

NH4435A



P-Channel Enhancement Mode Trench Power MOSFET

Voltage: -30 Volts

Current: -11 Ampers

Package: SOP-8

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)

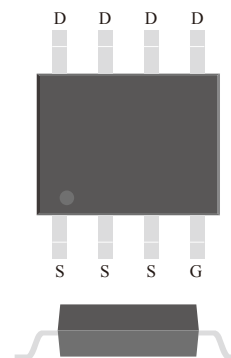
Typical Applications

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

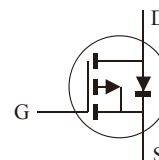
Product Summary

VDS Min.@Tj	-30	V
Id Min.@Ta	-11	A
RDS(ON)(TYP)@-10V	11	mΩ

Diagram:



Polarity:



***100% UIS TESTED**

***100% ΔVDS TESTED**

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

Parameter	Test Conditions	Symbol	Ratings	Unit
Drain-Source Voltage		V _{DS}	-30	V
Gate-Source Voltage		V _{GS}	±25	V
Continuous Drain Current (Note 1)	Ta= 25 ℃	I _D	-11	A
	Ta= 100 ℃		-7	
Drain Current-Pulse (Note 1)	Tj< 150 ℃	I _{DM}	-44	A
Maximum Power Dissipation Power	Ta= 25 ℃	P _D	2.5	W
Dissipation Derating Factor Above 25℃	Ta= 100 ℃		1	
Derating Factor		D _F	0.02	W/℃

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}	50	℃/W

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

NH4435A

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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}	-30	--	--	V
Bvdss Temperature Coefficient	ID=-250uA,Reference25℃	ΔBV _{DSS} /ΔT _J	--	0.03	--	V/℃
Drain-Source Leakage Current	VDS= -30 V,VGS=0V	I _{DSS}	--	--	-1	uA
Gate-Body Leakage Current	VGS= ±25 V,VDS=0V	I _{GSS}	--	--	±100	nA
Static On Characteristics						
Gate Threshold Voltage	VGS= VDS ID=-250uA	V _{GS(TH)}	-1	-2	-3	V
Drain-Source On Resistance	ID= -5.5 A,VGS= -10 V	R _{DS(ON)}	--	11	18	mΩ
	ID= -5.5 A,VGS= -4.5 V		--	14	30	
Dynamic Characteristics						
Input Capacitance	VDS= -15 V	C _{iss}	--	1380	--	pF
Output Capacitance	VGS= 0 V	C _{oss}	--	160	--	pF
Reverse Transfer Capacitance	F= 1 MHZ	C _{rss}	--	150	--	pF
Switching Paramters (Test Circuit & Waveform See Fig.14)						
Turn-On Delay Time	VDS= -15 V	t _{d(on)}	--	18	--	ns
Turn-On Rise Time	VGS= -10.0 V	t _r	--	22	--	ns
Turn-Off Delay Time	RG= 10.0 Ω	t _{d(off)}	--	55	--	ns
Turn-Off Rise Time		t _f	--	43	--	ns
Gate Charge Paramters (Test Circuit & Waveform See Fig.15)						
Total Gate Charge	VDS= -15 V	Q _g	--	27	--	nC
Gate-Source Charge	VGS= -10.0 V	Q _{gs}	--	6	--	nC
Gate-Drain Charge	ID= -5.5 A	Q _{gd}	--	4	--	nC
Drain-Source Diode Characteristics And Maximum Ratings (Test Circuit & Waveform See Fig.17)						
Max. Diode Forward Cuurent		I _S	--	--	-11.0	A
Max. Pulsed Forward Cuurent		I _{SM}	--	--	-44.0	A
Diode Forward Voltage	ID= -5.5 A,VGS=0V	V _{SD}	--	-0.7	-1.2	V

