



# SPN4428 N-Channel Enhancement Mode MOSFET

## DESCRIPTION

The SPN4428 is the N-Channel logic enhancement mode power field effect transistors are produced using high cell density , DMOS trench technology.

This high density process is especially tailored to minimize on-state resistance.

These devices are particularly suited for low voltage application , notebook computer power management and other battery powered circuits where high-side switching .

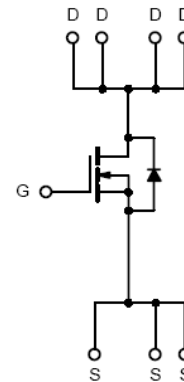
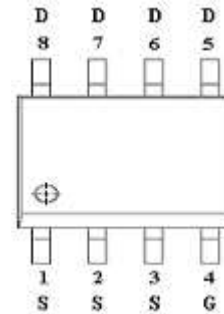
## FEATURES

- ◆ 20V/14A, $R_{DS(ON)}= 20m\Omega@V_{GS}= 4.5V$
- ◆ 20V/7.0A, $R_{DS(ON)}= 28m\Omega@V_{GS}= 2.5V$
- ◆ Super high density cell design for extremely low  $R_{DS(ON)}$
- ◆ Exceptional on-resistance and maximum DC current capability
- ◆ SOP – 8P package design

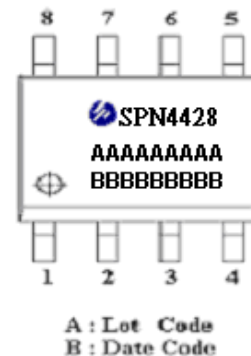
## APPLICATIONS

- Power Management in Note book
- Portable Equipment
- Battery Powered System
- DC/DC Converter
- Load Switch
- DSC
- LCD Display inverter

## PIN CONFIGURATION(SOP – 8P)



## PART MARKING





# SPN4428

## N-Channel Enhancement Mode MOSFET

### PIN DESCRIPTION

Pin	Symbol	Description
1	S	Source
2	S	Source
3	S	Source
4	G	Gate
5	D	Drain
6	D	Drain
7	D	Drain
8	D	Drain

### ORDERING INFORMATION

Part Number	Package	Part Marking
SPN4428S8RGB	SOP- 8P	SPN4428

※ SPN4428S8RGB : 13" Tape Reel ; Pb – Free ; Halogen - Free

### ABSOLUTE MAXIMUM RATINGS

(TA=25°C Unless otherwise noted)

Parameter	Symbol	Typical	Unit
Drain-Source Voltage	V <sub>DSS</sub>	20	V
Gate –Source Voltage	V <sub>GSS</sub>	±20	V
Continuous Drain Current(T <sub>J</sub> =150°C)	I <sub>D</sub>	TA=25°C	9
		TA=70°C	5.6
Pulsed Drain Current	I <sub>DM</sub>	30	A
Continuous Source Current(Diode Conduction)	I <sub>S</sub>	2.3	A
Power Dissipation	P <sub>D</sub>	TA=25°C	2.8
		TA=70°C	1.6
Operating Junction Temperature	T <sub>J</sub>	-55/150	°C
Storage Temperature Range	T <sub>STG</sub>	-55/150	°C
Thermal Resistance-Junction to Ambient	R <sub>θJA</sub>	80	°C/W



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### ELECTRICAL CHARACTERISTICS

