

NHSH220N10G



N-Channel Enhanced Shielded Gate Trench Power MOSFET

Voltage:	100	Volts	Current:	0.8	Amperes	Package:	SOT-223
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Features

- NH'S Advanced SGT Technology
- Low Reverse Transfer Capacitances
- Low Gate Charge For Low Switching Loss
- Excellent $Q_g \cdot R_{ds(on)}$ Product(FOM)

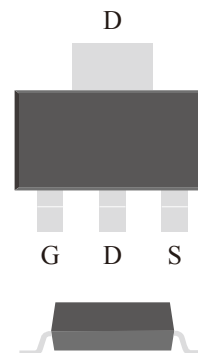
Typical Applications

- Synchronous Rectification
- High-Frequency Circuits
- The Motor Drives
- Automotive Electronics

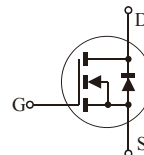
Product Summary

V _{DS} Min.@T _j	100	V
I _D Min.@Ta	0.8	A
R _{DS(ON)} (TYP)@10V	220	mΩ

Diagram:



Polarity:



***100% UIS TESTED**

***100% ΔV_{DS} 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 ℃	I _D	0.8	A
	Ta= 100 ℃		0.5	
Drain Current-Pulse (Note 1)	T _j < 150 ℃	I _{DM}	3	A
Maximum Power Dissipation Power	Ta= 25 ℃	P _D	1041	mW
Dissipation Derating Factor Above 25℃	Ta= 100 ℃		416	
Derating Factor		D _F	8.33	mW/℃

Thermal Characteristics (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 _{θJA}	120	℃/W

Notes: 1.Pulse Width Limited By Max. Junction Temperature. (See Fig.14)

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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}	100	--	--	V
Bvdss Temperature Coefficient	ID=250uA,Reference25℃	ΔBV _{DSS} /ΔT _J	--	0.11	--	V/℃
Drain-Source Leakage Current	VDS= 100 V,VGS=0V	I _{DSS}	--	--	25	uA
Gate-Body Leakage Current	VGS= ±20 V,VDS=0V	I _{GSS}	--	--	±100	nA
Static On Characteristics						
Gate Threshold Voltage	VGS= VDS ID=250uA	V _{GS(TH)}	2.2	3	3.8	V
Drain-Source On Resistance	ID= 0.4 A,VGS= 10.0 V	R _{DS(ON)}	--	220	240	mΩ
	ID= 0.4 A,VGS= 5.0 V		--	319	360	
Dynamic Characteristics						
Input Capacitance	VDS= 50 V	C _{iss}	--	90	--	pF
Output Capacitance	VGS= 0 V	C _{oss}	--	16	--	pF
Reverse Transfer Capacitance	F= 1 MHZ	C _{rss}	--	3	--	pF
Gate Charge Paramters (Test Circuit & Waveform See Fig.16)						
Total Gate Charge	VDS= 50 V	Q _g	--	2	--	nC
Gate-Source Charge	VGS= 10.0 V	Q _{gs}	--	0.4	--	nC
Gate-Drain Charge	ID= 0.8 A	Q _{gd}	--	1	--	nC
Drain-Source Diode Characteristics And Maximum Ratings (Test Circuit & Waveform See Fig.18)						
Max. Diode Forward Current		I _S	--	--	0.8	A
Max. Pulsed Forward Current		I _{SM}	--	--	3	A
Diode Forward Voltage	ID= 0.4 A,VGS=0V	V _{SD}	--	0.7	1.2	V

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Typical Characteristics Curves

