PJM9928NPA

Dual N-Channel Enhancement Mode Power MOSFET

Product Summary

- V_{DS}= 20V,I_D= 7A
- $R_{DS(on)}$< 15mΩ @V_{GS}= 4.5V
- $R_{DS(on)}$< 20mΩ @V_{GS}= 2.5V

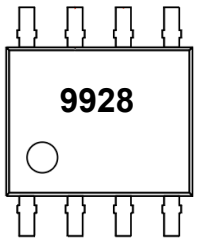
Features

- Advanced Trench Technology
- 100% Avalanche Tested
- RoHS and Reach Compliant
- Halogen and Antimony Free
- Moisture Sensitivity Level 3
- Molding Compound Meets UL 94 V-0 Flammability Rating

Application

- Load Switch
- PWM Application
- Power Management

Marking Code



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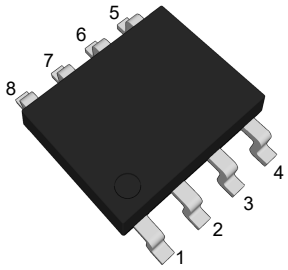
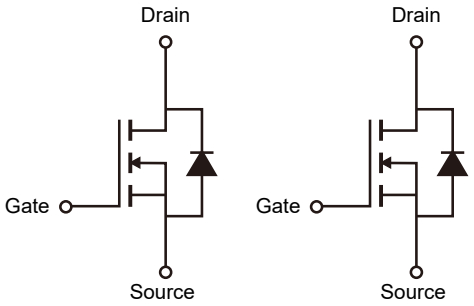


(Top View)

Pin	Description	Pin	Description
1	Source1	4	Gate2
2	Gate1	5,6	Drain2
3	Source2	7,8	Drain1

Schematic Diagram



N-Channel **N-Channel**

Absolute Maximum Ratings

Ratings at 25℃ ambient temperature unless otherwise specified.

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	±12	V
Drain Current-Continuous	T_A=25°C	I_D	7	A
	T_A=100°C		4.2	
Drain Current-Pulsed Note1		I_{DM}	28	A
Single Pulse Avalanche Energy Note2		E_{AS}	16	mJ
Maximum Power Dissipation		P_D	1.3	W
Junction and Storage Temperature Range		T_J,T_{STG}	-55 to +150	°C

Thermal Characteristics

Thermal Resistance,Junction-to-Ambient Note3	$R_{\theta JA}$	96	°C/W

Electrical Characteristics

(T_J=25℃ unless otherwise specified)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V,I_D=250μA	20	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=20V,V_{GS}=0V	--	--	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±12V,V_{DS}=0V	--	--	±100	nA
Gate Threshold Voltage Note4	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	0.4	0.7	1.2	V
Drain-Source On-Resistance Note4	$R_{DS(on)}$	V_{GS}=4.5V,I_D=3A	--	11	15	mΩ
		V_{GS}=2.5V,I_D=2.5A	--	15	20	mΩ
Forward Transconductance Note4	g_{FS}	V_{DS}=5V,I_D=2A	--	8.5	--	S
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS}=10V,V_{GS}=0V,f=1MHz	--	760	--	pF
Output Capacitance	C_{oss}		--	110	--	pF
Reverse Transfer Capacitance	C_{rss}		--	92	--	pF
Gate Resistance	R_g	V_{DS}=0V,V_{GS}=0V,f=1MHz	--	1.2	--	Ω
Total Gate Charge	Q_g	V_{DS}=10V,I_D=3A, V_{GS}=4.5V	--	9	--	nC
Gate-Source Charge	Q_{gs}		--	1.5	--	nC
Gate-Drain Charge	Q_{gd}		--	2.5	--	nC
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=10V, I_D=3A, V_{GS}=4.5V, R_{GEN}=3Ω	--	5	--	nS
Turn-on Rise Time	t_r		--	16	--	nS
Turn-off Delay Time	$t_{d(off)}$		--	23	--	nS
Turn-off Fall Time	t_f		--	7	--	nS
Source-Drain Diode Characteristics						
Diode Forward Voltage Note4	V_{SD}	V_{GS}=0V,I_S=3A	--	--	1.2	V
Diode Forward Current	I_S		--	--	7	A
Reverse Recovery Time	trr	I_F=3A,di/dt=100A/μS	--	7	--	nS
Reverse Recovery Charge	Qrr		--	2	--	nC

