

NTH084N06S



N-Channel Enhancement Mode Trench Power MOSFET

Voltage:	60	Volts	Current:	75	Ampers	Package:	TO-252
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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)

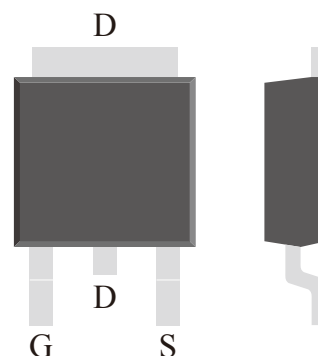
Typical Applications

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

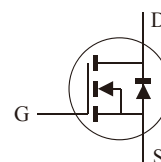
Product Summary

VDS Min.@Tj	60	V
Id Min.@Ta	75	A
RDS(ON)(TYP)@10V	6.3	mΩ

Diagram:



Polarity:



***100% UIS TESTED**

***100% ΔVDS TESTED**

Absolute Maximum Ratings (Ta=25°C Unless Otherwise Specified)

Parameter	Test Conditions	Symbol	Ratings	Unit
Drain-Source Voltage		V _{DS}	60	V
Gate-Source Voltage		V _{GS}	±20	V
Continuous Drain Current (Note 1)	Ta= 25 °C	I _D	75	A
	Ta= 100 °C		60	
Drain Current-Pulse (Note 1)	Tj< 175 °C	I _{DM}	300	A
Maximum Power Dissipation Power	Ta= 25 °C	P _D	115	W
	Ta= 100 °C		58	
Derating Factor		D _F	0.77	W/°C
Avalanche Current,Single Pulse (Note 1)	L= 0.5 mH	I _{AS}	33	A
Single Pulse Avalanche Energy (Note 1) Test Circuit & Waveform See Fig.16	L= 0.5 mH IAS= 33 A, RG= 10.0 Ω Starting Tj=25 °C, VG = 10.0 V	E _{AS}	272	mJ

Thermal Characteristics (Ta=25°C Unless Otherwise Specified)

Parameter	Test Conditions	Symbol	Typ.	Unit
Junction Temperature		T _J	-55 to 175	°C
Storage Temperature Range		T _{STD}	-55 to 175	°C
Thermal Resistance Junction To Ambient With Steady-State	Still Air Environment With Ta=25°C	R _{θJA}	62.5	°C/W
Thermal Resistance Junction-Case With Steady-State	Device Mounted On 1 in2 FR-4 Board With 2oz. Copper	R _{θJC}	1.3	

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

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Electrical Characteristics (Ta=25°C Unless Otherwise Specified)

Parameter	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
Static Off Characteristics						
Drain-Source Breakdown Voltage	VGS=0V, ID=250uA	BV_{DSS}	60	--	--	V
Bvdss Temperature Coefficient	ID=250uA, Reference 25°C	ΔBV_{DSS}/ΔT_J	--	0.06	--	V/°C
Drain-Source Leakage Current	VDS= 60 V, VGS=0V	I_{DSS}	--	--	1	uA
Gate-Body Leakage Current	VGS= ±20 V, VDS=0V	I_{GSS}	--	--	±100	nA
Forward Transconductance	ID= 20.0 A, VDS= 5 V	g_{fs}	--	55	--	S
Static On Characteristics						
Gate Threshold Voltage	VGS= VDS ID=250uA	V_{GS(TH)}	2	3	4	V
Drain-Source On Resistance	ID= 20.0 A, VGS= 10.0 V	R_{DS(ON)}	--	6.3	8.4	mΩ
	ID= 20.0 A, VGS= 4.5 V		--	8.2	12.6	
Dynamic Characteristics						
Gate Resistance	VGS=0V, VDS=0V, Freq.=1MHz	R_g	--	1.7	--	Ω
Input Capacitance	VDS= 30 V	C_{iss}	--	3180	--	pF
Output Capacitance	VGS= 0 V	C_{oss}	--	215	--	pF
Reverse Transfer Capacitance	F= 1 MHz	C_{rss}	--	190	--	pF
Switching Parameters (Test Circuit & Waveform See Fig.14)						
Turn-On Delay Time	VDS= 30 V	t_{d(on)}	--	16	--	ns
Turn-On Rise Time	VGS= 10.0 V	t_r	--	19	--	ns
Turn-Off Delay Time	RG= 10.0 Ω	t_{d(off)}	--	30	--	ns
Turn-Off Rise Time		t_f	--	3	--	ns
Gate Charge Parameters (Test Circuit & Waveform See Fig.15)						
Total Gate Charge	VDS= 30 V	Q_g	--	61	--	nC
Gate-Source Charge	VGS= 10.0 V	Q_{gs}	--	17	--	nC
Gate-Drain Charge	ID= 20.0 A	Q_{gd}	--	27	--	nC
Drain-Source Diode Characteristics And Maximum Ratings (Test Circuit & Waveform See Fig.17)						
Max. Diode Forward Current		I_S	--	--	75.0	A
Max. Pulsed Forward Current		I_{SM}	--	--	300.0	A
Diode Forward Voltage	ID= 20.0 A, VGS=0V	V_{SD}	--	0.7	1.2	V
Reverse Recovery Time	IS= 20.0 A, di/dt= 100 A/us	t_{rr}	--	75	--	ns
Reverse Recovery Charge	VGS= 0.0 V	Q_{rr}	--	46	--	nC
Reverse Recovery Current		I_{RRM}	--	1	--	A