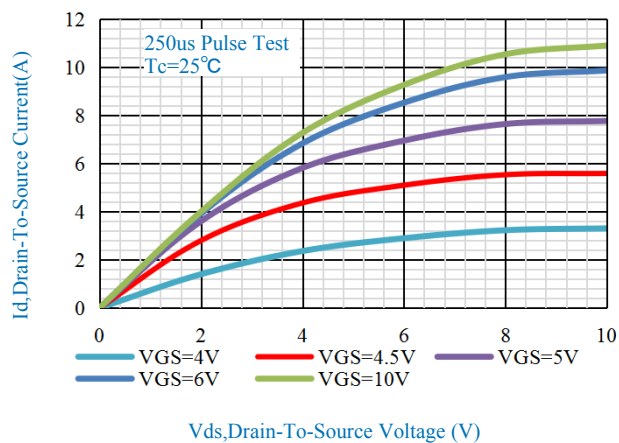


Fig.1-Output Characteristic

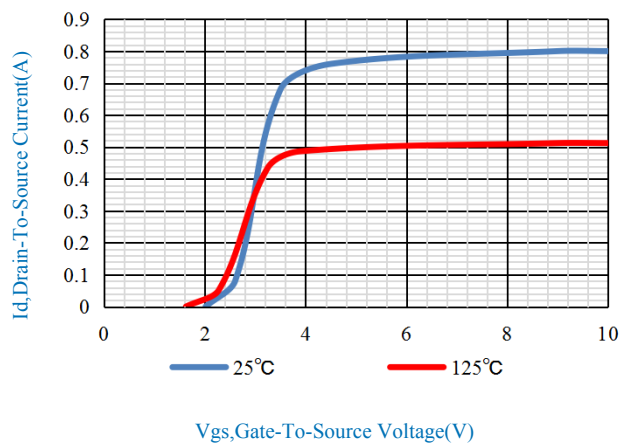


Fig.2-Transfer Characteristic

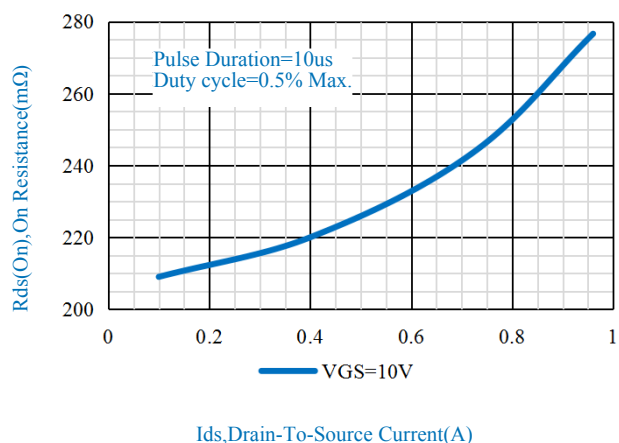


Fig.3-On Resistance Vs. Drain Current

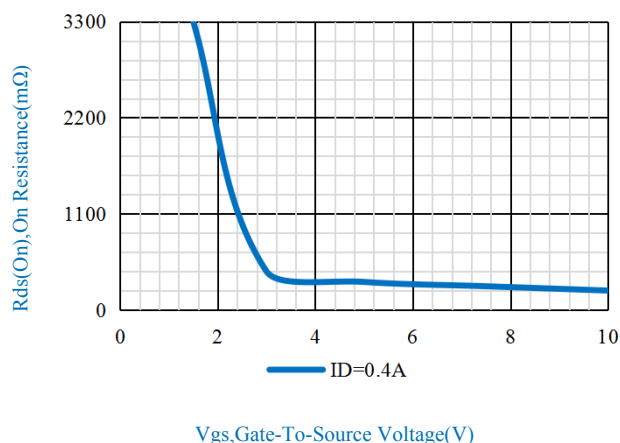


Fig.4-On Resistance Vs. Gate Source Voltage

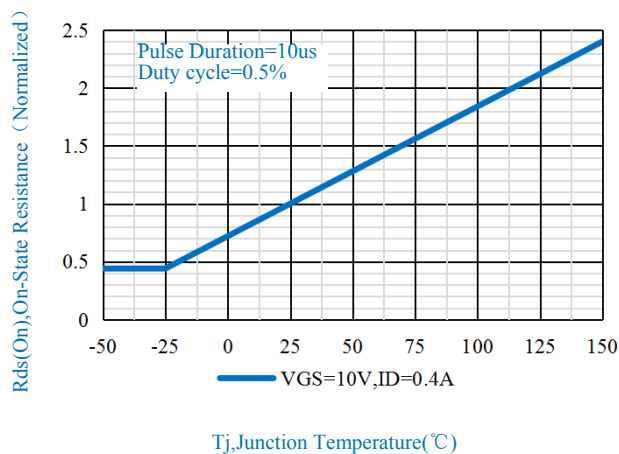


Fig.5-On Resistance Vs. Junction Temperature

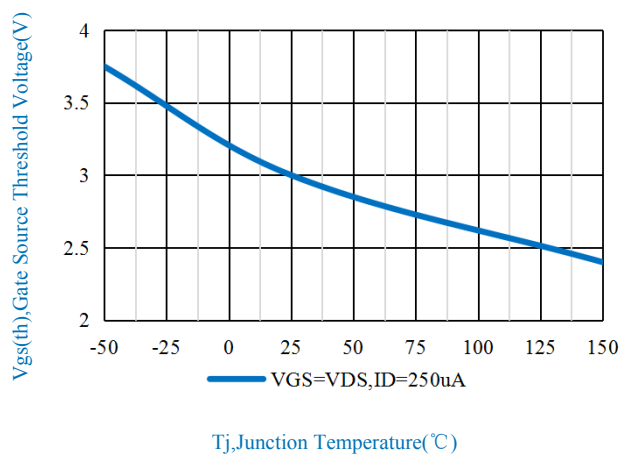


Fig.6-Gate Source Threshold Voltage Vs. Junction Temperature

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Typical Characteristics Curves

