NVT015N10S

N-Channel Enhancement Mode Trench Power MOSFET

Pb-Free RoHS COMPLIANT

Voltage:	100 Volts	Current:	15 Ampers	Package:	TO-252

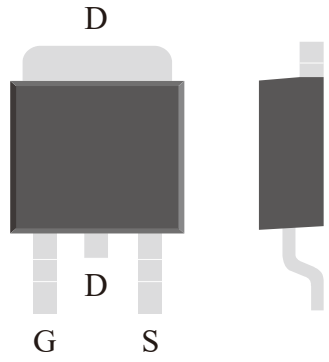
Features

- NH'S Advanced Trench Technology
- Low Rds(on) For Low On-State Loss
- High EAS For High Reliability
- Excellent Qg*Rds(on) Product(FOM）

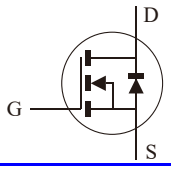
Typical Applications

- DC-DC Converter
- Battery Management System(BMS)
- Printed Circuit Board For Control Circuit
- Uninterrupible Power Supplies(UPS)

Diagram:



Polarity:



Product Summary

VDS Min.@T_j	100	V
I_D Min.@Ta	15.0	A
RDS(ON)(TYP)@10V	75.0	mΩ

***100% UIS TESTED**

***100% DVSD TESTED**

Absolute Maximum Ratings (Ta=25℃ Unless Otherwise Specified)

Parameter	Test Conditions	Symbol	Ratings	Unit
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current (Note 1)	Ta= 25 ℃ Ta= 100 ℃	I_D	15.0 9.6	A
Drain Current-Pulse (Note 1)	T_J< 150 ℃	I_{DM}	50	A
Maximum Power Dissipation Power Dissipation Derating Factor Above 25℃	Ta= 25 ℃ Ta= 100 ℃	P_D	45 18	W
Derating Factor		D_F	0.36	W/℃
Avalanche Current,Single Pulse (Note 1)	L= 0.5 mH	I_{AS}	9.0	A
Single Pulse Avalanche Energy (Note 1) Test Circuit & Waveform See Fig.16	L= 0.5 mH IAS= 9.0 A,RG= 10.0 Ω Starting Tj=25 ℃,VG = 10.0 V	E_{AS}	20	mJ

Thermal Characteristcs (Ta=25℃ Unless Otherwise Specified)

Parameter	Test Conditions	Symbol	Typ.	Unit
Junction Temperature		T_J	-55 to 150	℃
Storage Temperature Range		T_{STD}	-55 to 150	℃
Thermal Resistance Junction To Ambient With Steady-State	Still Air Environment With Ta=25℃	$R_{\theta JA}$	50.0	℃/W
Thermal Resistance Junction-Case With Steady-State	Device Mounted On 1 in2 FR-4 Board With 2oz. Copper	$R_{\theta JC}$	2.80	

Notes: 1.Pulse Width Limited By Max. Junction Temperature. (See Fig. 13).

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Electrical Characteristcs (Ta=25℃ Unless Otherwise Specified)

Parameter	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
Static Off Characteristics						
Drain-Source Breakdown Voltage	VGS=0V,ID=250uA	BV_{DSS}	100	--	--	V
Bvdss Temperature Coefficient	ID=250uA,Reference25℃	$\Delta BV_{DSS}/\Delta T_J$	--	0.11	--	V/℃
Drain-Source Leakage Current	VDS= 100 V,VGS=0V	I_{DSS}	--	--	1	uA
Gate-Body Leakage Current	VGS= ±20 V,VDS=0V	I_{GSS}	--	--	±100	nA
Forward Transconductance	ID= 7.5 A,VDS= 5 V	gfs	--	30.0	--	S
Static On Characteristics						
Gate Threshold Voltage	VGS= VDS ID=250uA	$V_{GS(TH)}$	1.3	2.0	2.8	V
Drain-Source On Resistance	ID= 7.5 A,VGS= 10.0 V ID= 7.5 A,VGS= 4.5 V	$R_{DS(ON)}$	-- --	75.0 100	100.0 120	mΩ
Dynamic Characteristics						
Input Capacitance	VDS= 50 V	C_{iss}	--	250.0	--	pF
Output Capacitance	VGS= 0 V	C_{oss}	--	80.0	--	pF
Reverse Transfer Capacitance	F= 1 MHZ	C_{rss}	--	5.0	--	pF
Switching Paramters (Test Circuit & Waveform See Fig.14)						
Turn-On Delay Time	VDS= 50 V	$t_{d(on)}$	--	15.0	--	ns
Turn-On Rise Time	VGS= 10.0 V	t_r	--	8.0	--	ns
Turn-Off Delay Time	RG= 10.0 Ω	$t_{d(off)}$	--	15.0	--	ns
Turn-Off Rise Time		t_f	--	25.0	--	ns
Gate Charge Paramters (Test Circuit & Waveform See Fig.15)						
Total Gate Charge	VDS= 50 V	Q_g	--	6.0	--	nC
Gate-Source Charge	VGS= 10.0 V	Q_{gs}	--	1.1	--	nC
Gate-Drain Charge	ID= 7.5 A	Q_{gd}	--	1.2	--	nC
Drain-Source Diode Characteristics And Maximum Ratings (Test Circuit & Waveform See Fig.17)						
Max. Diode Forward Cuurent		I_S	--	--	15	A
Max. Pulsed Forward Cuurent		I_{SM}	--	--	60	A
Diode Forward Voltage	ID= 7.5 A,VGS=0V	V_{SD}	--	0.80	1.2	V
Reverse Recovery Time	ID= 7.5 A,di/dt= 100 A/us	t_{rr}	--	15.0	--	ns
Reverse Recovery Charge	VGS= 10.0 V,VDD= 50 V	Q_{rr}	--	53.0	--	nC