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Typical Characteristics Curves

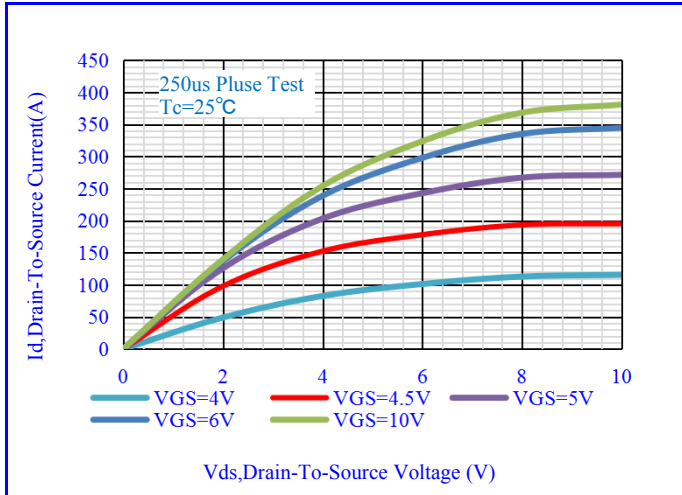


Fig.1-Output Characteristics

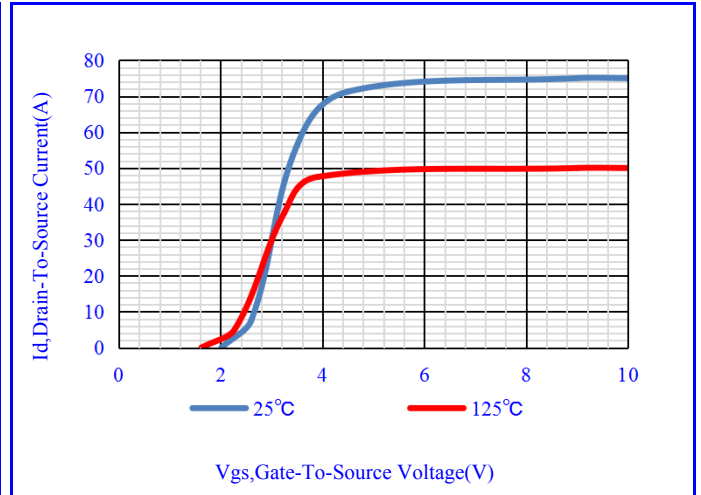


Fig.2-Transfer Characteristics

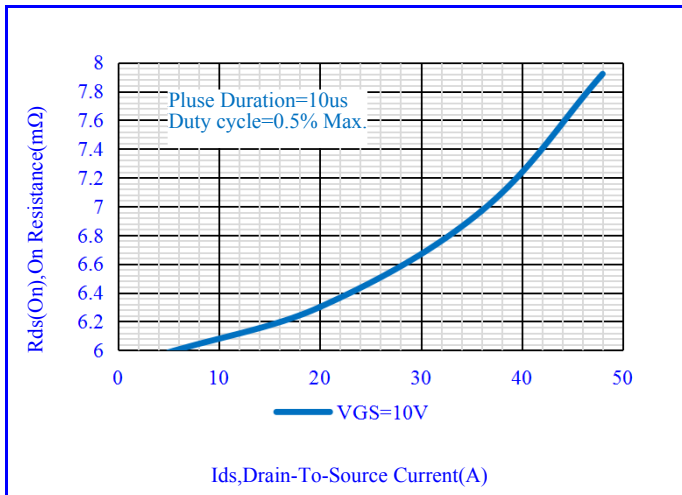


Fig.3-On Resistance Vs. Drain Current

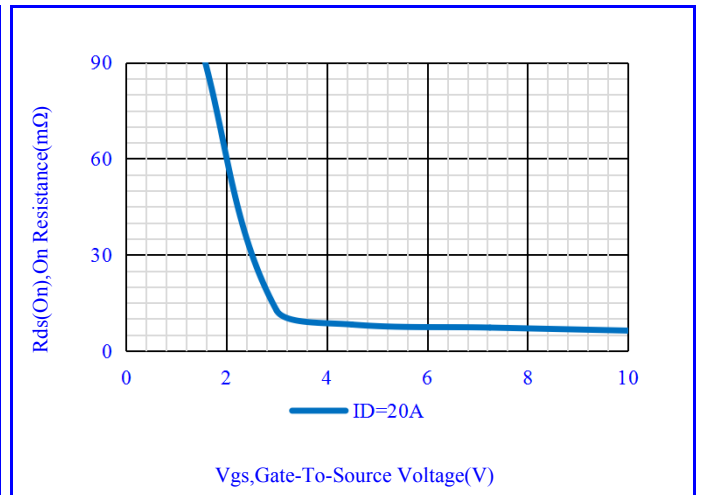


Fig.4-On Resistance Vs. Gate Source Voltage

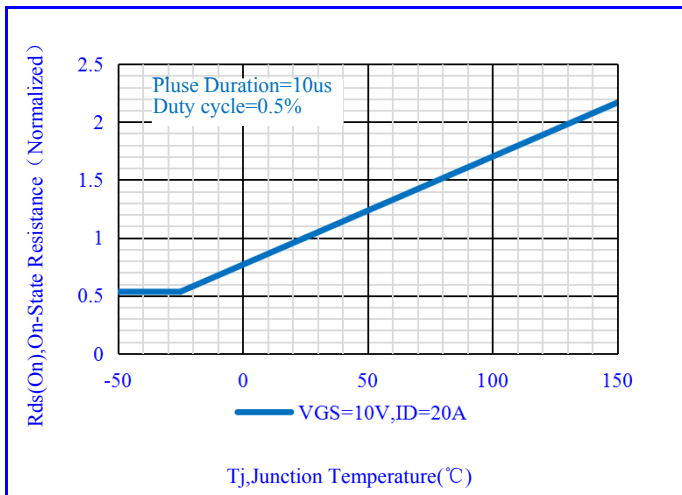


Fig.5-On Resistance Vs. Junction Temperature

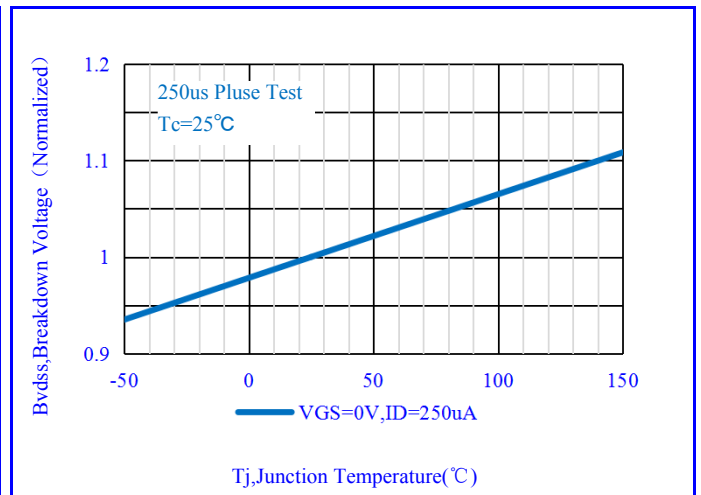


Fig.6-Breakdown Voltage Vs. Junction Temperature

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Typical Characteristics Curves