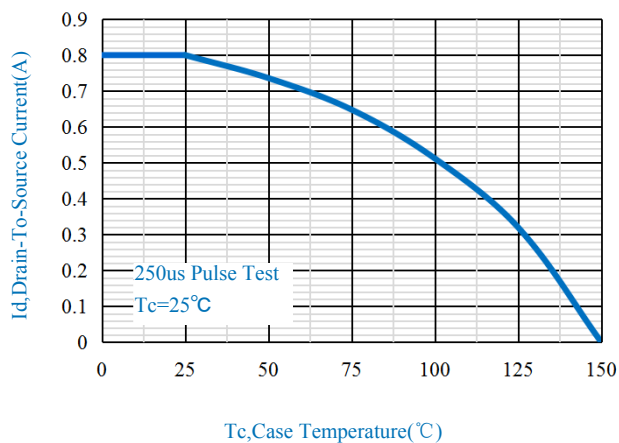


Fig.7-Maximum Continuous Drain Current Vs. Case Temperature

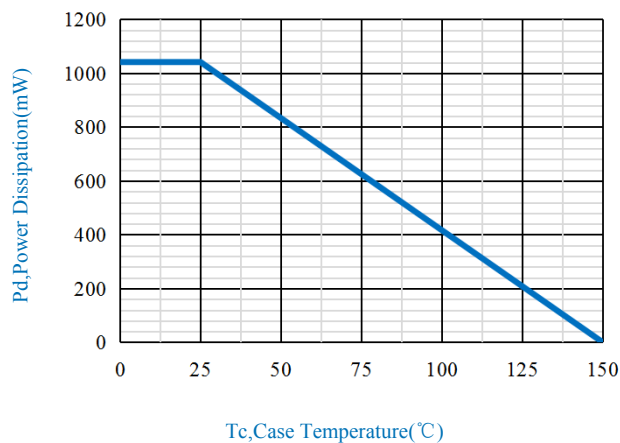


Fig.8-Maximum Power Dissipation Vs. Case Temperature

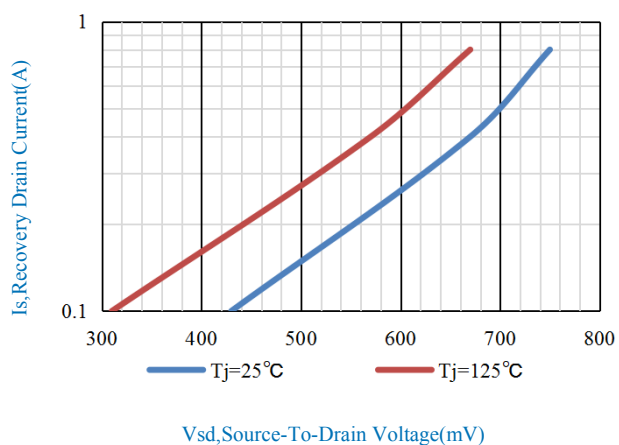


Fig.9-Source-To-Drain Diode Forward Voltage

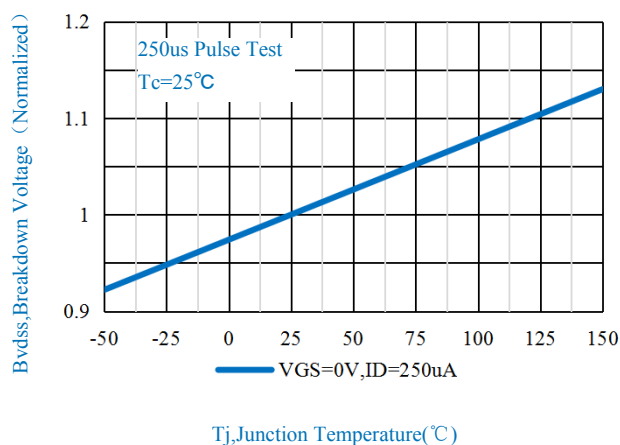


Fig.10-Breakdown Voltage Vs. Junction Temperature