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Typical Characteristics Curves

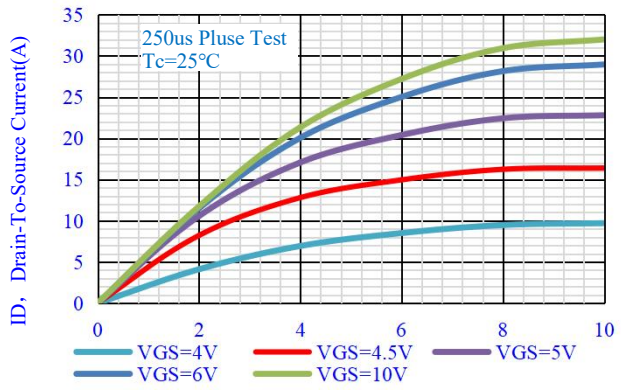

Fig.1-Output Characteritsics

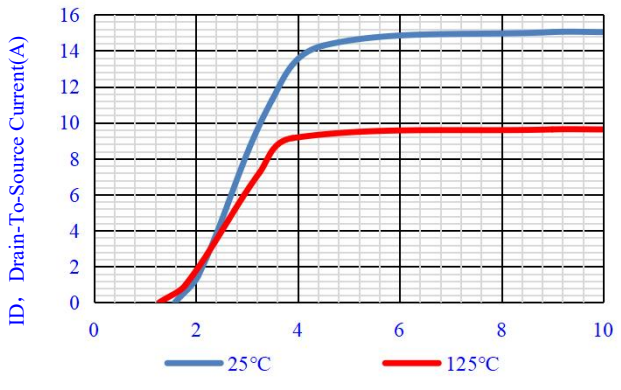

Fig.2- Transfer Characteritsics

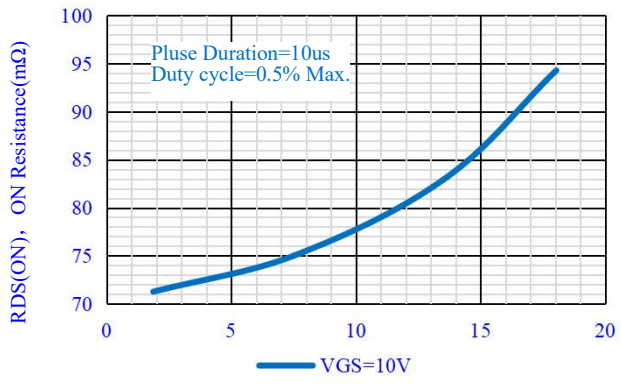

Fig.3- On Resistance vs. Drain Current

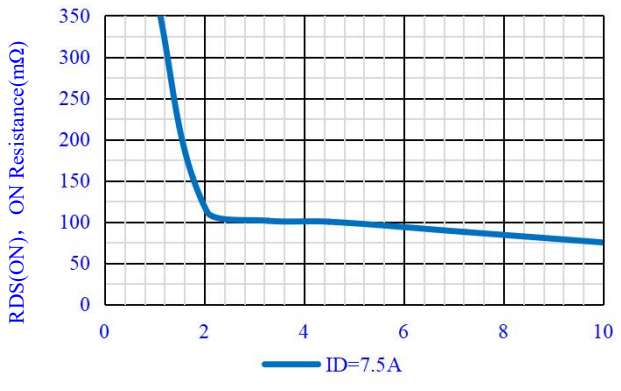

Fig.4- On Resistance vs. Gate Source Voltage

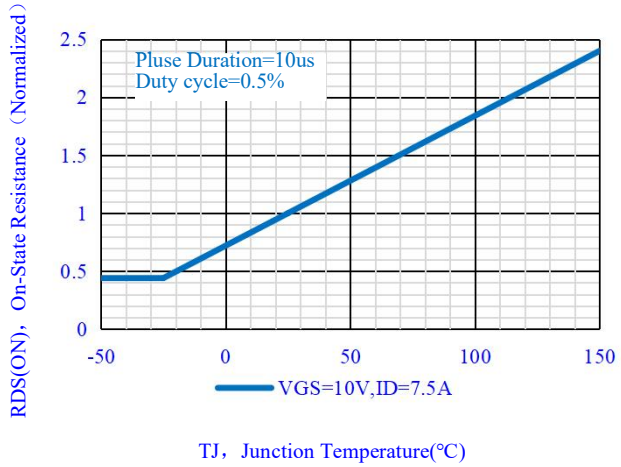

Fig.5-On Resistance vs. Junction Temperature

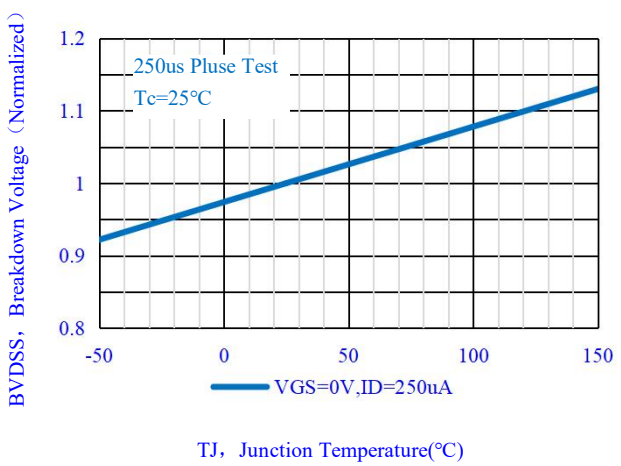

Fig.6- Breakdown Voltage vs. Junction Temperature

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Typical Characteristics Curves

