



# SPN4402 N-Channel Enhancement Mode MOSFET

### DESCRIPTION

The SPN4402 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 .

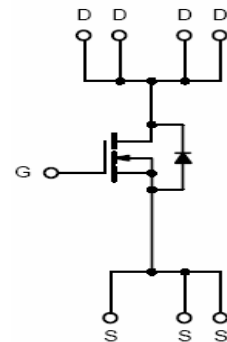
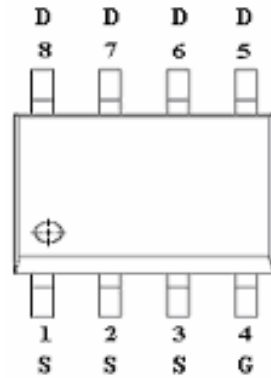
### FEATURES

- ◆ 30V/12A, $R_{DS(ON)}= 13m\Omega@V_{GS}= 10V$
- ◆ 30V/10A, $R_{DS(ON)}= 18m\Omega@V_{GS}= 4.5V$
- ◆ Super high density cell design for extremely low  $R_{DS(ON)}$
- ◆ Exceptional on-resistance and maximum DC current capability
- ◆ SOP – 8P package design

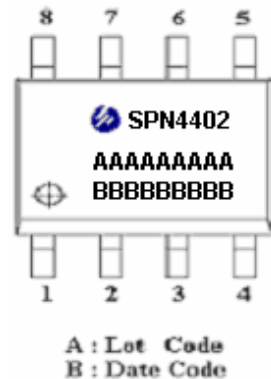
### APPLICATIONS

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

### PIN CONFIGURATION(SOP – 8P)



### PART MARKING





# SPN4402

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### 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
SPN4402S8RG	SOP- 8P	SPN4402
SPN4402S8TG	SOP- 8P	SPN4402

※ SPN4402S8RG : 13" Tape Reel ; Pb – Free

※ SPN4402S8TG : Tube ; Pb – Free

### ABSOLUTE MAXIMUM RATINGS

(TA=25°C Unless otherwise noted)

Parameter	Symbol	Typical	Unit
Drain-Source Voltage	V <sub>DSS</sub>	30	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	12
		TA=70°C	10
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	2.5
		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

( $T_A=25^{\circ}\text{C}$  Unless otherwise noted)