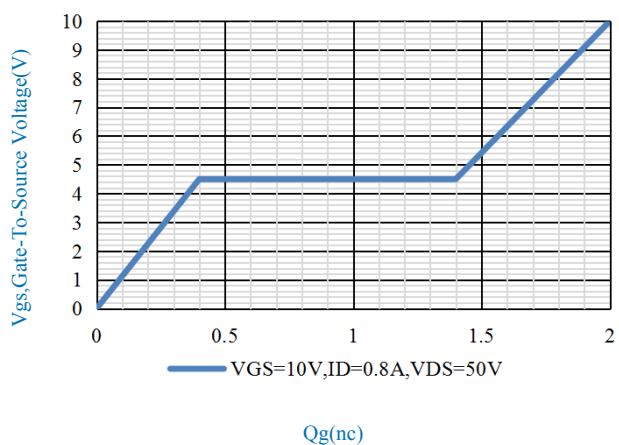


Fig.11-Gate Charge Waveform

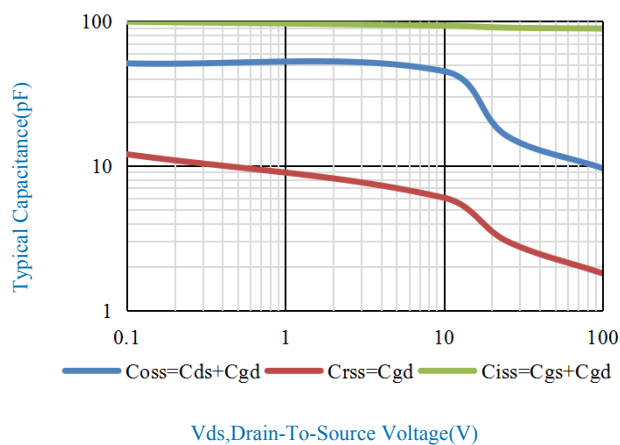


Fig.12-Typical Capacitance Vs. Drain-To-Source Voltage

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Typical Characteristics Curves

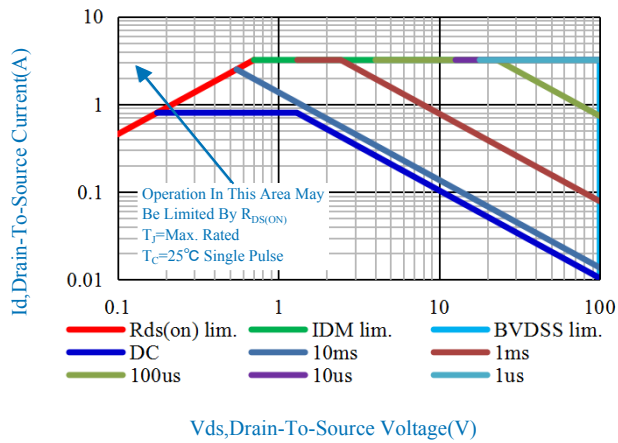


Fig.13-Maximum Safe Operating Area(SOA)