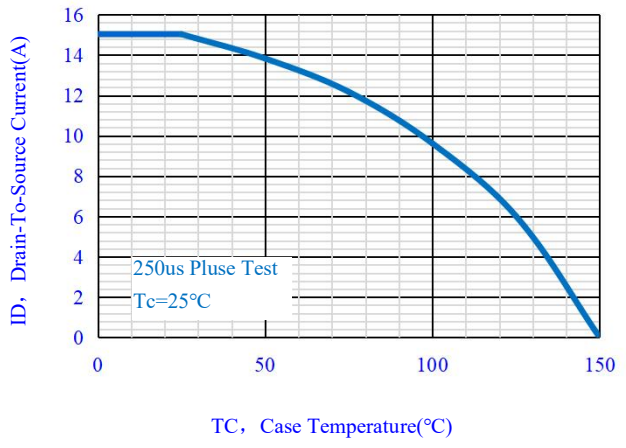

Fig.7-Maximum Continuous Drain Current vs. Case Temperature

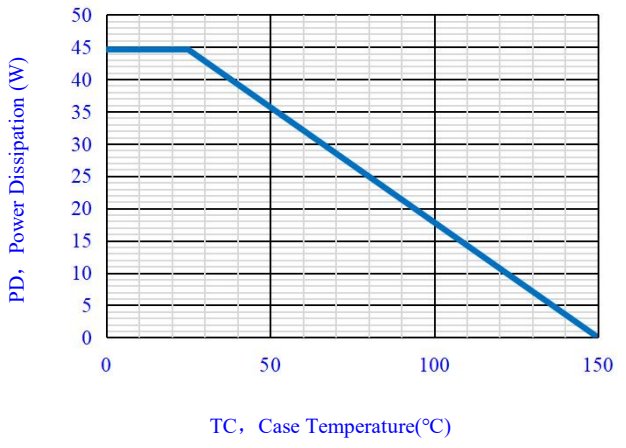

Fig.8-Maximum Power Dissipation vs. Case Temperature

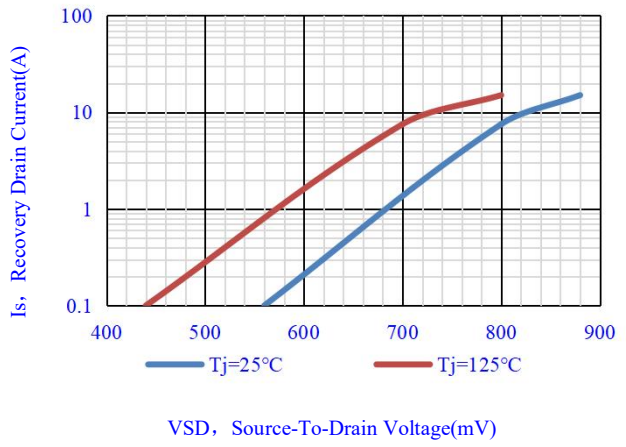

Fig.9- Source-To-Drain Diode Forward Voltage

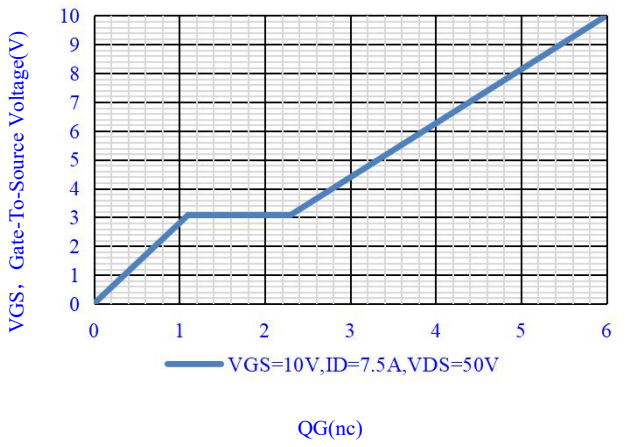

