TJ≤150℃

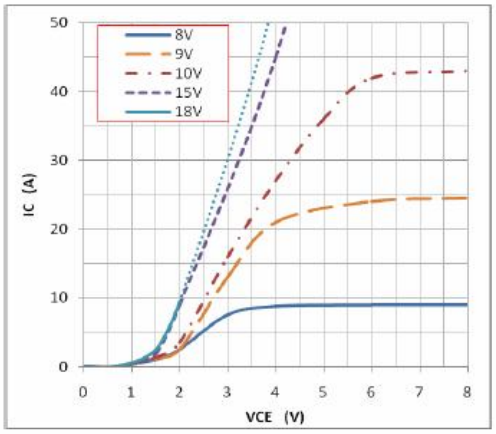


Figure5:typical IGBT output characteristics, TJ=25℃;tp=300us

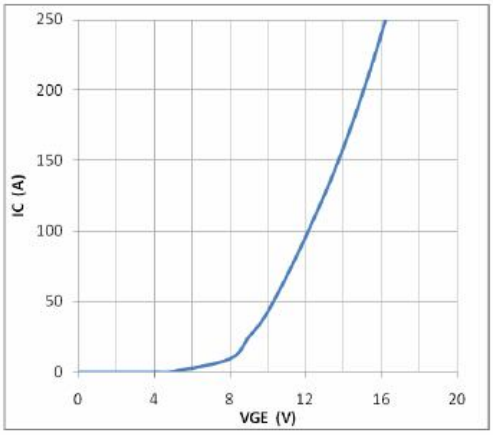


Figure6:typical trans characteristics,VCE=20V,tp=20us

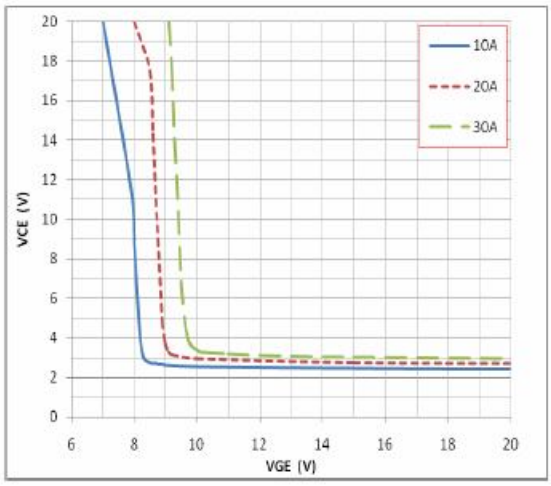


Figure7: typical VCE VS. VGE,TJ=25℃

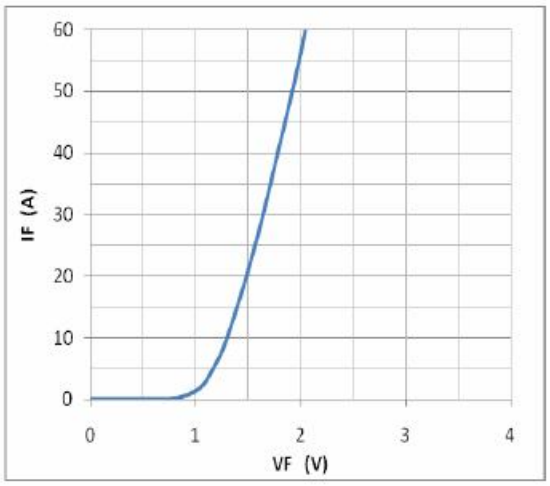


Figure8:typical diode forward characteristic,tp=300us

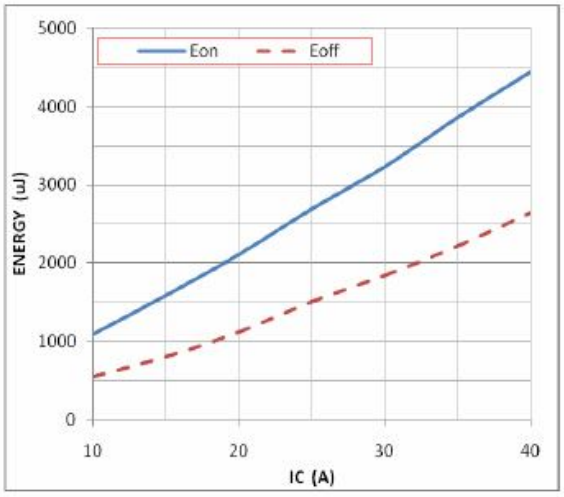