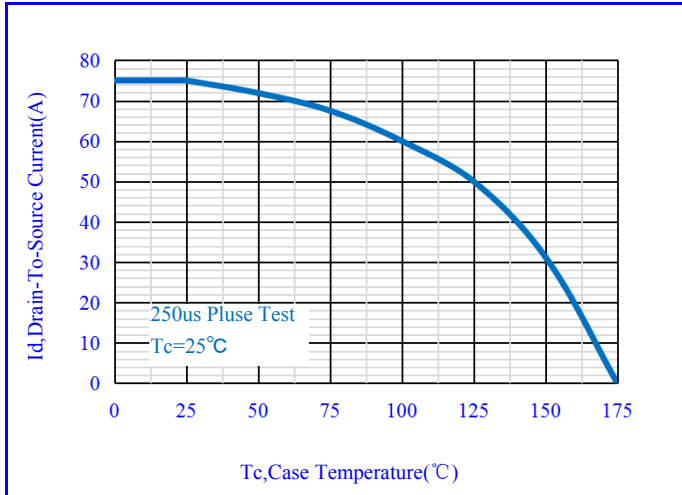


Fig.7-Maximum Continuous Drain Current Vs. Case Temperature

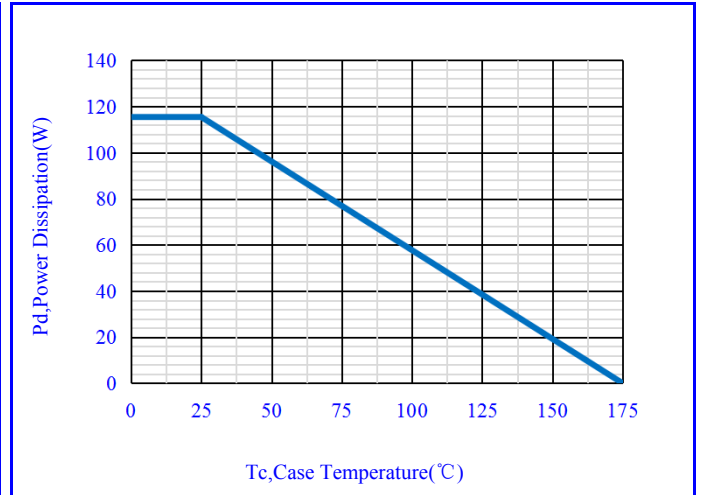


Fig.8-Maximum Power Dissipation Vs. Case Temperature

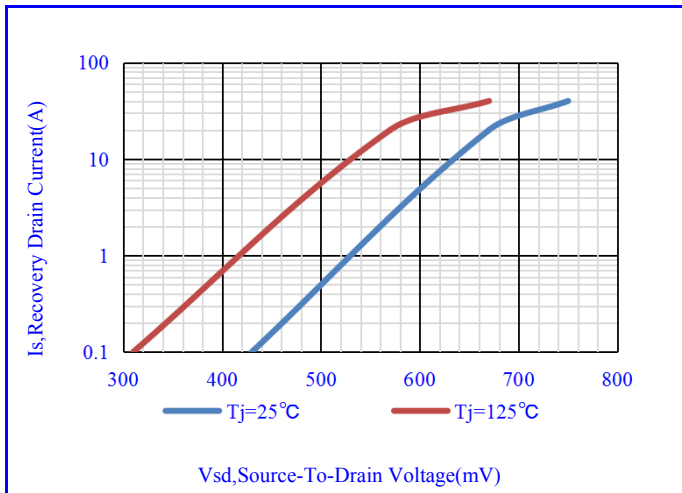


Fig.9-Source-To-Drain Diode Forward Voltage

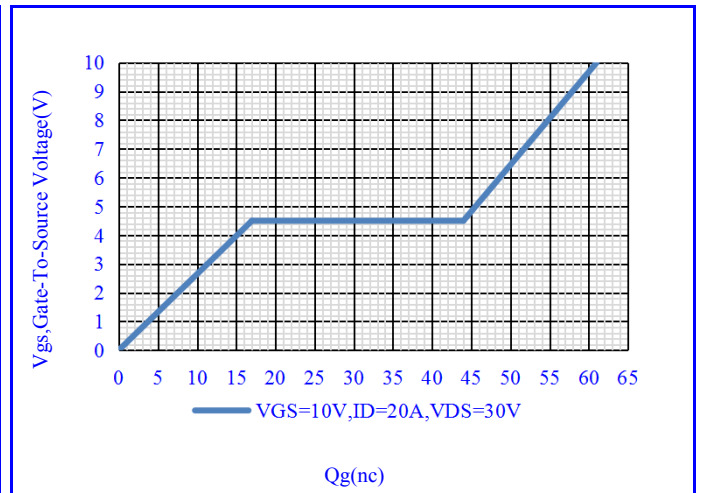