(TA=25°C Unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	20			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.5		1.2	
Gate Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 16V$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=16V, V_{GS}=0V$			1	uA
		$V_{DS}=16V, V_{GS}=0V$ $T_J=85^\circ C$			5	
On-State Drain Current	$I_{D(on)}$	$V_{DS}\geq 5V, V_{GS}=10V$	25			A
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=14A$		0.016	0.020	$\Omega$
		$V_{GS}=2.5V, I_D=7.0A$		0.022	0.028	
Forward Transconductance	$g_{fs}$	$V_{DS}=15V, I_D=6.2A$		30		S
Diode Forward Voltage	$V_{SD}$	$I_S=2.3A, V_{GS}=0V$		0.8	1.2	V
<b>Dynamic</b>						
Total Gate Charge	$Q_g$	$V_{DS}=15V, V_{GS}=4.5V$ $I_D=14A$		9.8		nC
Gate-Source Charge	$Q_{gs}$			2.1		
Gate-Drain Charge	$Q_{gd}$			3		
Input Capacitance	$C_{iss}$	$V_{DS}=15, V_{GS}=0V$ $f=1MHz$		772		pF
Output Capacitance	$C_{oss}$			83		
Reverse Transfer Capacitance	$C_{rss}$			79		
Turn-On Time	$t_{d(on)}$	$V_{DD}=10V, I_D=14A,$ $V_{GS}=4.5V, R_G=3.3\Omega$		4		nS
	$t_r$			12.5		
Turn-Off Time	$t_{d(off)}$			20		
	$t_f$			8		