Fig.10-Gate Charge Waveform

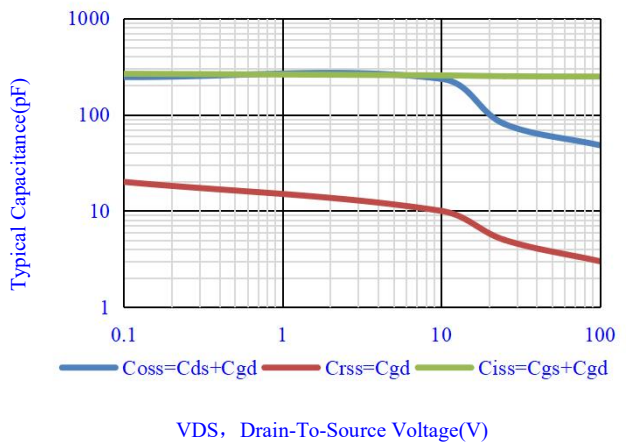

Fig.11-Typical Capacitance vs. Drain-To-Source Voltage

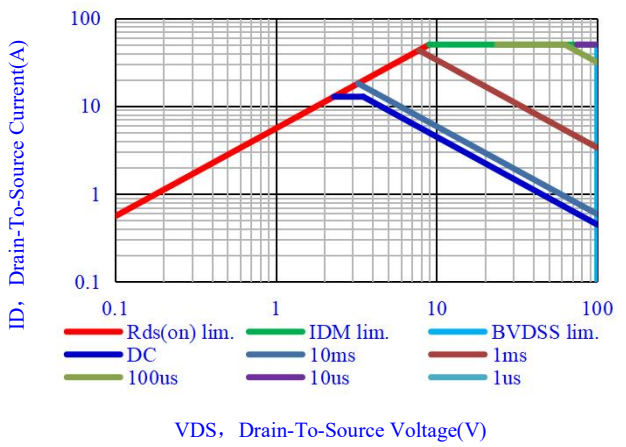

Fig.12-Maximum Safe Operating Area(SOA)

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Typical Characteristics Curves