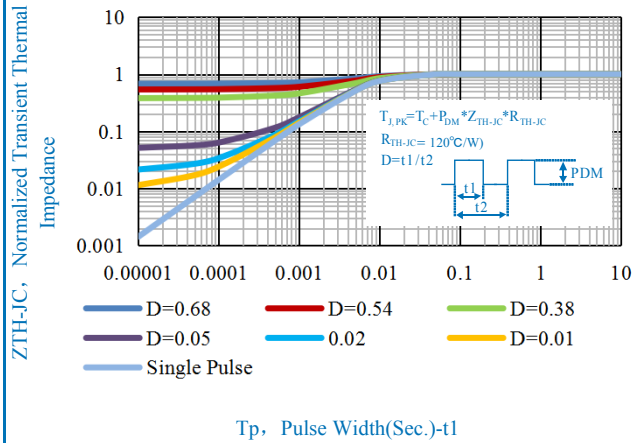


Fig.14- Normalized Maximum Transient Thermal Impedance Vs. Pulse Width

Inductive Load Test Circuit & Waveform

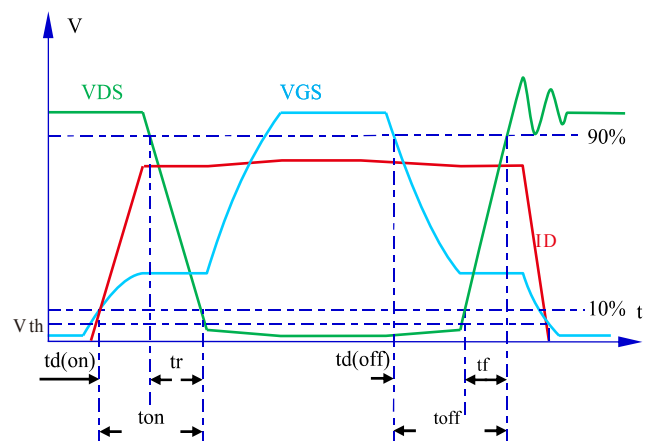
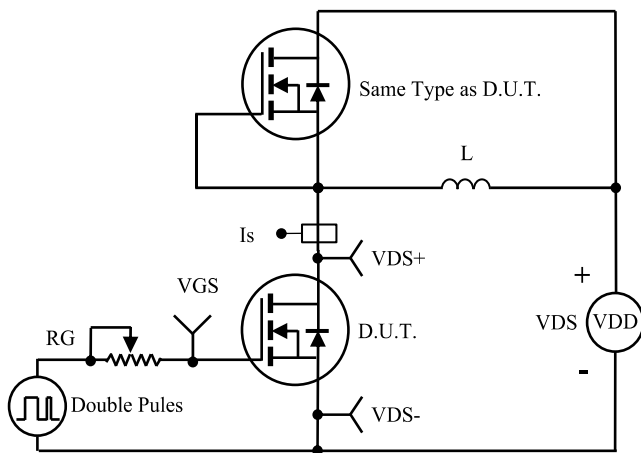