P-Channel Enhancement Mode Trench Power MOSFET

Typical Characteristics Curves

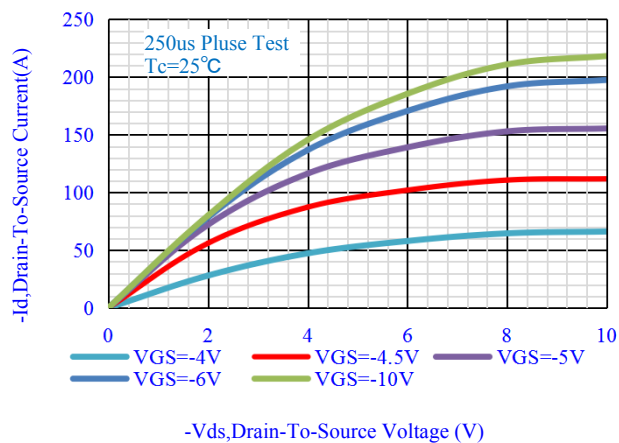


Fig.1-Output Characteristics

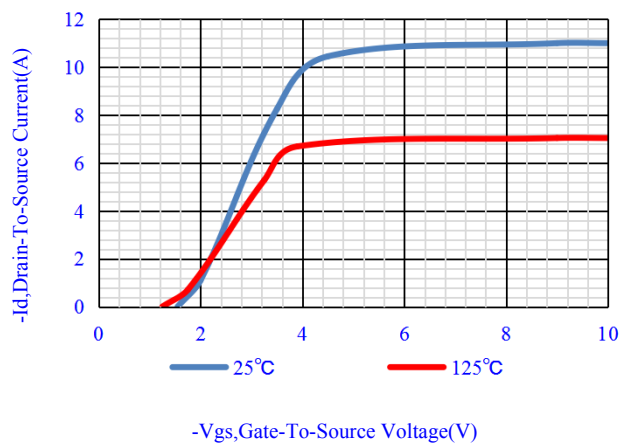


Fig.2-Transfer Characteristics

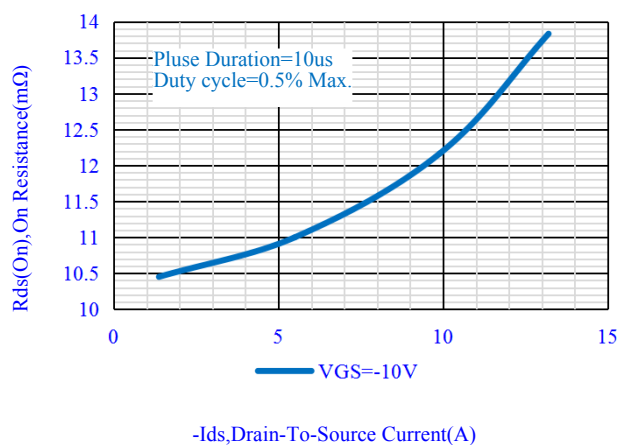


Fig.3-On Resistance Vs. Drain Current

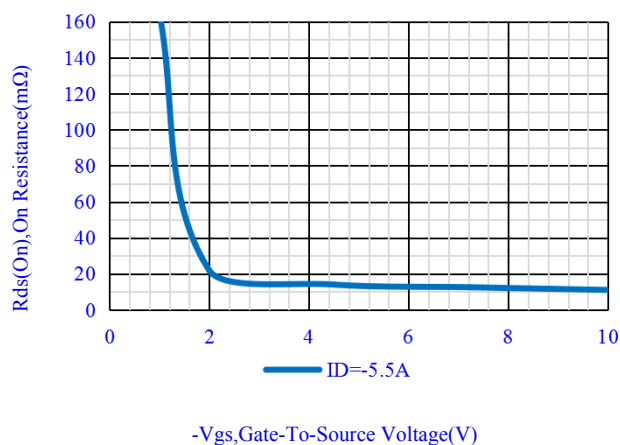


Fig.4-On Resistance Vs. Gate Source Voltage