Figure9: typical energy loss VS. IC, TC=25℃,

L=500uH, VCE=600V,VGE=15V,Rg=28Ω

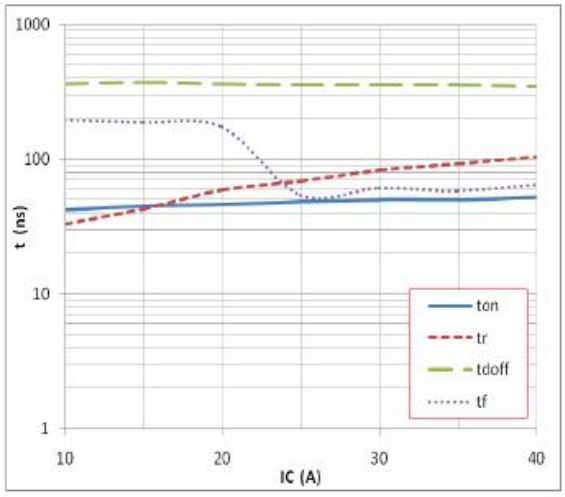


Figure10: typical switching time VS. IC, TC=25℃,

L=500uH, VCE=600V,VGE=15V,Rg=28Ω

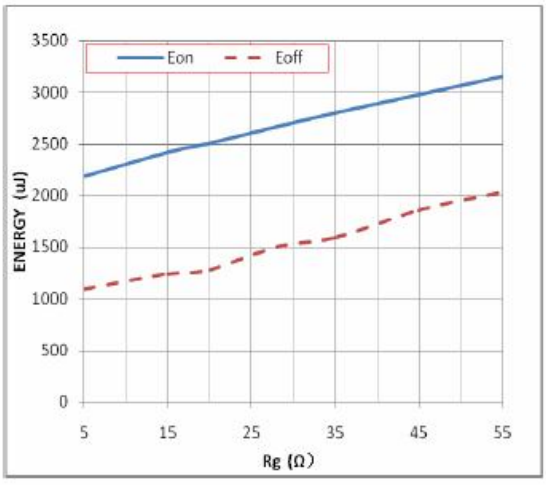


Figure11: typical energy loss VS. Rg,TC=25℃,

L=500uH, VCE=600V, VGE=15V,IC=25A

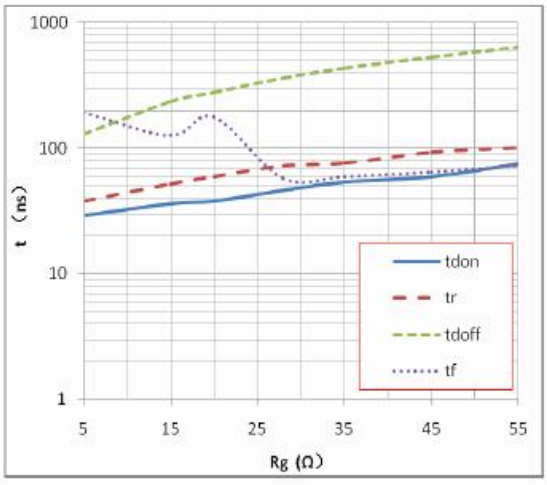