Fig.10-Gate Charge Waveform

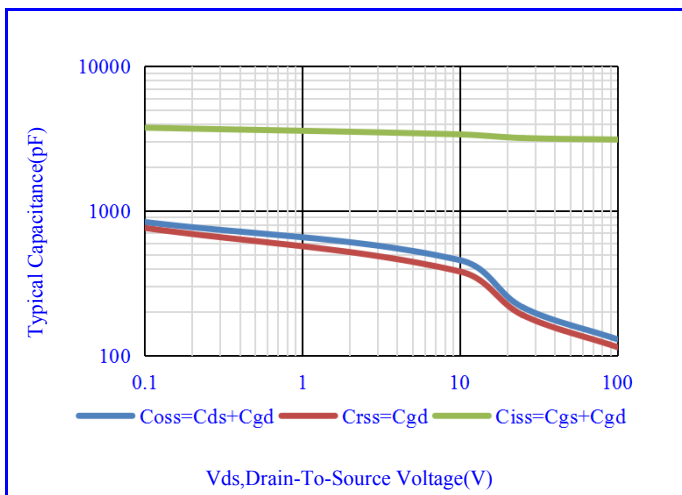


Fig.11-Typical Capacitance Vs. Drain-To-Source Voltage

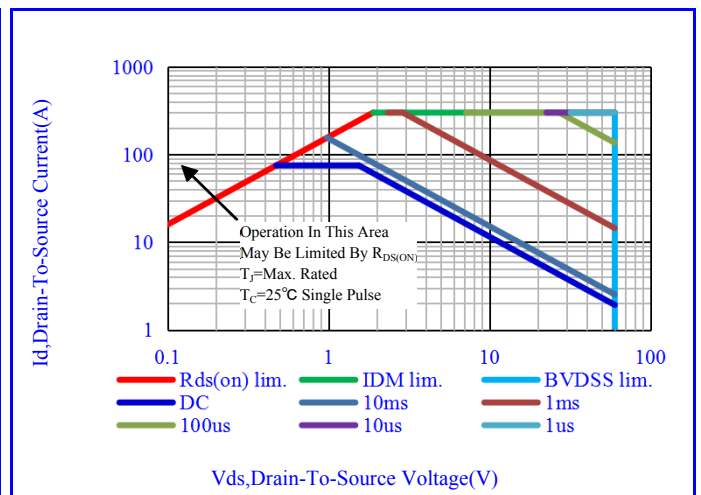


Fig.12-Maximum Safe Operating Area(SOA)

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Typical Characteristics Curves