Fig.15- Inductive Switching Test Circuit & Waveform

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Test Circuit & Waveform

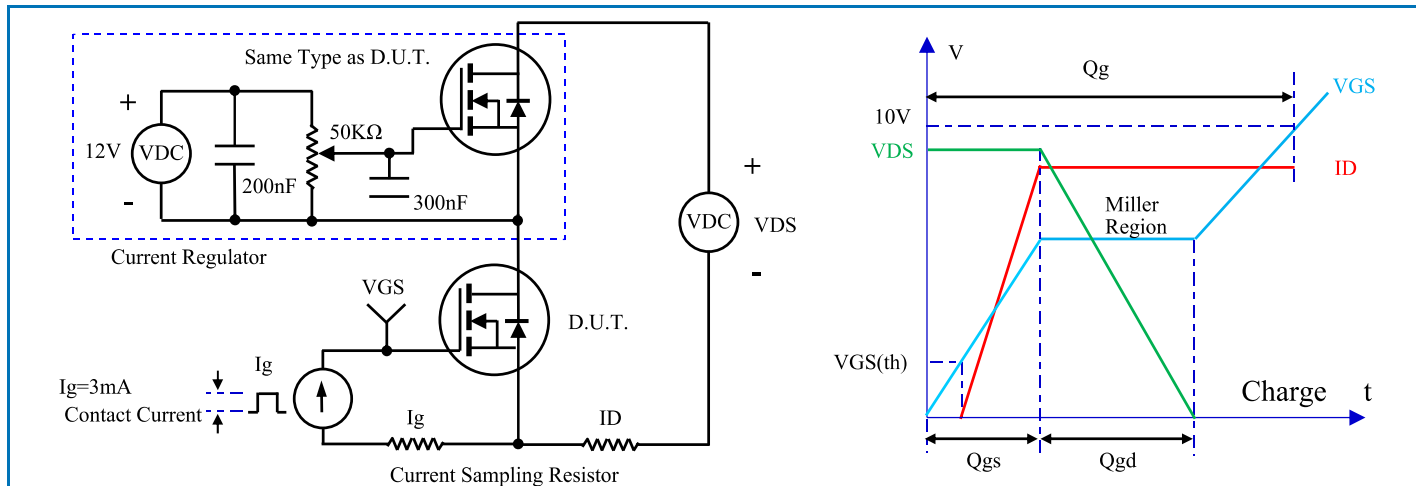


Fig.16-Gate Charge Test Circuit & Waveform

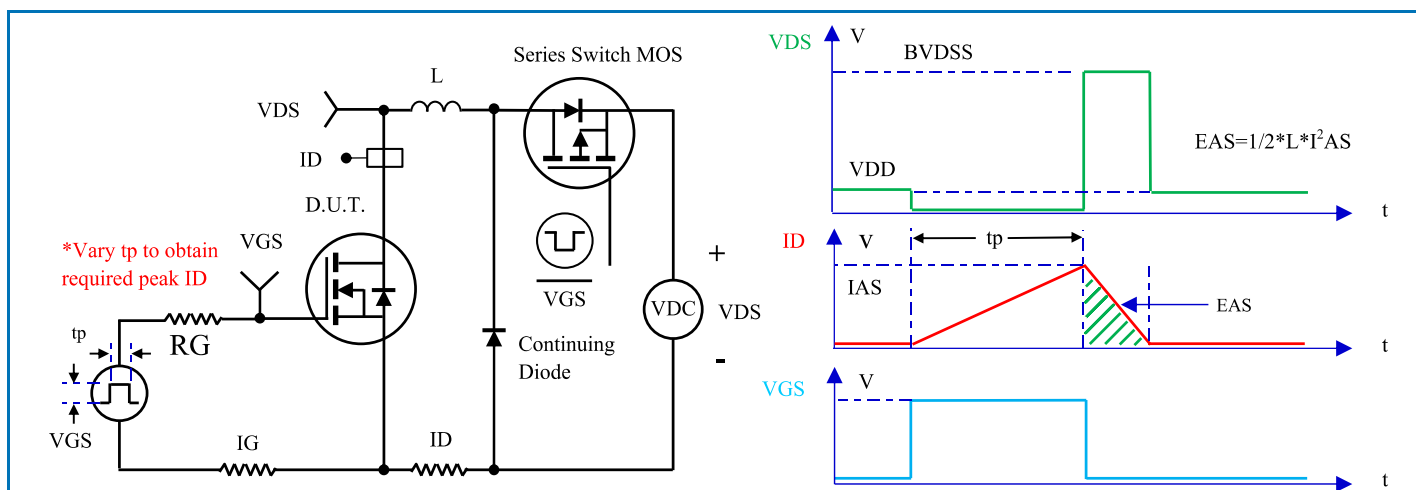


Fig.17- Unclamped Inductive Switching (UIS) Test Circuit & Waveform

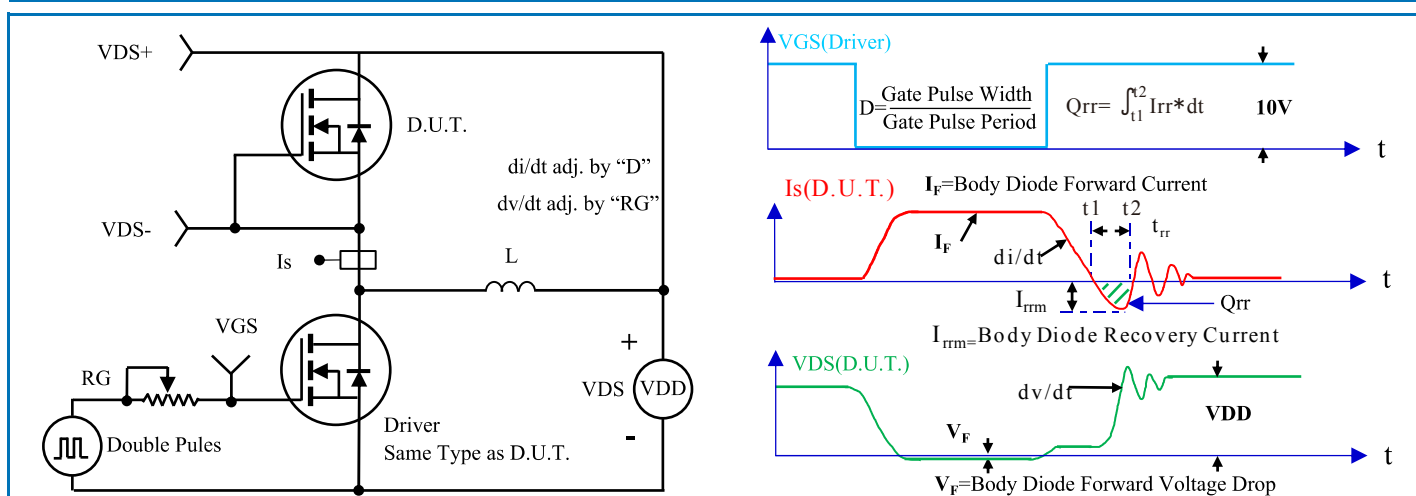


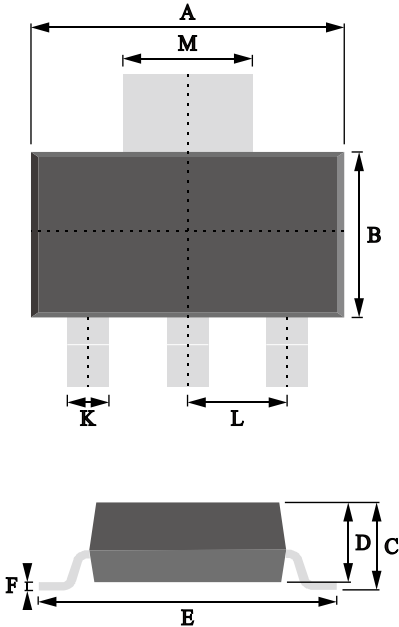
Fig.18- Diode Recovery Test Circuit & Waveform