Note：

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. E_{AS} condition: T_J=25℃,V_{DD}=10V, V_G=10V, R_G=25Ω, L=0.5mH, I_{AS}=8A
3. Surface mounted on 1inch^2 FR-4 board with 2OZ copper
4. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

Test Circuit

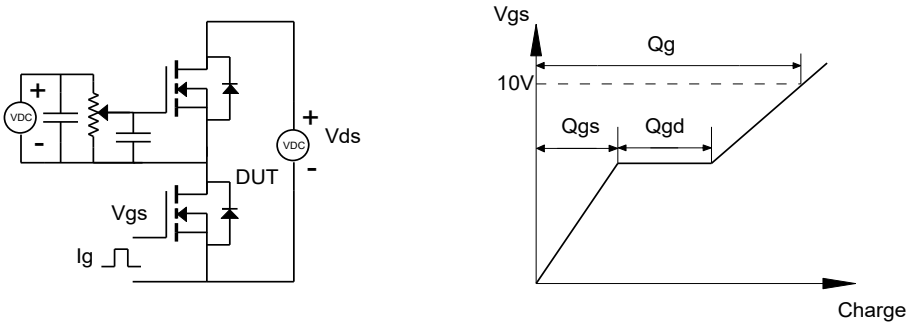


Figure 1: Gate Charge Test Circuit & Waveform

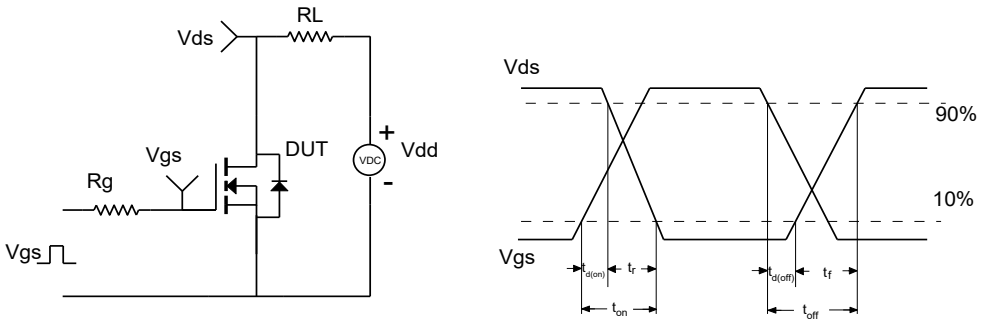


Figure 2: Resistive Switching Test Circuit & Waveform

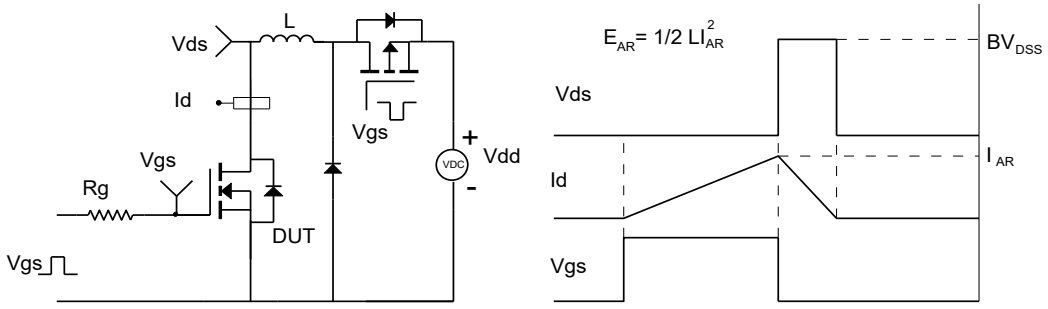


Figure 3: Unclamped Inductive Switching Test Circuit& Waveform

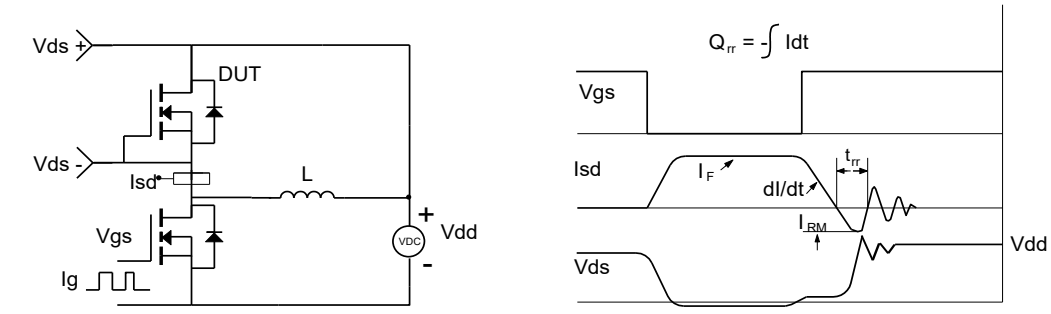


Figure 4: Diode Recovery Test Circuit & Waveform

Package Outline