Figure12: typical switching time VS. Rg,TC=25℃,

L=500uH,VCE=600V,VGE=15V,IC=25A

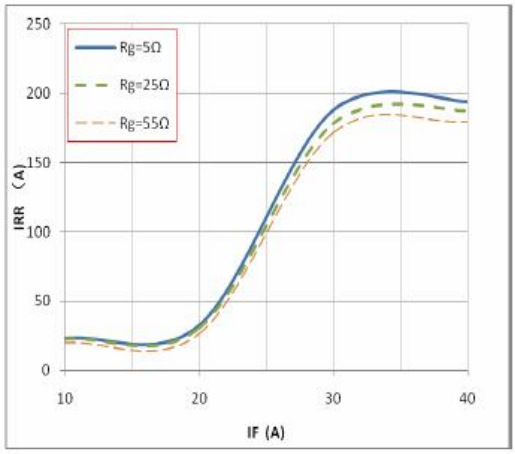


Figure13: typical diode IRR VS. IF, TC=25℃

VCC=600V, VGE=15V

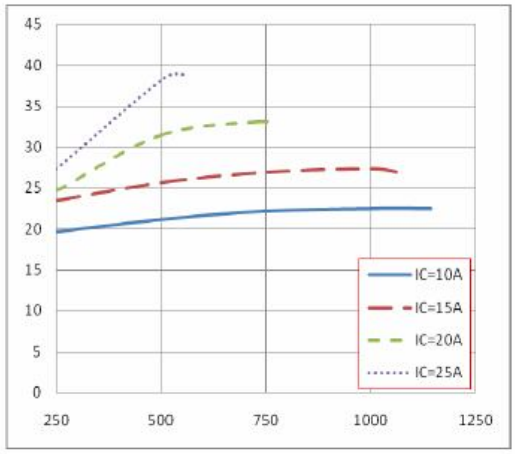


Figure14:typical diode IRR VS. dIF/dt

VCC=600V,VGE=15V

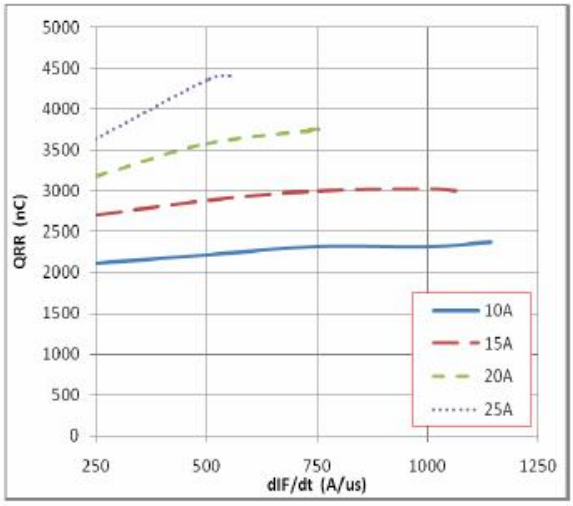


Figure15:typical diode QRR VS. dIF/dt

VCC=600V,VGE=15V

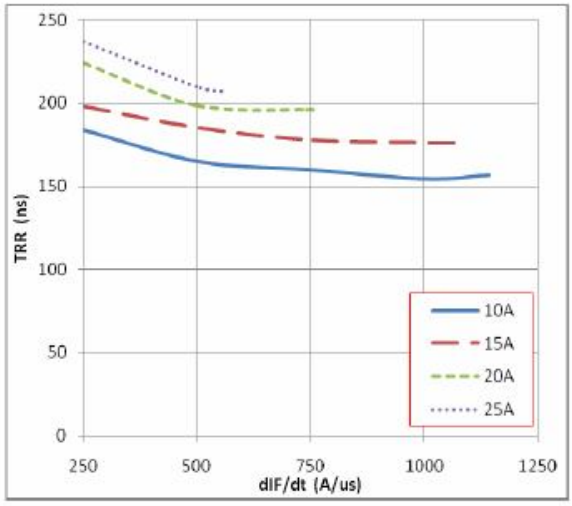