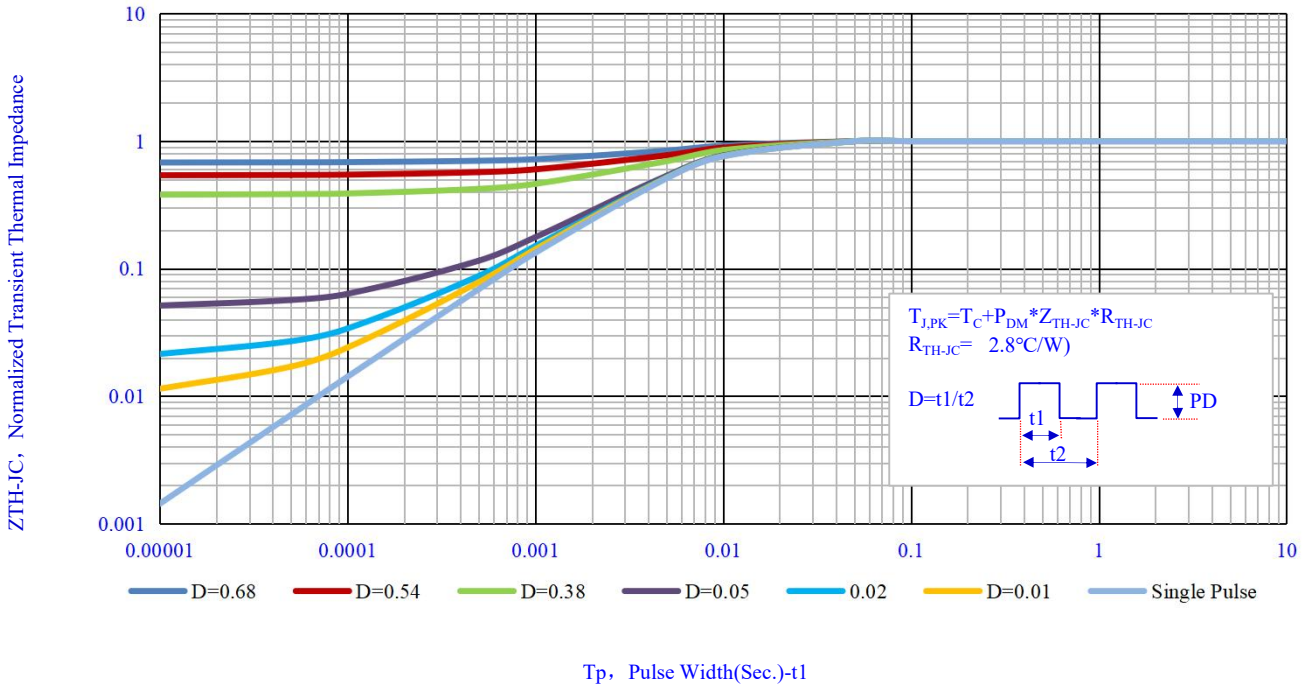

Fig.13- Normalized Maximum Transient Thermal Impedance vs.Pulse Width

Test Circuit & Waveform

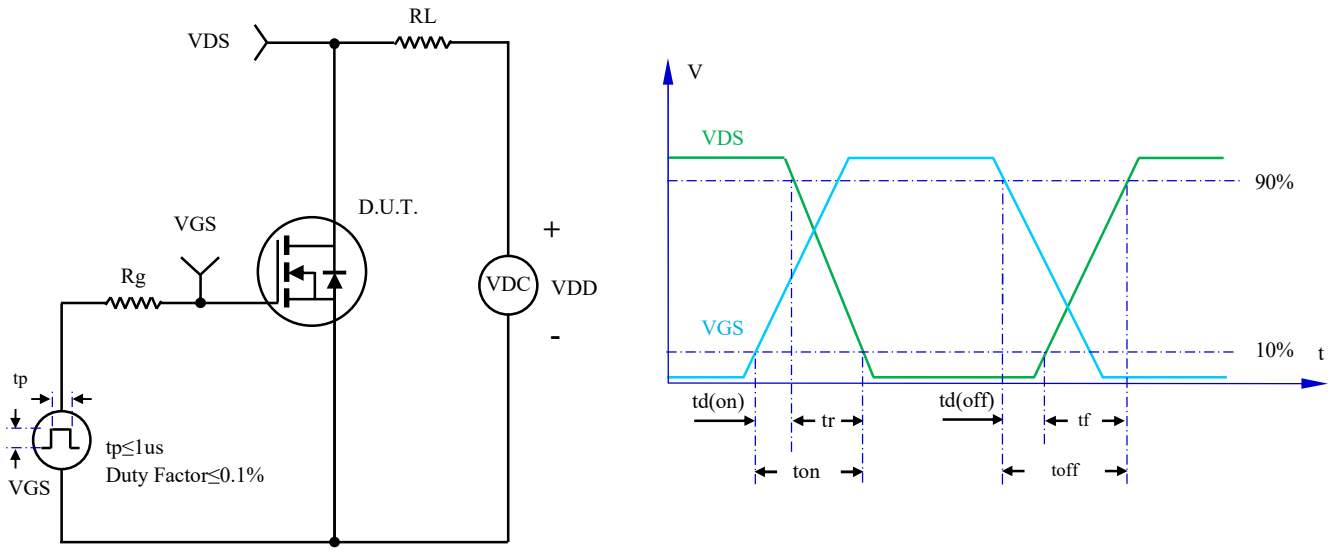

Fig.14- Resistive Switching Test Circuit & Waveform