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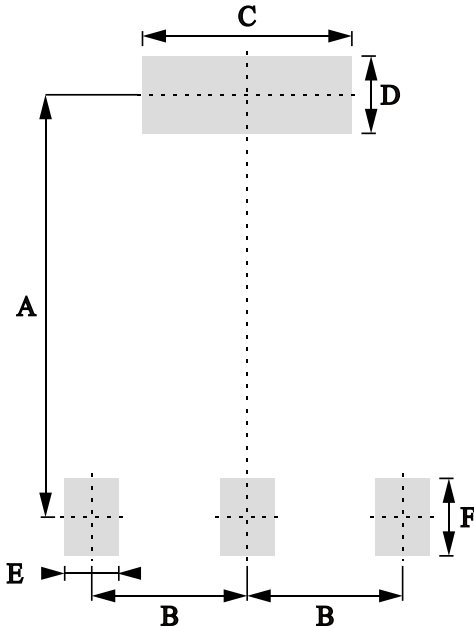
OUTLINE DRAWINGS



SOT-223

OUTLINE DIMENSIONS						
Dim.	Milimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	6.05	-	6.60	0.2382	-	0.2598
B	3.30	-	3.70	0.1299	-	0.1457
C	1.45	-	1.85	0.0571	-	0.0728
D	1.40	-	1.80	0.0551	-	0.0709
E	6.70	-	7.20	0.2638	-	0.2835
F	0.20	-	0.40	0.0079	-	0.0157
K	0.55	-	0.85	0.0217	-	0.0335
L	2.10	-	2.50	0.0827	-	0.0984
M	2.85	-	3.25	0.1122	-	0.1280