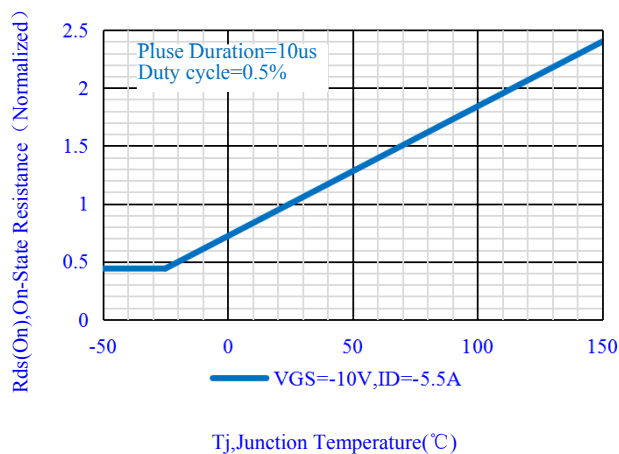


Fig.5-On Resistance Vs. Junction Temperature

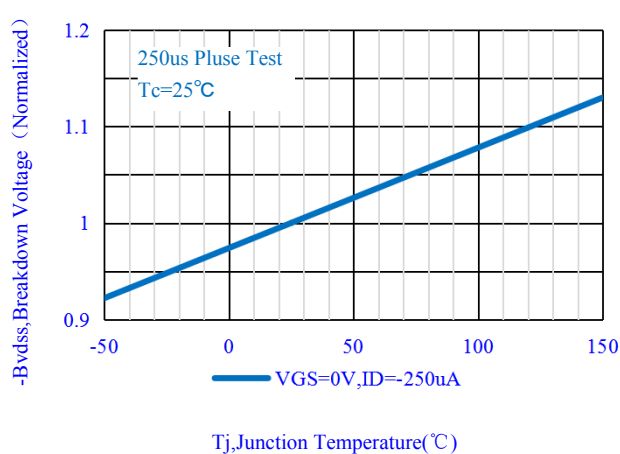


Fig.6-Breakdown Voltage Vs. Junction Temperature

NH4435A

P-Channel Enhancement Mode Trench Power MOSFET



Typical Characteristics Curves

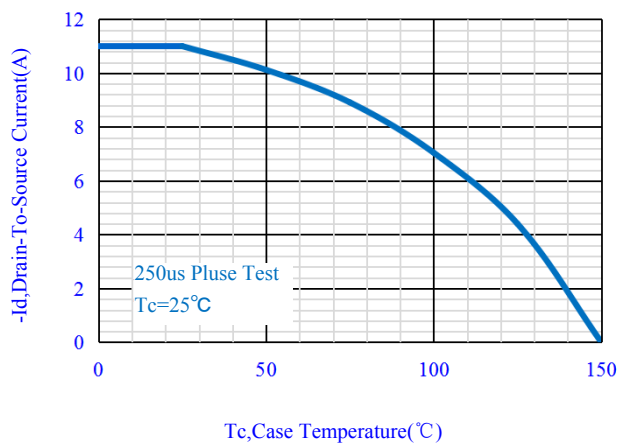


Fig.7-Maximum Continuous Drain Current Vs. Case Temperature

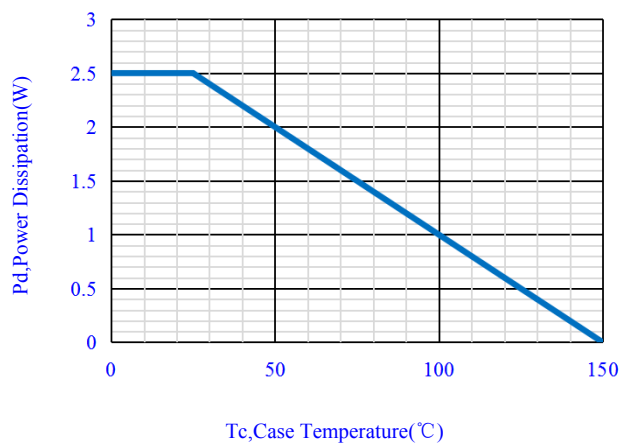