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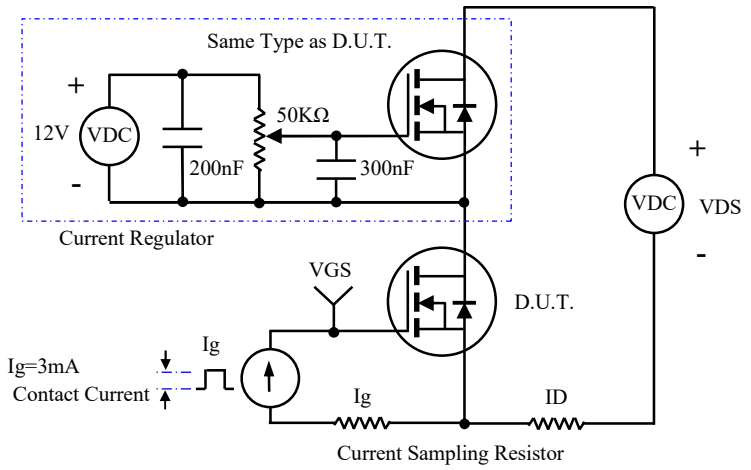
Test Circuit & Waveform



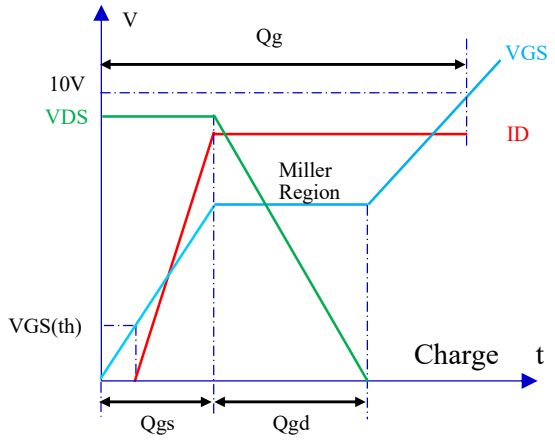
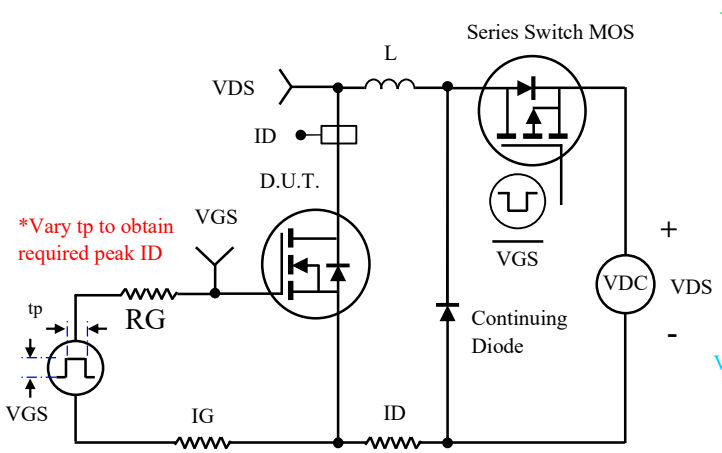