RECOMMEDND LAYOUT DRAWINGS



SOT-223

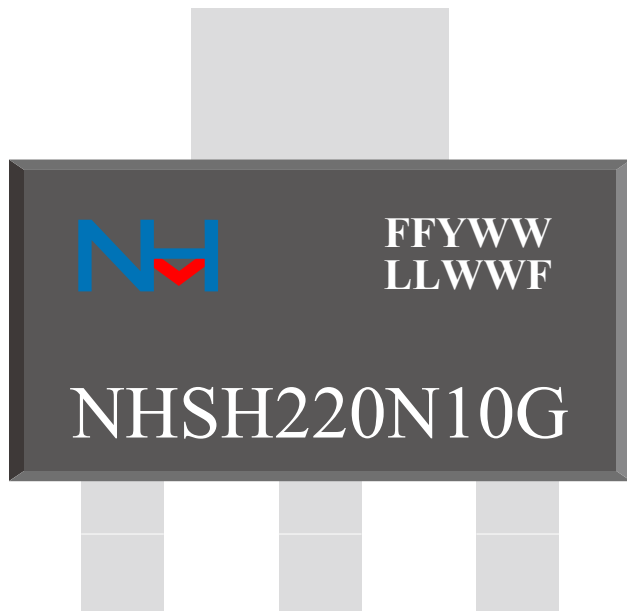
OUTLINE DIMENSIONS						
Dim.	Milimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	-	6.00	-	-	0.0000	-
B	-	2.30	-	-	0.0906	-
C	-	3.10	-	-	0.1220	-
D	-	1.10	-	-	0.0433	-
E	-	0.80	-	-	0.0315	-
F	-	1.10	-	-	0.0433	-

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MARKING INFORMATION

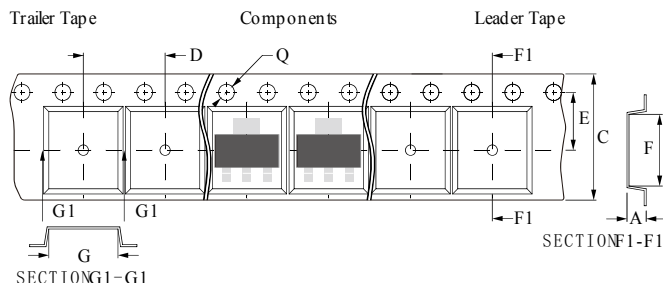


MARKING INSTRUCTIONS

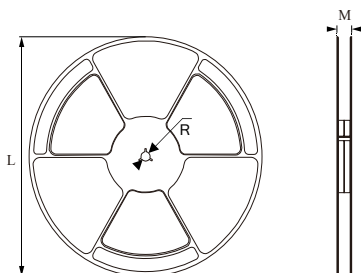
NH=Niuhan Trademark
FF=Product Line Code,According To Actual Changes
YWW=Date Code,According To Actual Changes
LLWWF=Internal Code,According To Actual Changes
NHSH220N10G=Model

PACKAGING

TAPE



REEL



SOT-223

OUTLINE DIMENSIONS

Dim.	Milimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
TAPE						
A	1.78	-	1.98	0.0701	-	0.0780
C	11.70	-	12.30	0.4606	-	0.4843
D	7.70	-	8.30	0.3031	-	0.3268
E	5.30	-	5.70	0.2087	-	0.2244
F	7.13	-	7.53	0.2807	-	0.2965
G	6.56	-	6.96	0.2583	-	0.2740
Q Φ	1.40	-	1.60	0.0551	-	0.0630
REEL						
L	328.00	-	332.00	12.913	-	13.071
R	12.00	-	14.00	0.4724	-	0.5512
M	16.50	-	18.50	0.6496	-	0.7283

PACKING INFORMATION

Package Type	Package Code	Product Weight Approx(g/Pcs)	Package Method	Quantity (Pcs/Min. Pack.)	Quantity (Pcs/Inner Box)	Quantity (Pcs/Carton)
SOT-223	P1	0.19	13" Reel	2500	5000	50000

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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 (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 (t _p)	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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Specification Revision History

Rev.	Date	Changed Items	Pre-Changed Content	Changed Content
A/1	2014-10-20	First Issue		
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