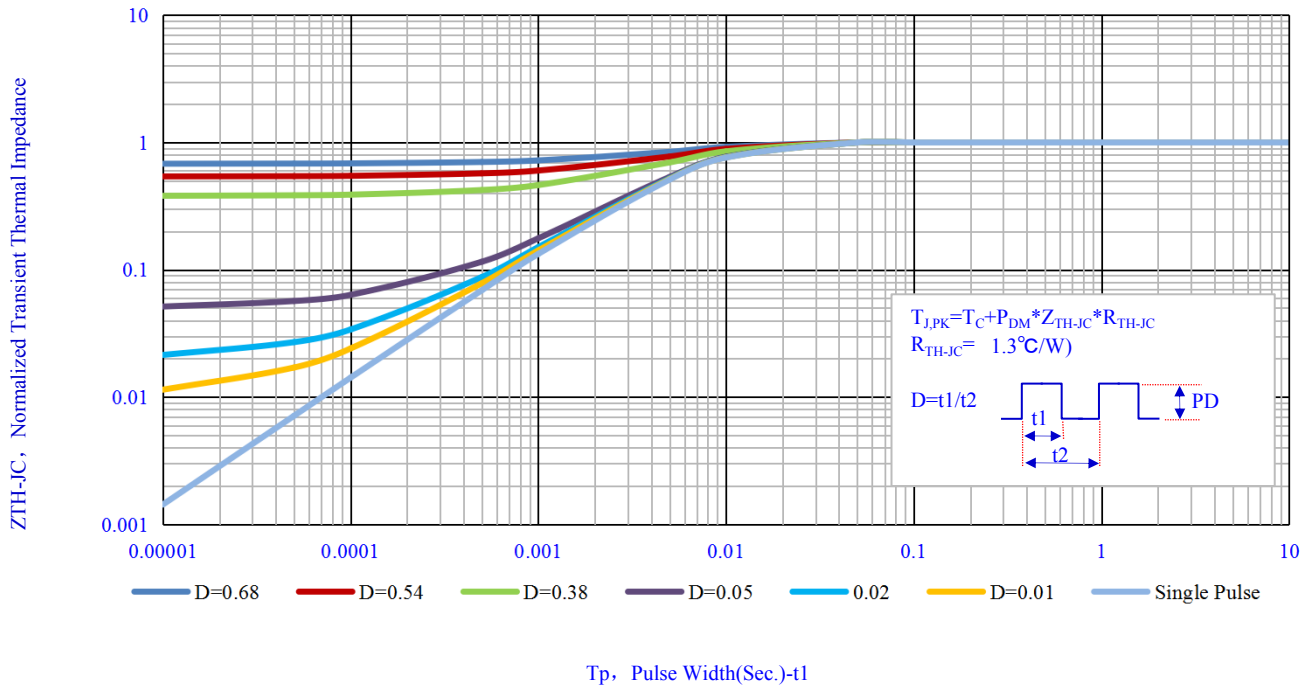


Fig.13- Normalized Maximum Transient Thermal Impedance Vs.Pulse Width

Test Circuit & Waveform

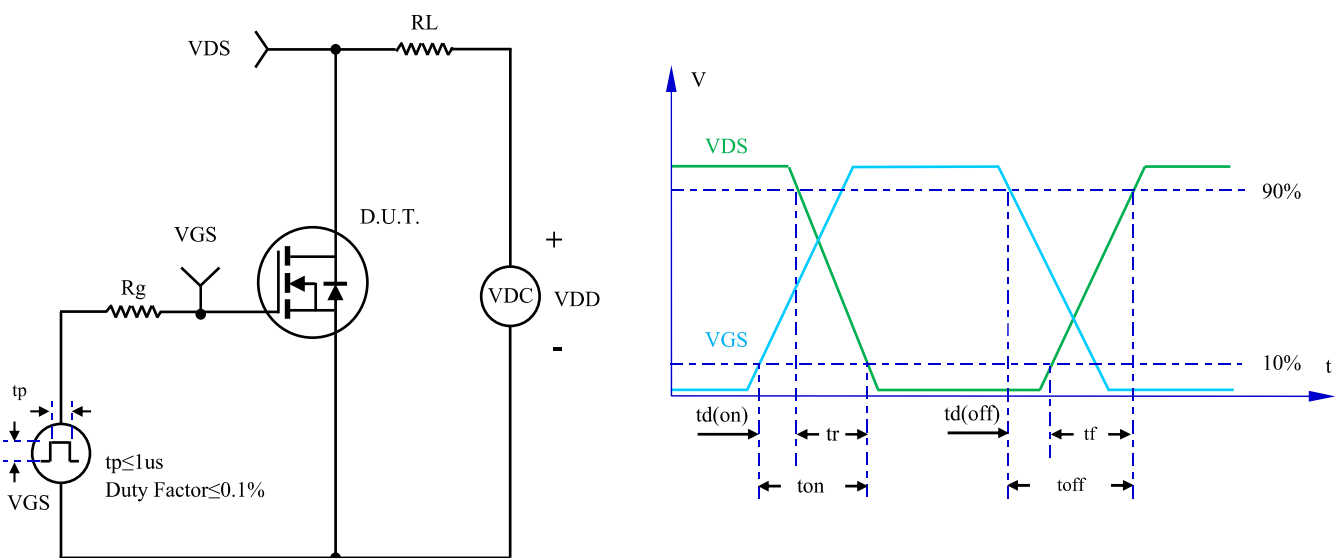


Fig.14- Resistive Switching Test Circuit & Waveform

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Test Circuit & Waveform

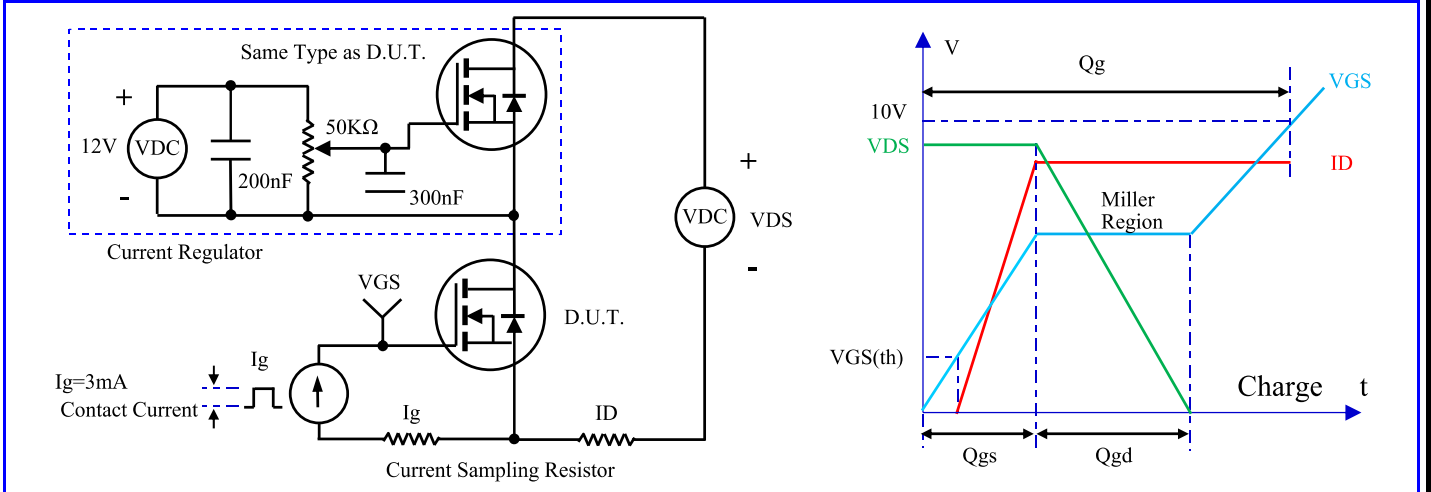


Fig.15-Gate Charge Test Circuit & Waveform

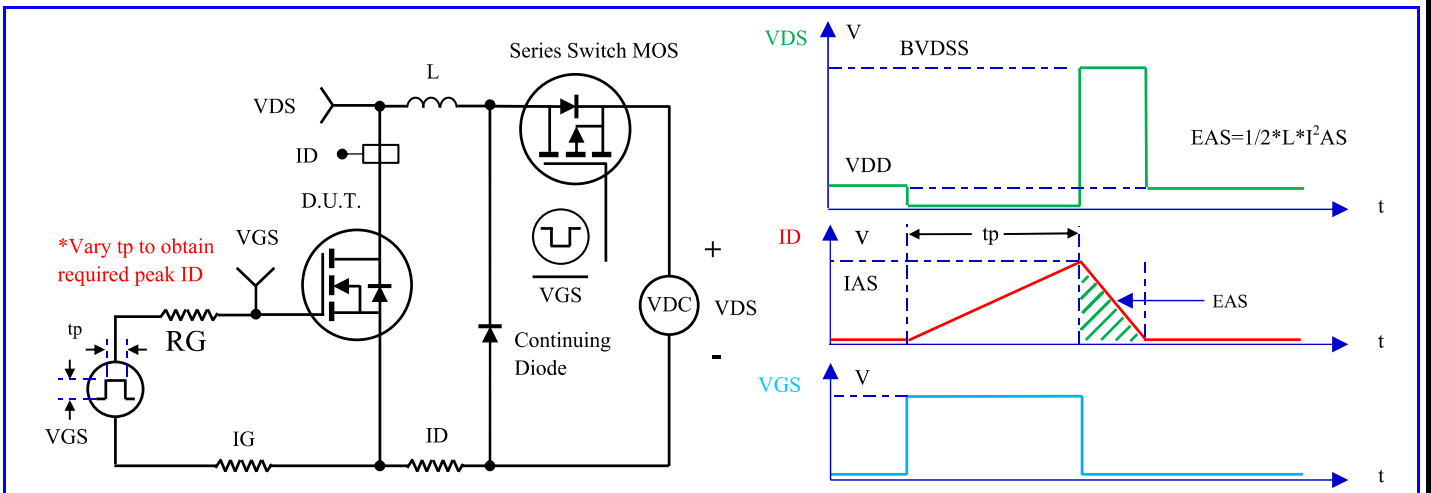