Fig.15-Gate Charge Test Circuit & Waveform



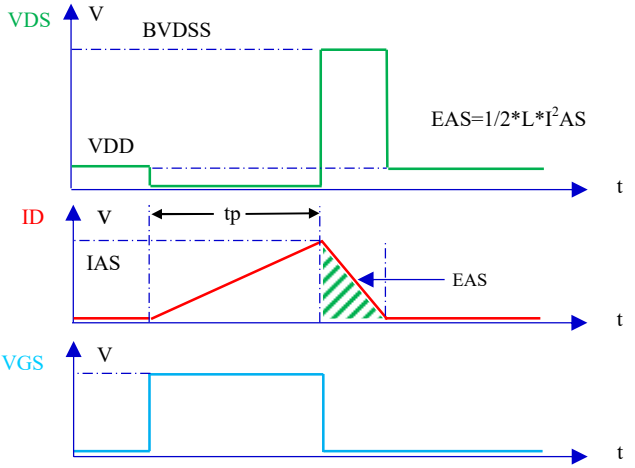
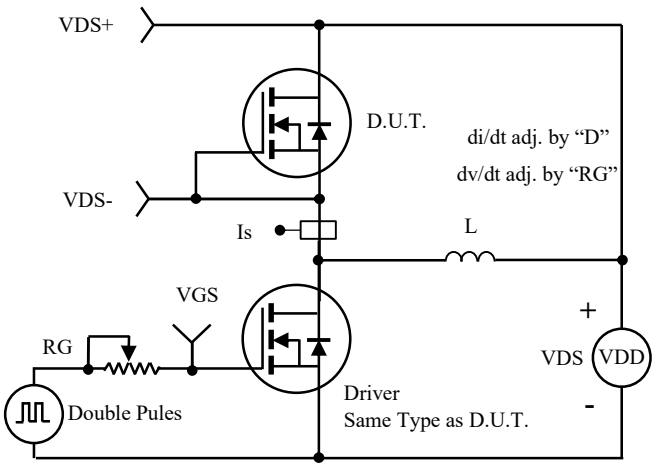


Fig.16- Unclamped Inductive Switching (UIS) Test Circuit & Waveform



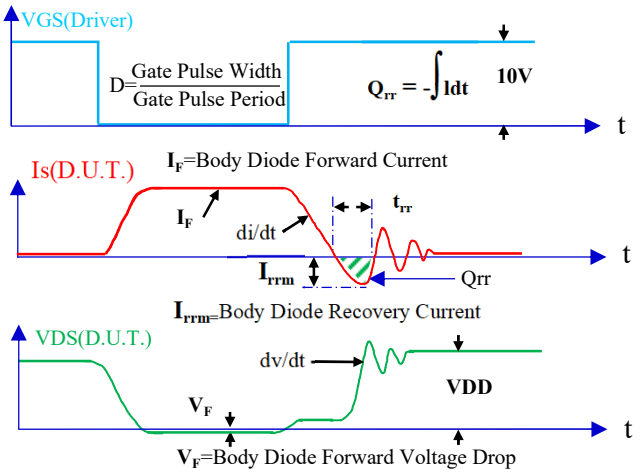


Fig.17- Diode Recovery Test Circuit & Waveform

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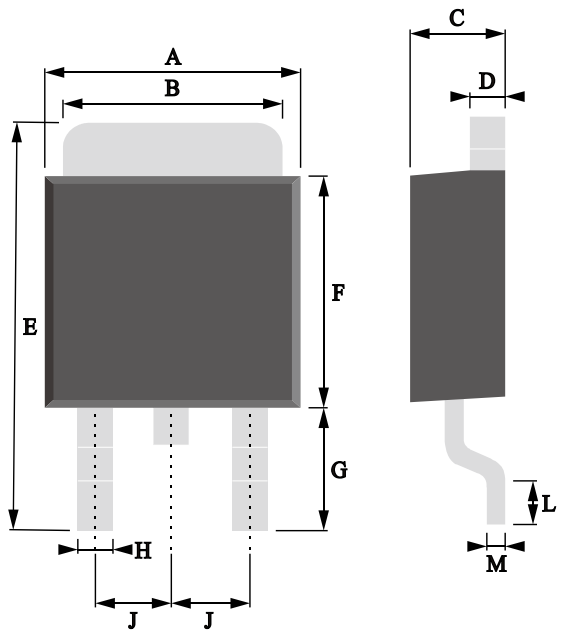
OUTLINE DRAWINGS