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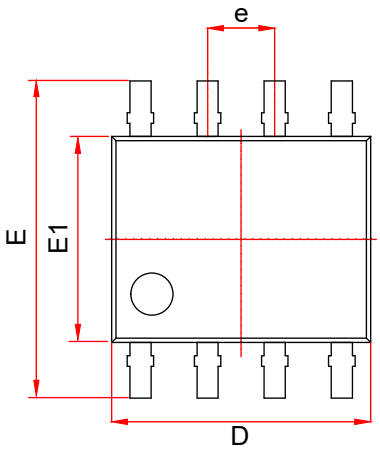
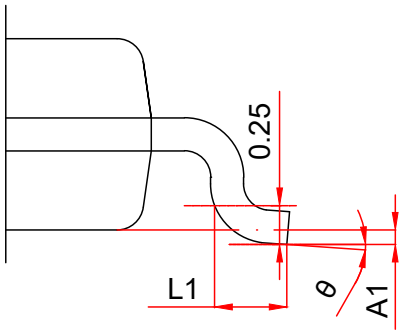
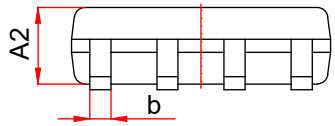


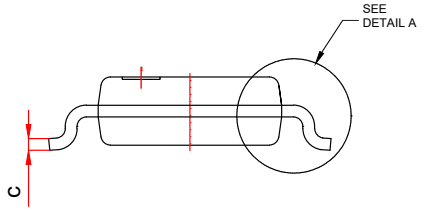
TOP VIEW



DETAIL A



SIDE VIEW



FRONT VIEW

Symbol	Dimensions in Millimeters			Dimensions in Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A1	0.030	0.090	0.150	0.001	0.004	0.006
A2	1.425	1.450	1.475	0.056	0.057	0.058
b	0.300	0.400	0.500	0.012	0.016	0.020
c	0.150	0.200	0.250	0.006	0.008	0.010
D	4.800	5.000	5.200	0.189	0.197	0.205
E	5.800	6.000	6.200	0.228	0.236	0.244
E1	3.800	4.000	4.200	0.150	0.157	0.165
e	1.270BSC			0.05BSC		
L1	0.400	0.600	0.800	0.016	0.024	0.031
θ	0°	-	8°	0°	-	8°