Fig.16- Unclamped Inductive Switching (UIS) Test Circuit & Waveform

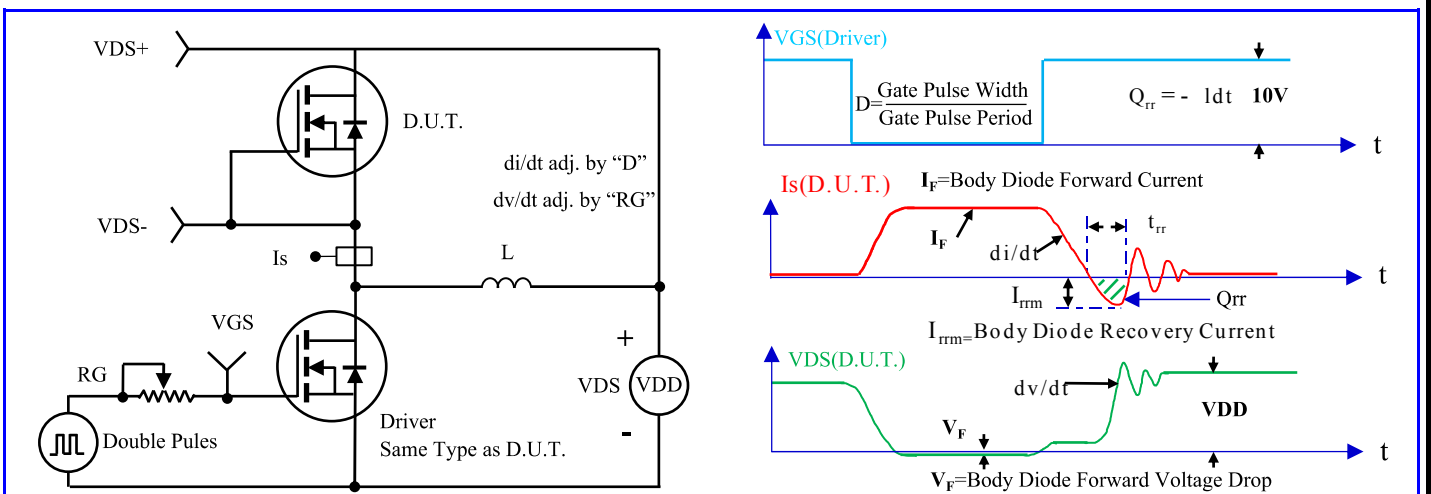


Fig.17- Diode Recovery Test Circuit & Waveform

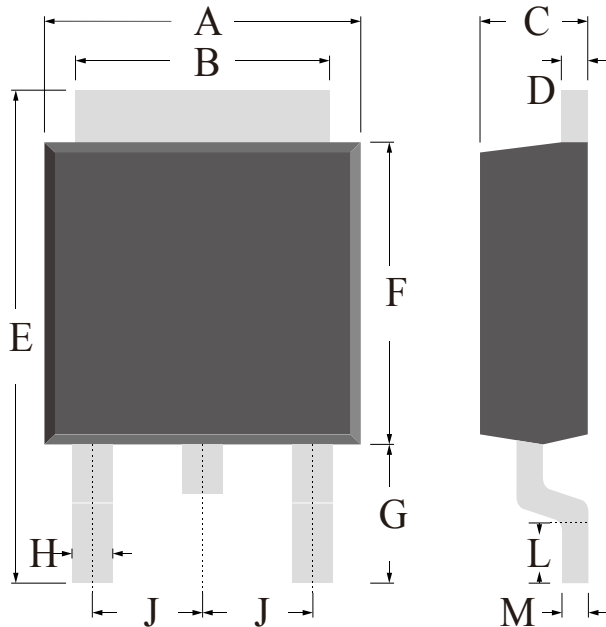
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OUTLINE DRAWINGS

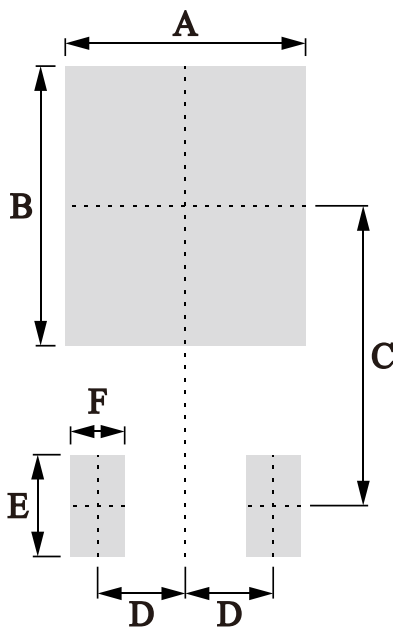
TO-252



OUTLINE DIMENSIONS						
Dim.	Millimeters			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

RECOMMENDED LAYOUT DRAWINGS

TO-252



OUTLINE DIMENSIONS						