Fig.8-Maximum Power Dissipation Vs. Case Temperature

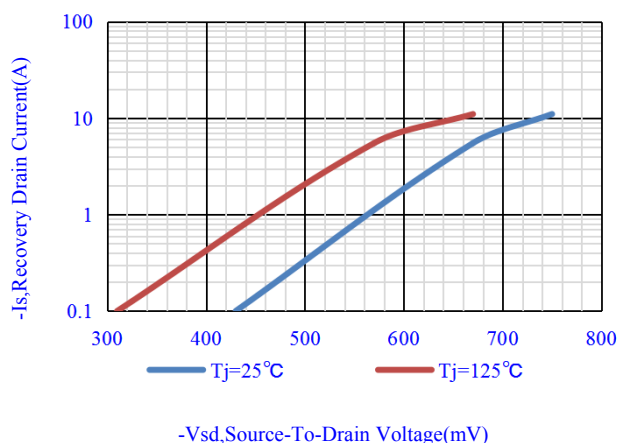


Fig.9-Source-To-Drain Diode Forward Voltage

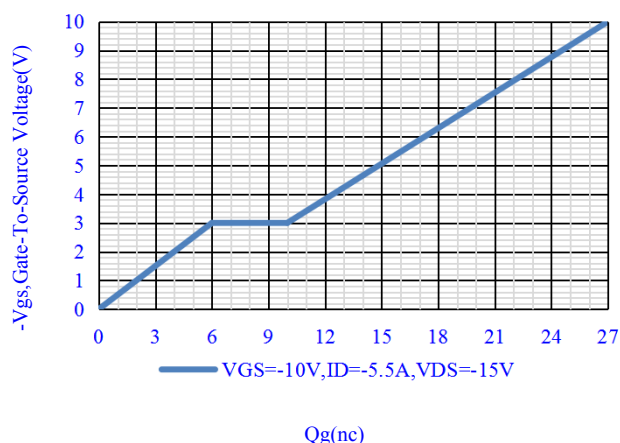


Fig.10-Gate Charge Waveform

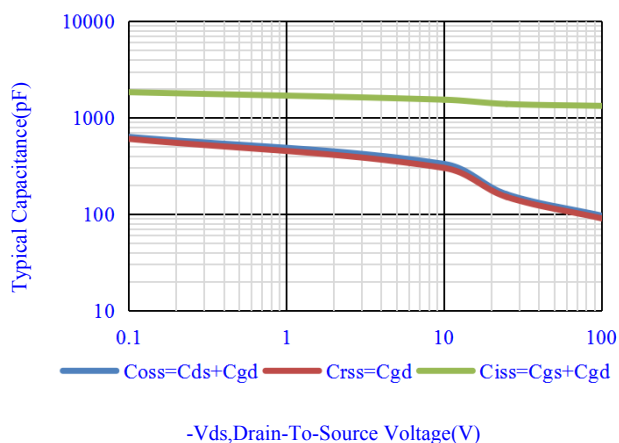


Fig.11-Typical Capacitance Vs. Drain-To-Source Voltage

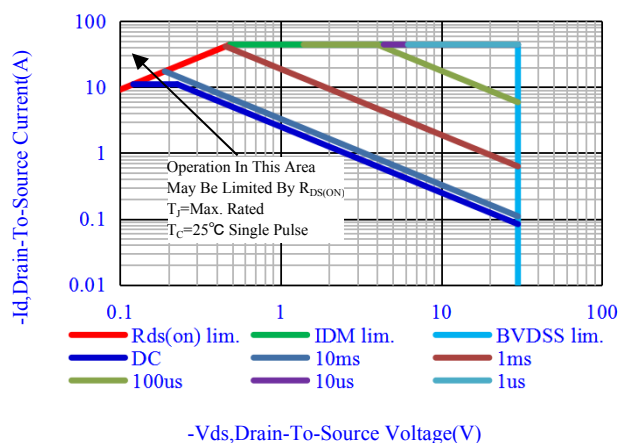


Fig.12-Maximum Safe Operating Area(SOA)