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## TYPICAL CHARACTERISTICS

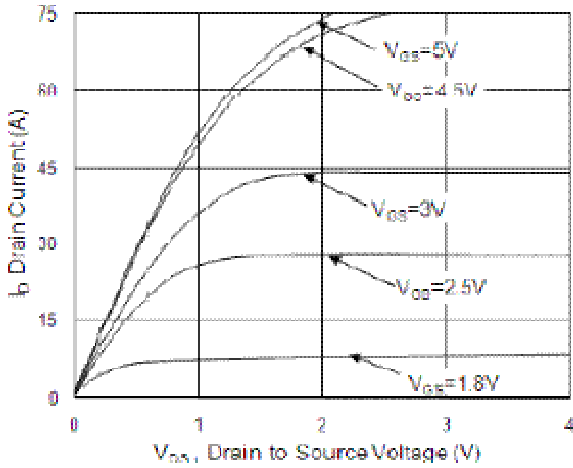


Fig. 1 Typical Output Characteristics

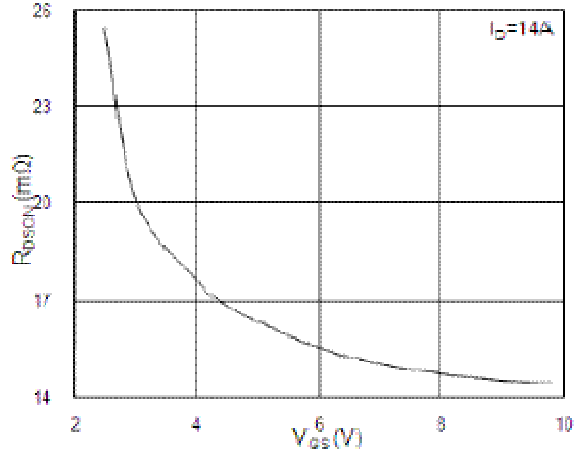


Fig. 2 On-Resistance vs Gate Voltage

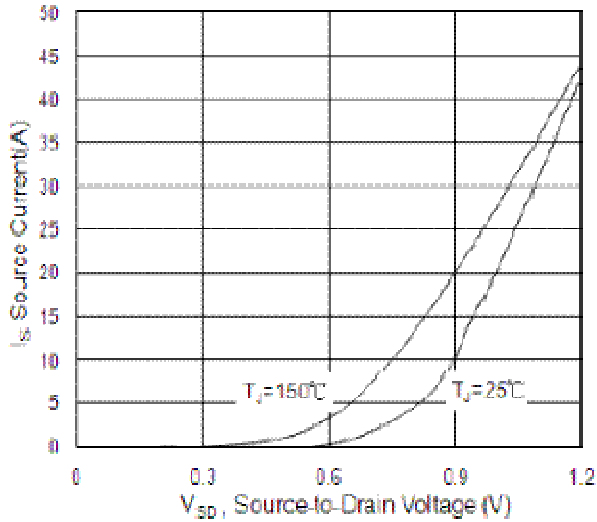


Fig. 3 Forward Characteristics

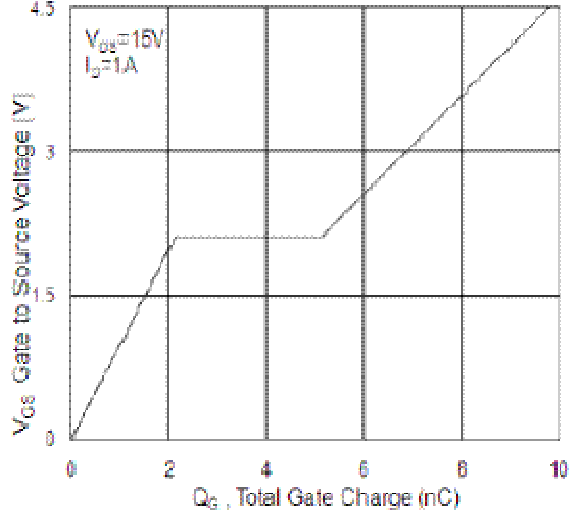


Fig. 4 Total Gate Charge

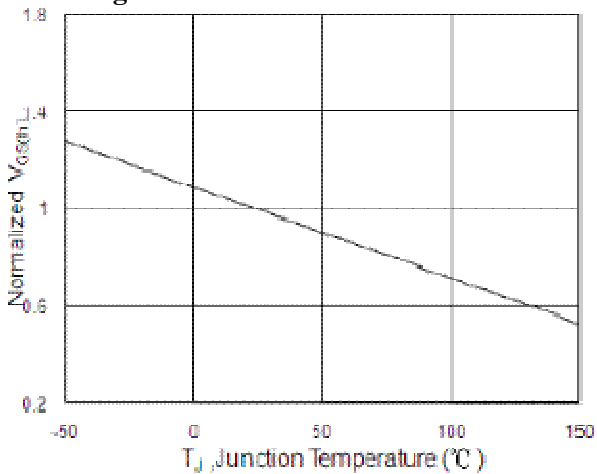


Fig. 5  $V_{GS}$  vs Temperature

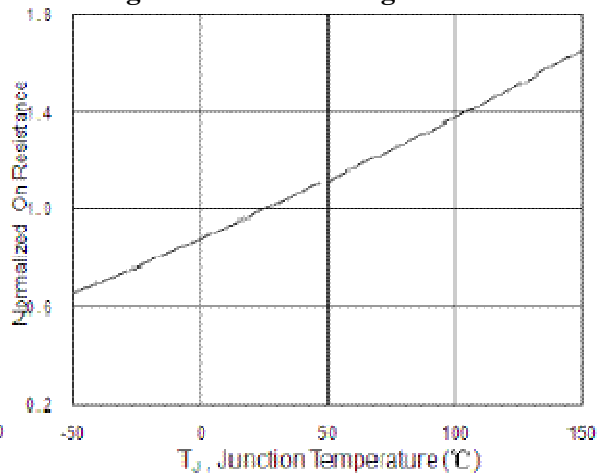


Fig. 6  $R_{DS(on)}$  vs Temperature



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## TYPICAL CHARACTERISTICS

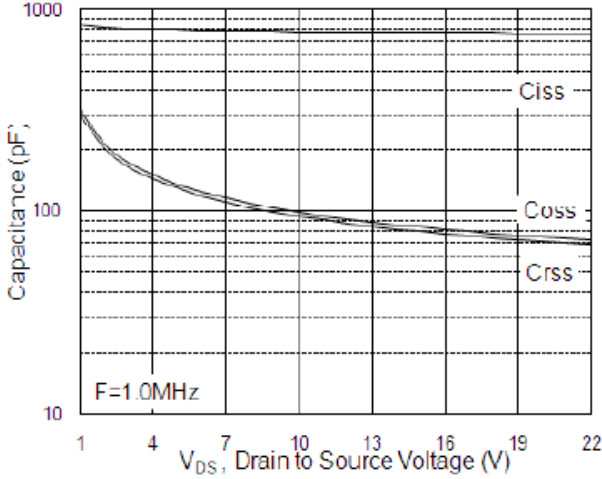