Dim.	Millimeters			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=Niuhan Trademark
 FF=Product Line Code,According To Actual Changes
 YWW=Date Code,According To Actual Changes
 LLWWF=Internal Code,According To Actual Changes
 NTH084N06S=Model

PACKING INFORMATION

Package Type	Package Code	Product 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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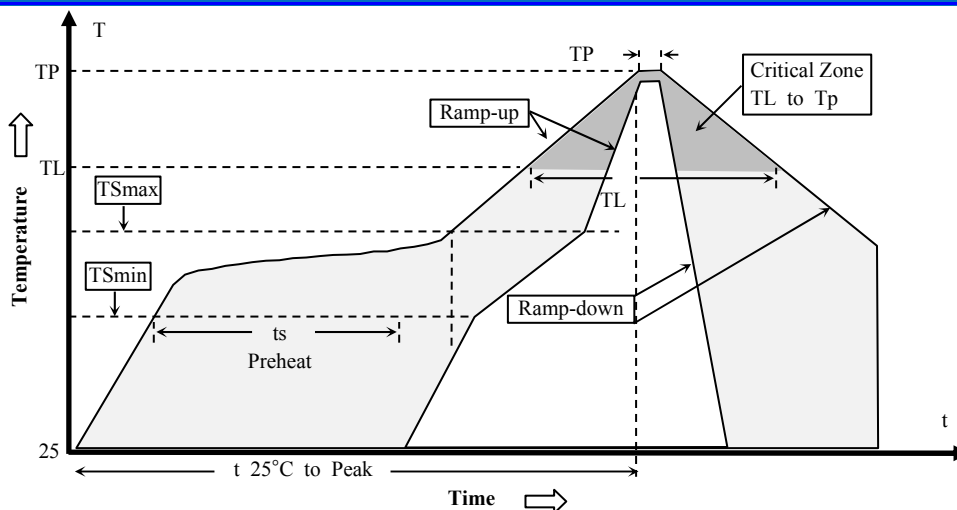


N-Channel Enhancement Mode Trench Power MOSFET

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 (T _{smax} to T _p)	3°C/second max.	3°C/second max.
Preheat -Temperature Min(T _S min) -Temperature Max(T _S max) -Time(t _s min to t _s max)	100°C 150°C 60-120 seconds	150°C 200°C 60-180 seconds
Time maintained above: -Temperature (T _L) - Time (t _L)	183°C 60-150 seconds	217°C 60-150 seconds
Peak Temperature(T _p)	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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