NH4435A

P-Channel Enhancement Mode Trench Power MOSFET



Typical Characteristics Curves

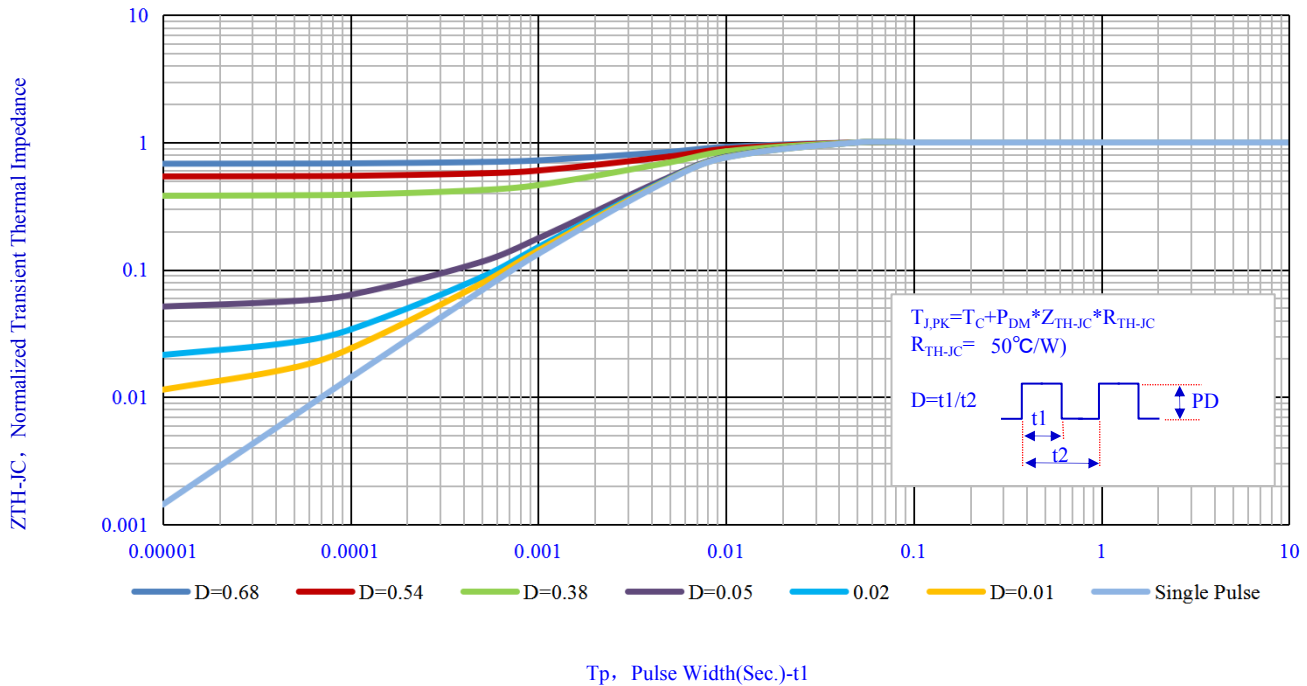


Fig.12- Normalized Maximum Transient Thermal Impedance Vs.Pulse Width

Test Circuit & Waveform