Figure16:typical diode TRR VS. dIF/dt,

VCC=600V,VGE=15V

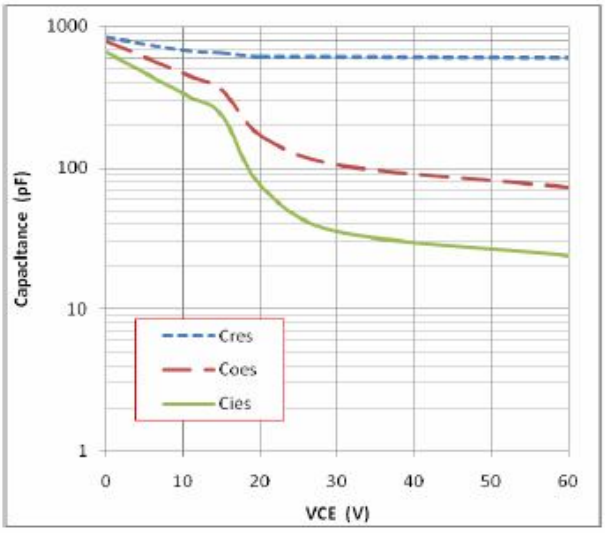


Figure17:typical capacitance VS. VCE,VGE=0V,f=100kHz

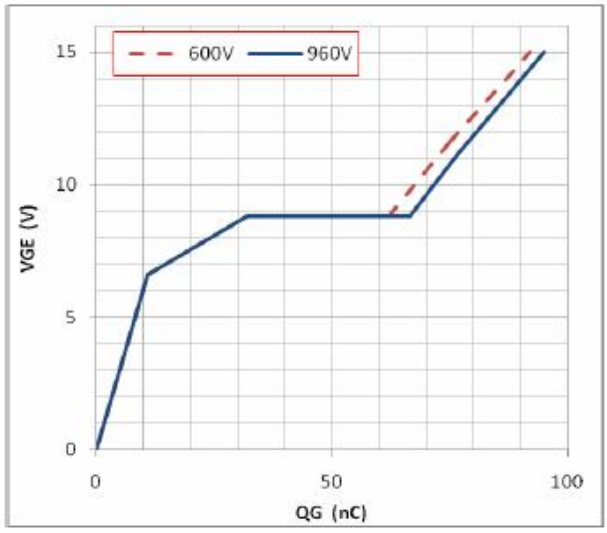


Figure18:typical gate charge VS. VGE,IC=25A

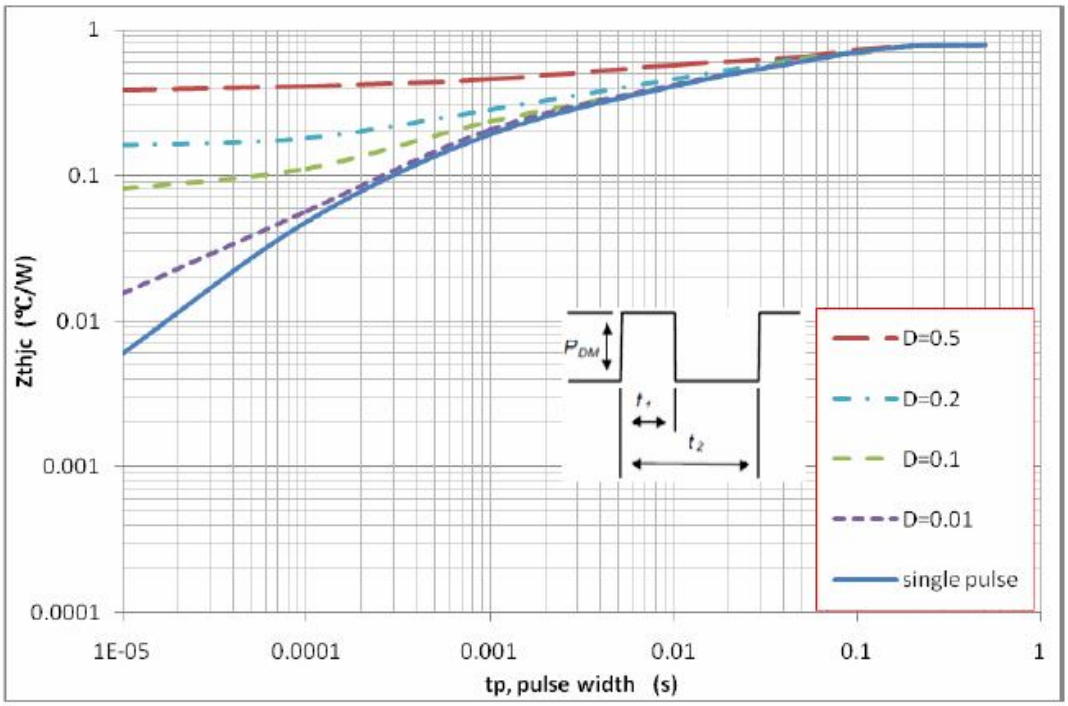


Figure19:Transient thermal impedance, junction-to-case

Note1.Duty factor D=t1/t2; Note2:peak TJ=PDM×Zthjc+TC

Mechanical Dimensions