Suggested Pad Layout

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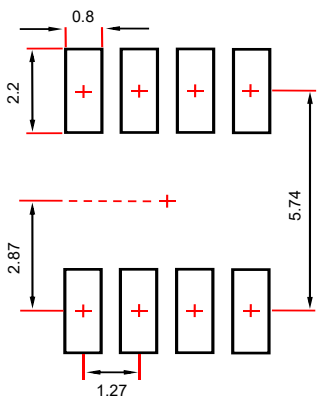
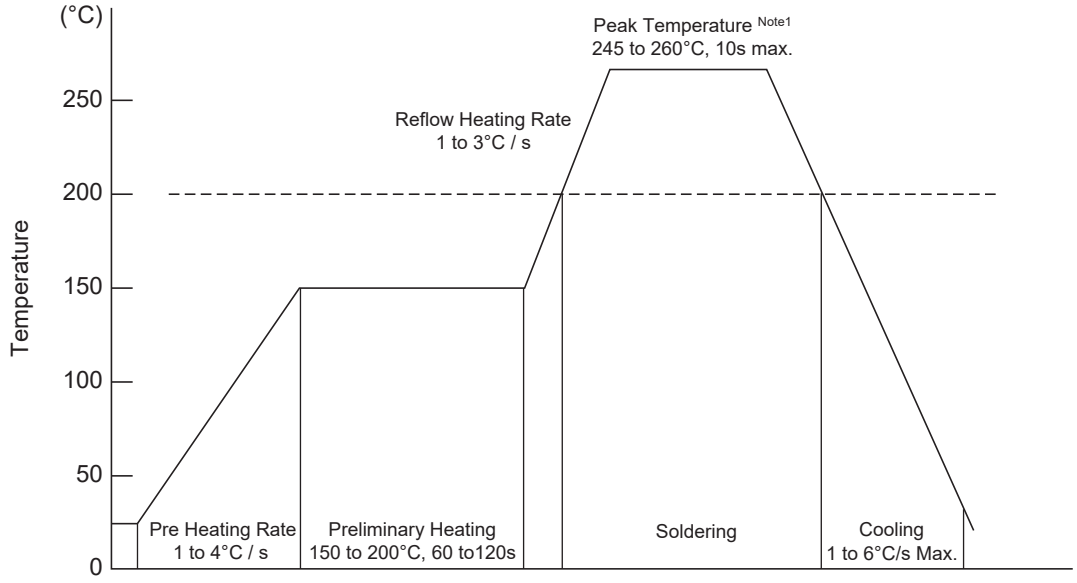


Note:

1. Package Body Sizes Exclude Mold Flash and Gate Burrs
2. Controlling Dimension: In millimeters
3. General Tolerance:±0.05mm
4. The Pad Layout is for reference purposes only

Conditions of Soldering and Storage

◆ **Recommended condition of Reflow Soldering(Pb-Free Solder)**



Recommended peak temperature is over 245°C. If peak temperature is below 245°C, you may adjust the following parameters:

- Time length of peak temperature (longer)
- Time length of soldering (longer)
- Thickness of solder paste (thicker)

Note1:

Maximum thermal excursion allowed during the reflow assembly is as follow:

- Temperature: 255°C~260°C
- Duration at peak soak : 30 seconds
- Number of reflow: 3

- **Conditions of hand soldering** Note2

- Temperature: 320±10°C
- Time: 3s max.
- Times: one time

Note2: Not recommended for mass production, an engineering project, or re-work, it is allowed. It should be used with caution