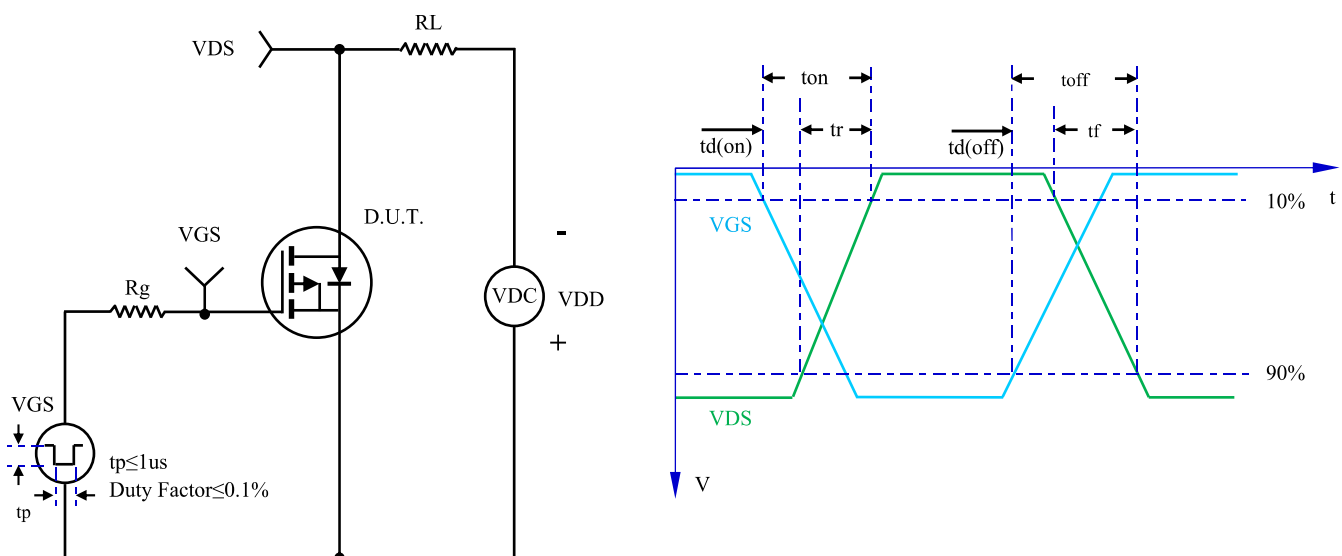


Fig.13- Resistive Switching Test Circuit & Waveform

NH4435A

P-Channel Enhancement Mode Trench Power MOSFET

Test Circuit & Waveform

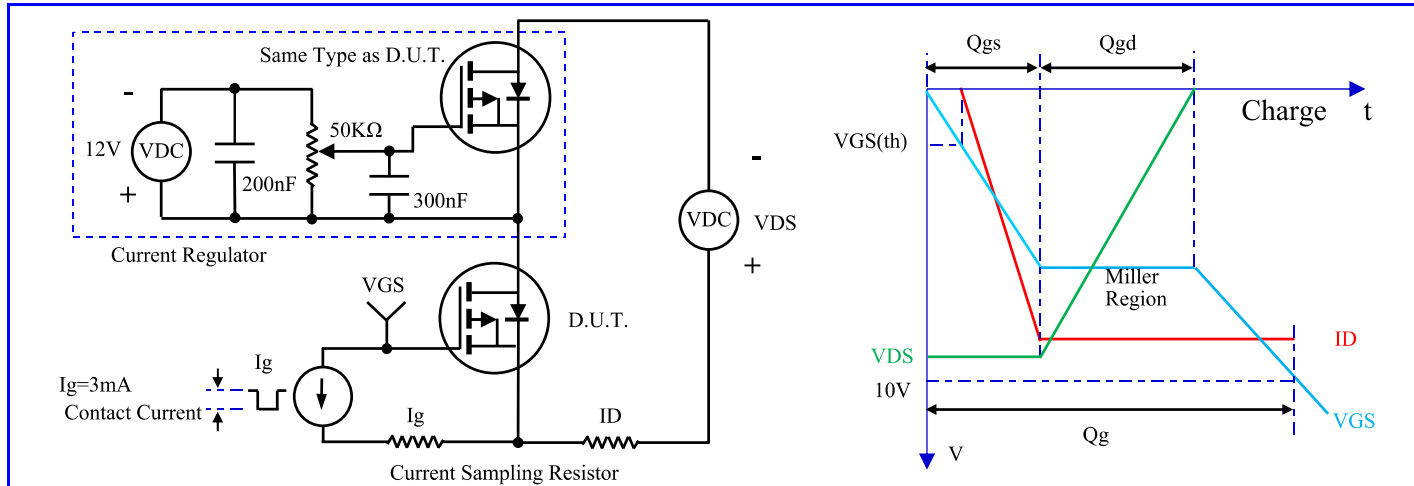


Fig.14-Gate Charge Test Circuit & Waveform