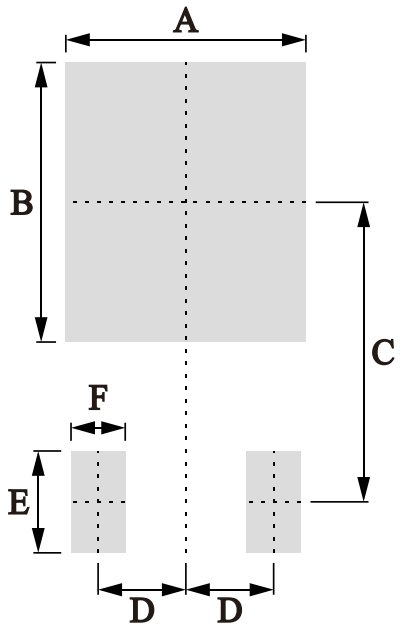
TO-252



OUTLINE DIMENSIONS						
Dim.	Milimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	6.10	-	7.10	0.2402	-	0.2795
B	4.80	-	5.80	0.1890	-	0.2283
C	1.95	-	2.55	0.0768	-	0.1004
D	0.35	-	0.75	0.0138	-	0.0295
E	9.25	-	10.75	0.3642	-	0.4232
F	5.60	-	6.60	0.2205	-	0.2598
G	2.50	-	3.10	0.0984	-	0.1220
H	0.65	-	1.05	0.0256	-	0.0413
J	2.10	-	2.50	0.0827	-	0.0984
L	1.00	-	1.40	0.0394	-	0.0551
M	0.35	-	0.75	0.0138	-	0.0295

RECOMMEDNED LAYOUT DRAWINGS

TO-252



OUTLINE DIMENSIONS						
Dim.	Milimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	-	6.09	-	-	0.2398	-
B	-	7.57	-	-	0.2980	-
C	-	6.64	-	-	0.2610	-
D	-	2.30	-	-	0.0910	-
E	-	2.76	-	-	0.1090	-
F	-	1.42	-	-	0.0560	-

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MARKING INFORMATION

MARKING INSTRUCTIONS

NH=Niuhang Trademark

FF=Product Line Code,According To Actual Changes

YWW=Date Code,According To Actual Changes

LLWWF=Inernal Code,According To Actual Changes

NVT015N10S=Model

PACKING INFORMATION

Package Type	Package Code	Productor Weight Approx(g/Pcs)	Package Method	Quantity (Pcs/Min. Pack.)	Quantity (Pcs/Inner Box)	Quantity (Pcs/Carton)
TO-252	P1	0.321	13" Reel	2500	5000	30000
TO-252	P2	0.321	13" Reel	2500	2500	25000

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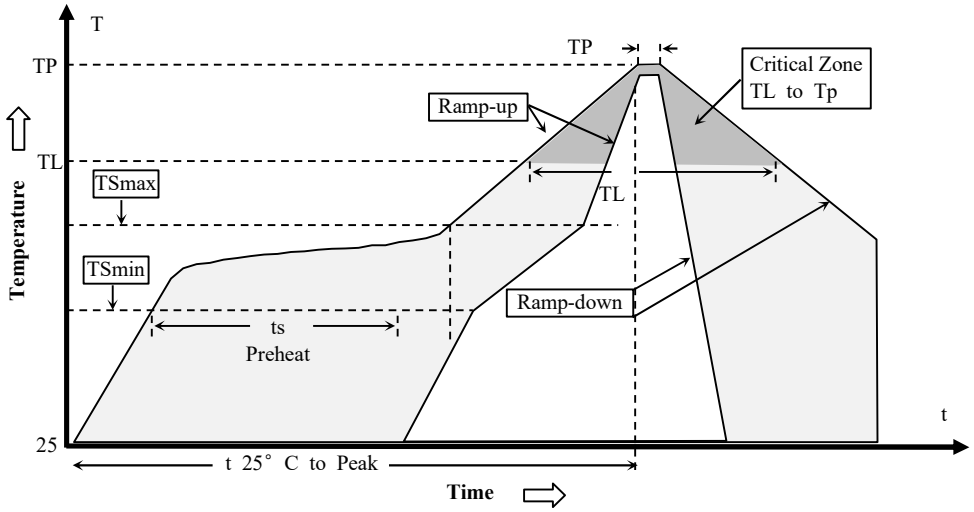
Recommended wave soldering condition

Product	Peak Temperature	Soldering Time
Pb-free devices	260 +0/-5 °C	5 +1/-1 seconds

Recommended temperature profile for IR reflow



Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(TS min) −Temperature Max(TS max) −Time(ts min to ts max)	100°C 150°C 60-120 seconds	150°C 200°C 60-180 seconds
Time maintained above: −Temperature (TL) − Time (tL)	183°C 60-150 seconds	217°C 60-150 seconds
Peak Temperature(TP)	240 +0/-5 °C	260 +0/-5 °C
Time within 5°C of actual peak temperature(tp)	10-30 seconds	20-40 seconds
Ramp down rate	6°C/second max.	6°C/second max.
Time 25 °C to peak temperature	6 minutes max.	8 minutes max.

Note : All temperatures refer to topside of the package, measured on the package body surface.

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