- **Storage conditions**

- **Temperature**

5 to 30°C

- **Humidity**

≤ 60% RH

- **Floor Life**

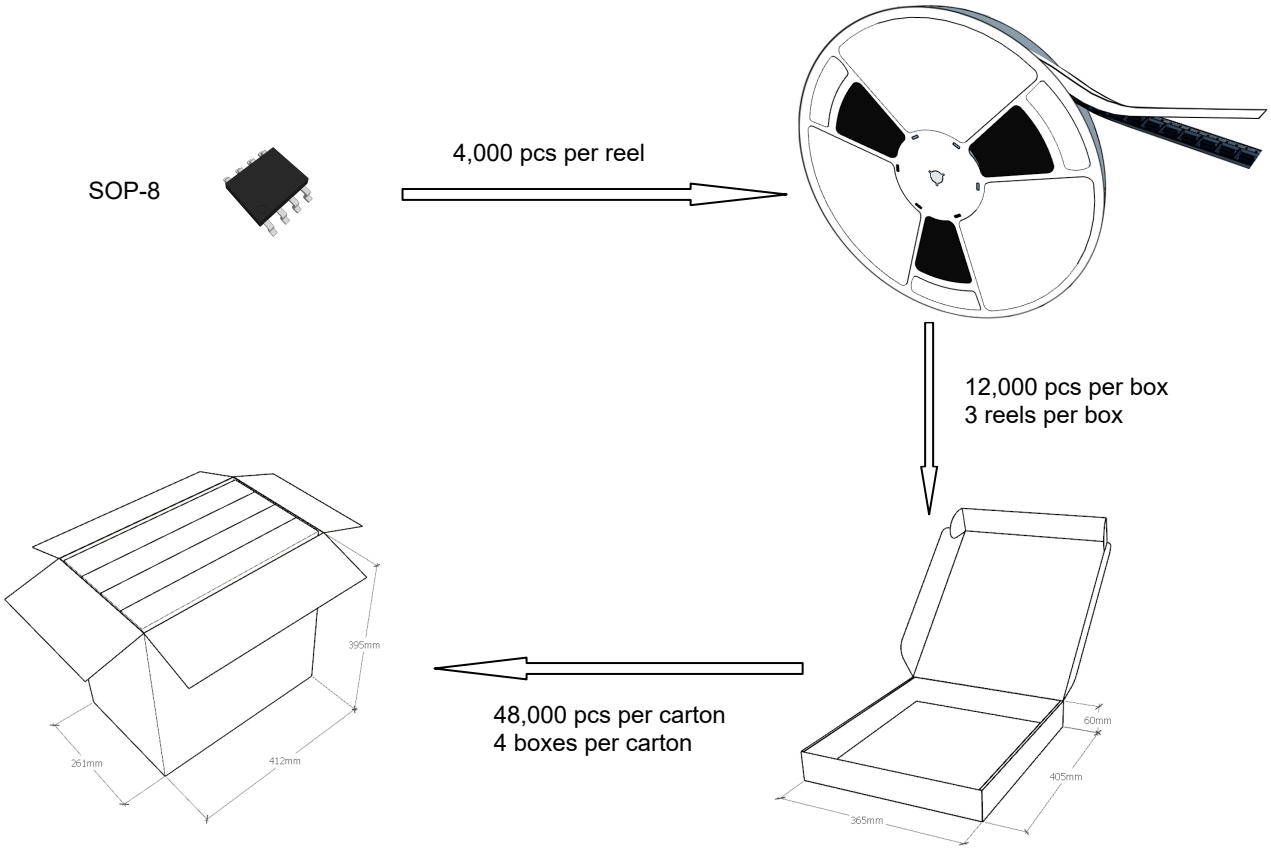
168 Hours

- **Recommended period**

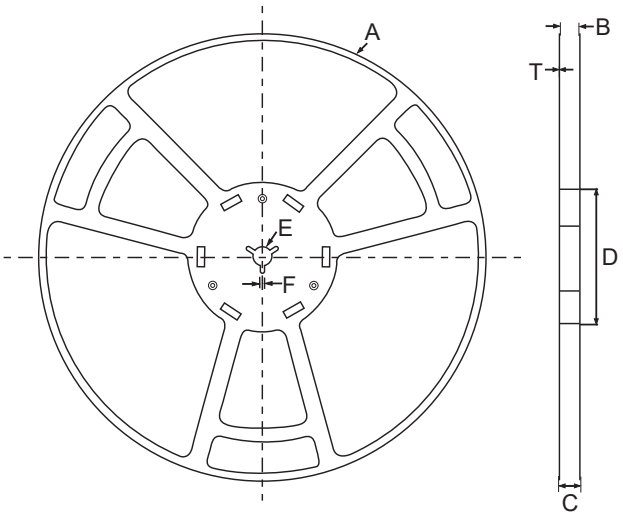
Five year after manufacturing(Depends on storage conditions)

Package Specifications

- The method of packaging



◆ Embossed tape and reel data



Reel (13")

symbol	Value(unit:mm)
A	ϕ330±1
B	12.7±0.5
C	16.5±0.3
D	ϕ99.5±0.5
E	ϕ13.6±0.3
F	2.8±0.3
T	1.9±0.2

◆ **Embossed tape data**