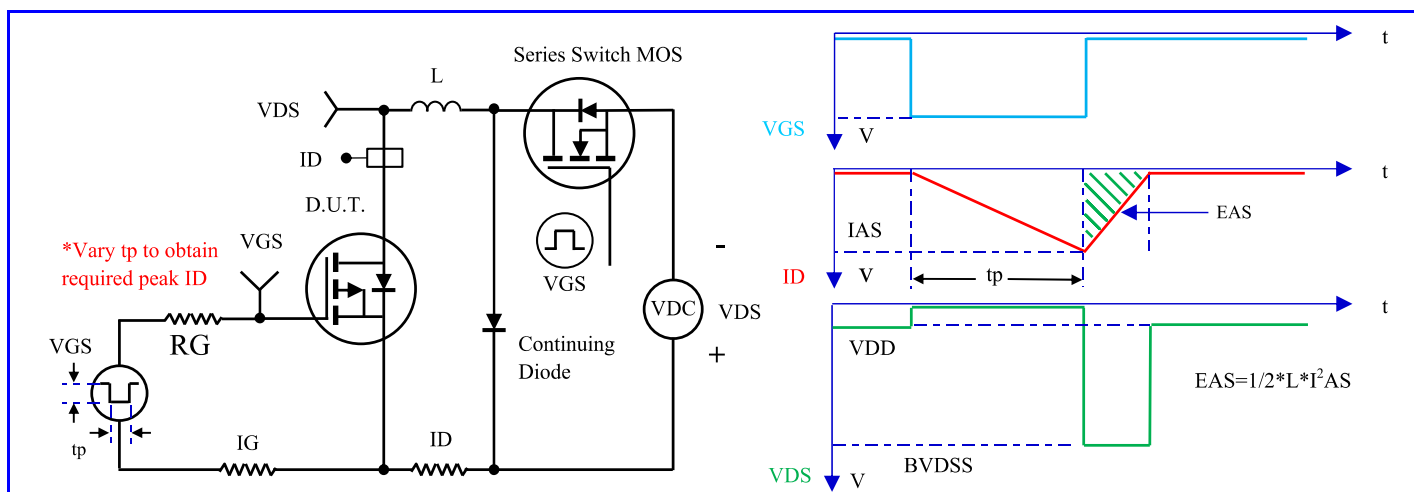


Fig.15- Unclamped Inductive Switching (UIS) Test Circuit & Waveform

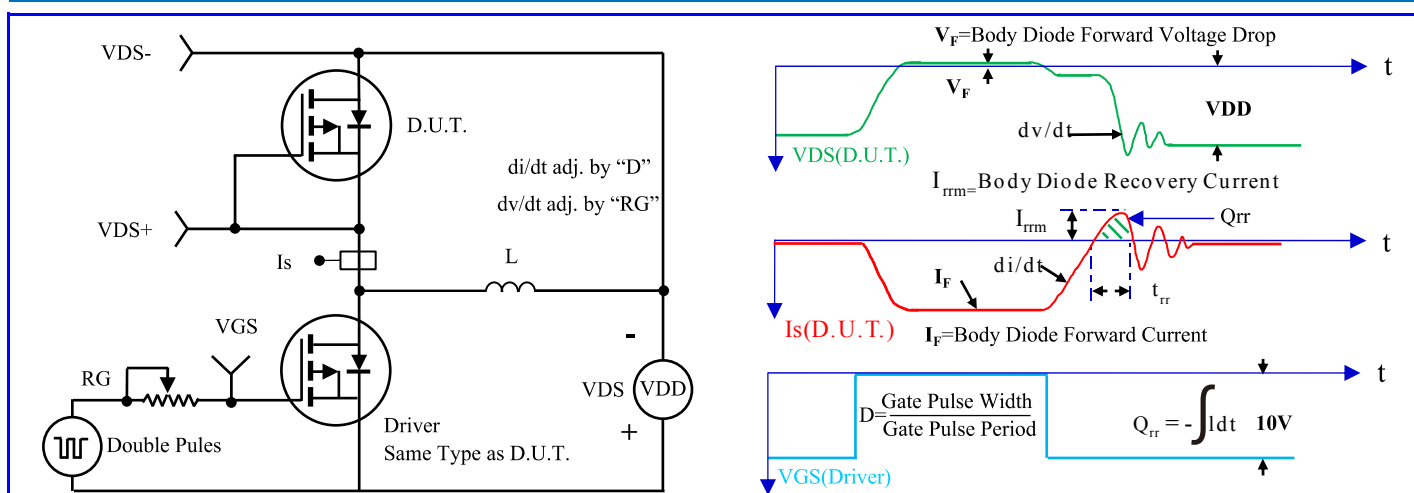


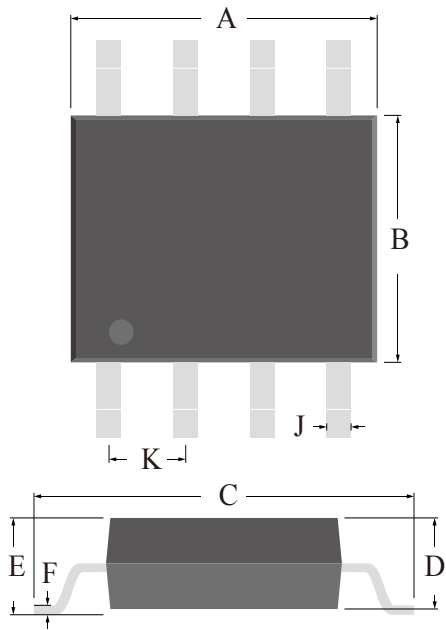
Fig.16- Diode Recovery Test Circuit & Waveform