Fig. 7 Capacitance vs Vds

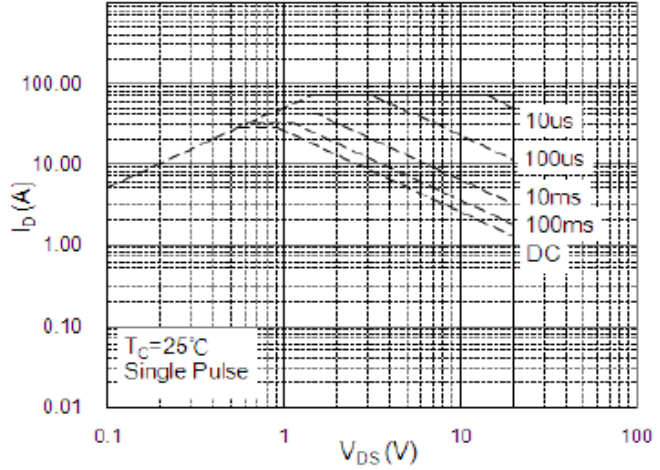


Fig. 8 Safe Operation Region

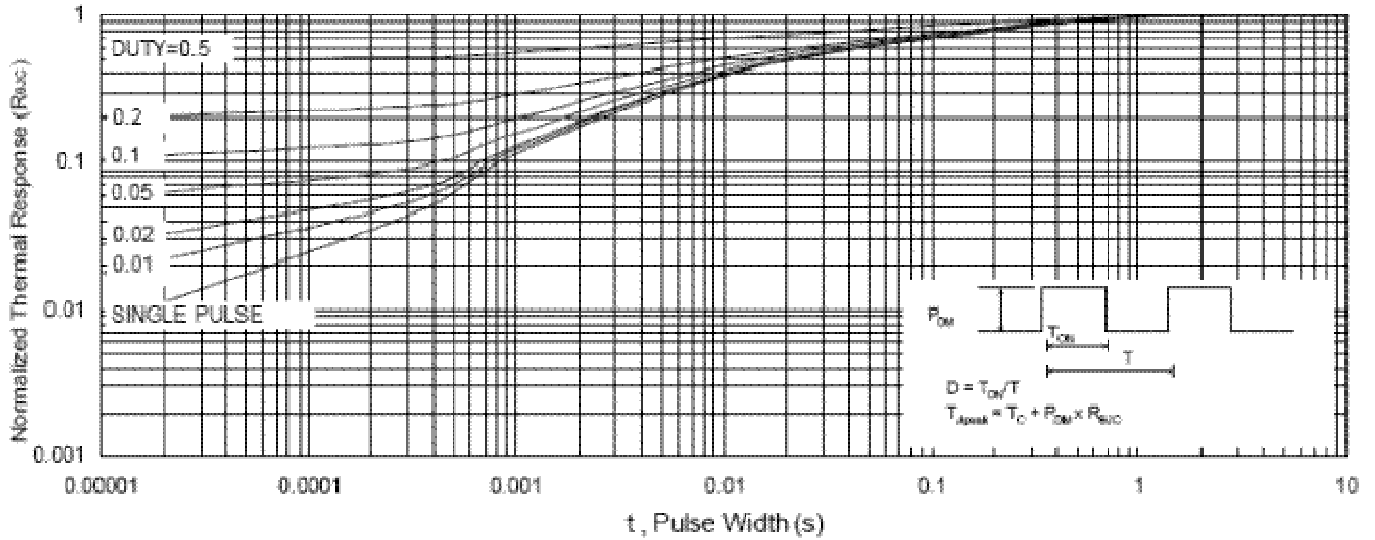


Fig. 9 Maximum Transient Thermal Impedance

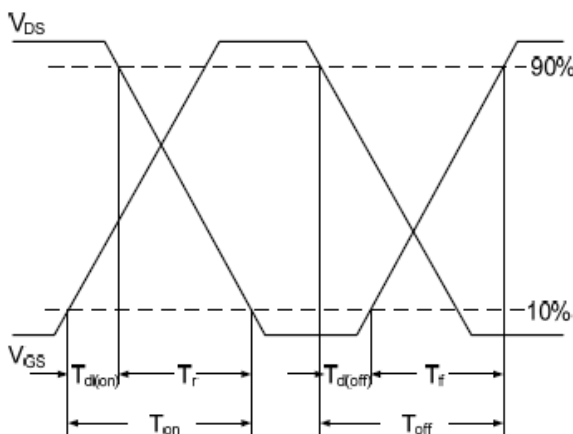


Fig. 10 Switching Time Waveform

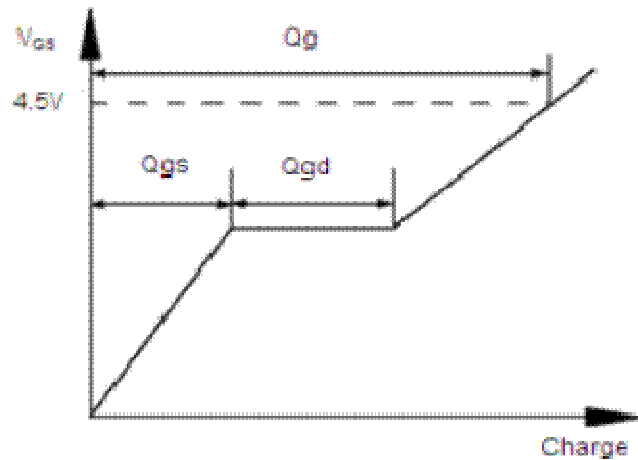
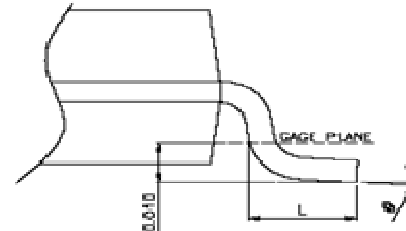
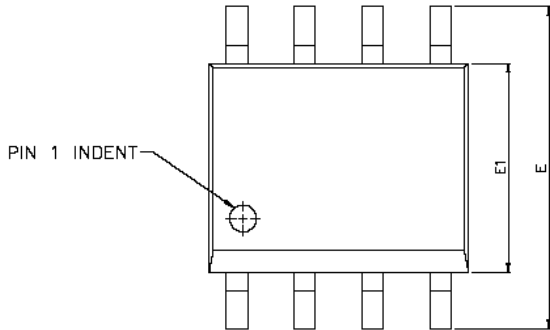


Fig. 11 Gate Charge Waveform

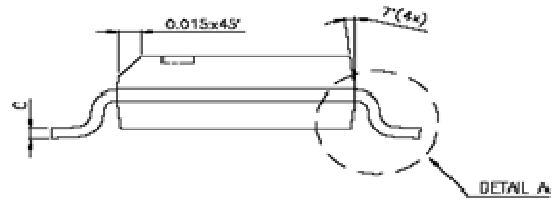
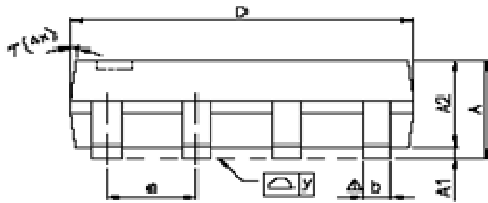


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## SOP- 8 PACKAGE OUTLINE



DETAIL A



SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.47	1.60	1.73	0.058	0.063	0.068
A1	0.10	—	0.25	0.004	—	0.010
A2	—	1.45	—	—	0.057	—
b	0.33	0.41	0.51	0.013	0.016	0.020
C	0.19	0.20	0.25	0.0075	0.008	0.0098
D	4.80	4.85	4.95	0.189	0.191	0.195
E	5.80	6.00	6.20	0.228	0.236	0.244
E1	3.80	3.90	4.00	0.150	0.154	0.157
e	—	1.27	—	—	0.050	—
L	0.38	0.71	1.27	0.015	0.028	0.050
$\Delta$ y	—	—	0.076	—	—	0.003
$\varnothing$	0°	—	8°	0°	—	8°



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SYNC Power Corporation

7F-2, No.3-1, Park Street

NanKang District (NKSP), Taipei, Taiwan 115

Phone: 886-2-2655-8178

Fax: 886-2-2655-8468

©<http://www.syncpower.com>



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