NH4435A



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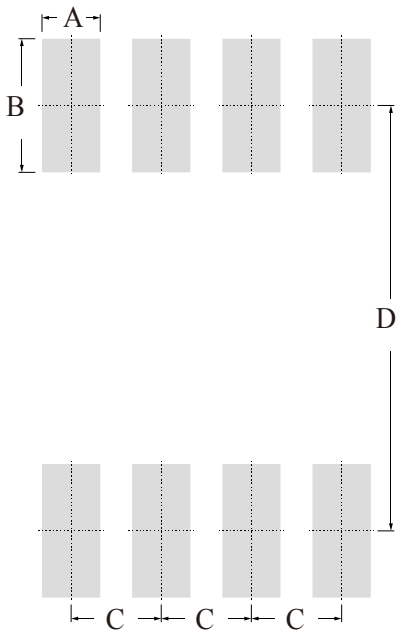
OUTLINE DRAWINGS



SOP-8

OUTLINE DIMENSIONS						
Dim.	Milimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.70	-	5.30	0.1850	-	0.2087
B	3.65	-	4.05	0.1437	-	0.1594
C	5.70	-	6.70	0.2244	-	0.2638
D	1.22	-	1.62	0.0480	-	0.0638
E	1.31	-	1.71	0.0516	-	0.0673
F	0.10	-	0.30	0.0039	-	0.0118
J	0.25	-	0.55	0.0098	-	0.0217
K	1.05	-	1.45	0.0413	-	0.0571

RECOMMENDED LAYOUT DRAWINGS



SOP-8

OUTLINE DIMENSIONS						
Dim.	Milimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	-	0.80	-	-	0.0315	-
B	-	1.75	-	-	0.0689	-
C	-	1.25	-	-	0.0492	-
D	-	7.35	-	-	0.2894	-

NH4435A

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MARKING INFORMATION



MARKING INSTRUCTIONS

4435A=mark,
XXXX=Inernal Code,According To Actual Changes

PACKING INFORMATION

Package Type	Package Code	Product Weight Approx(g/Pcs)	Package Method	Quantity (Pcs/Min. Pack.)	Quantity (Pcs/Inner Box)	Quantity (Pcs/Carton)
SOP-8	P1	0.173	13" Reel	3000	6000	48000

NH4435A

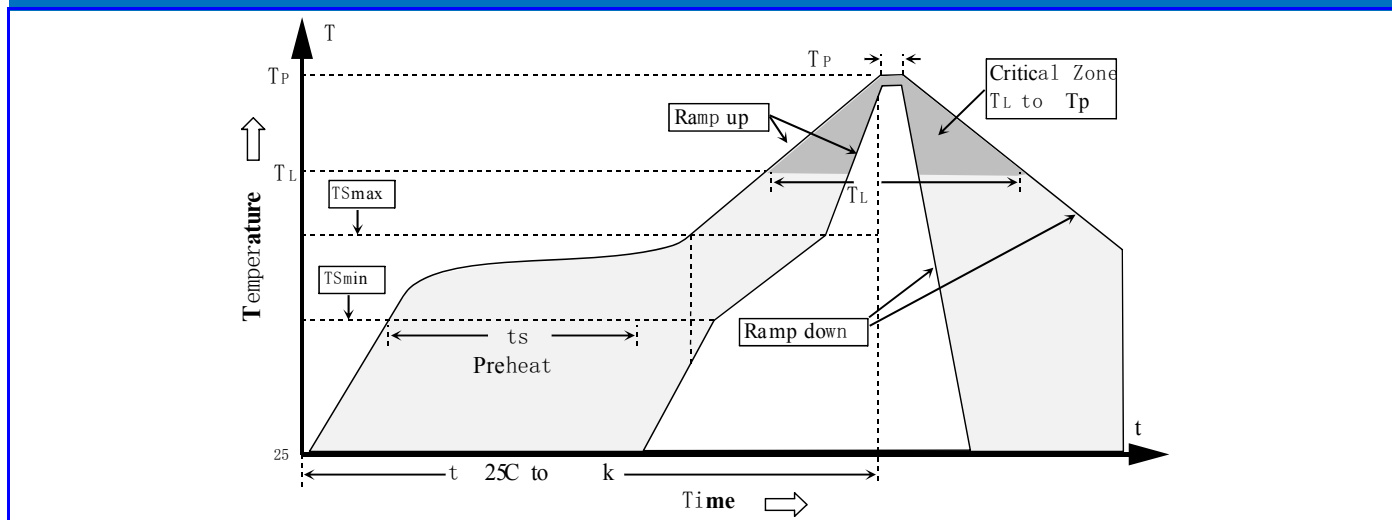


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Recommended wave soldering condition

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 (Tsmx 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.

NH4435A



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