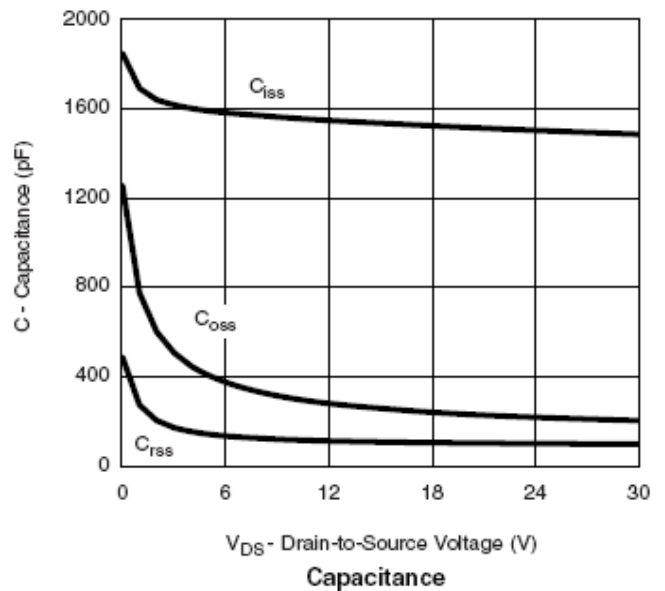
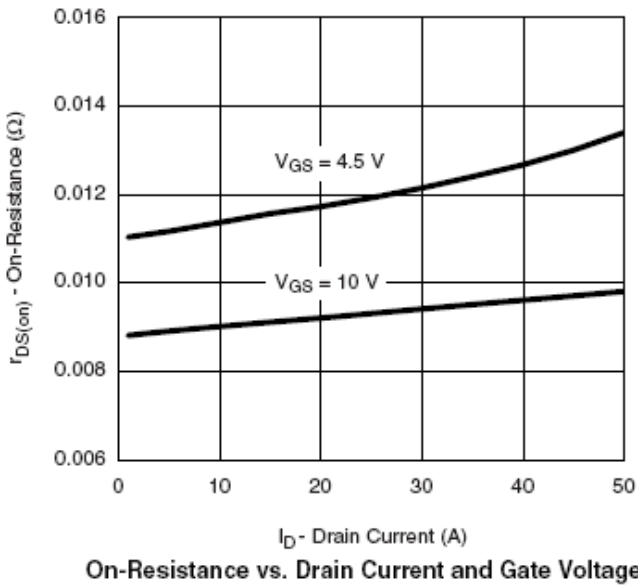
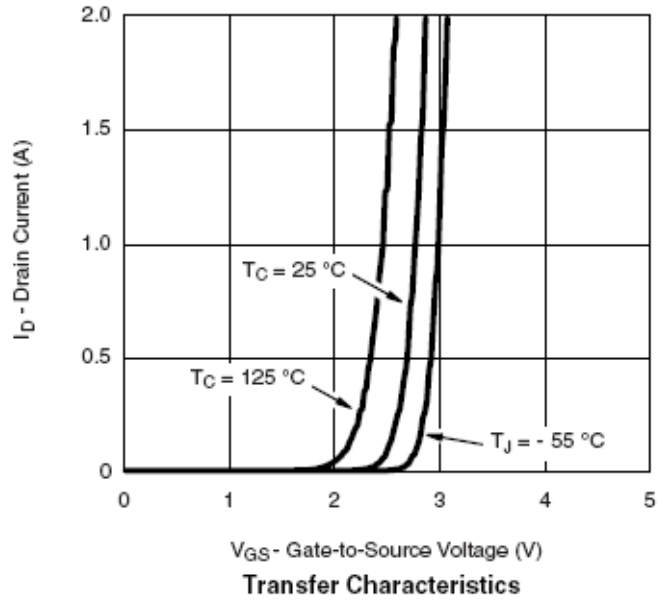
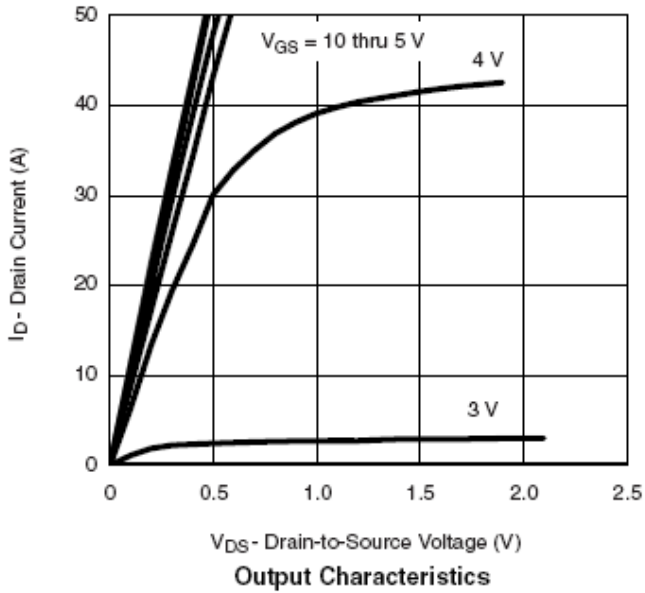
Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	30			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0		3.0	
Gate Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 20V$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=24V, V_{GS}=0V$			1	uA
		$V_{DS}=24V, V_{GS}=0V$ $T_J=85^{\circ}\text{C}$			5	
On-State Drain Current	$I_{D(on)}$	$V_{DS}\geq 5V, V_{GS}=10V$	25			A
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=12A$		0.010	0.013	$\Omega$
		$V_{GS}=4.5V, I_D=10A$		0.013	0.018	
Forward Transconductance	$g_{fs}$	$V_{DS}=15V, I_D=6.2A$		13		S
Diode Forward Voltage	$V_{SD}$	$I_S=2.3A, V_{GS}=0V$		0.8	1.2	V
<b>Dynamic</b>						
Total Gate Charge	$Q_g$	$V_{DS}=15V, V_{GS}=10V$ $I_D=2A$		16	24	nC
Gate-Source Charge	$Q_{gs}$			4.2		
Gate-Drain Charge	$Q_{gd}$			2.5		
Input Capacitance	$C_{iss}$	$V_{DS}=15V, V_{GS}=0V$ $f=1\text{MHz}$		1350		pF
Output Capacitance	$C_{oss}$			258		
Reverse Transfer Capacitance	$C_{rss}$			150		
Turn-On Time	$t_{d(on)}$	$V_{DD}=15V, R_L=15\Omega$ $I_D=5.0A, V_{GEN}=10V$ $R_G=1\Omega$		15	20	nS
	$t_r$			6	16	
Turn-Off Time	$t_{d(off)}$			20	40	
	$t_f$			12	20	



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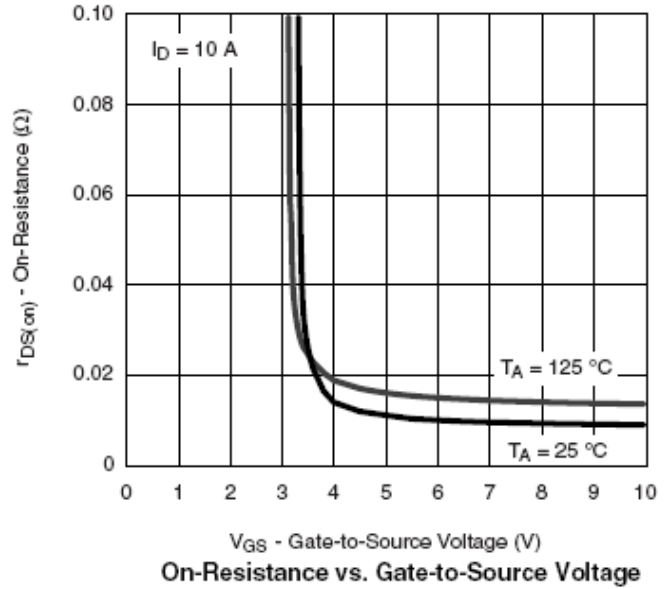
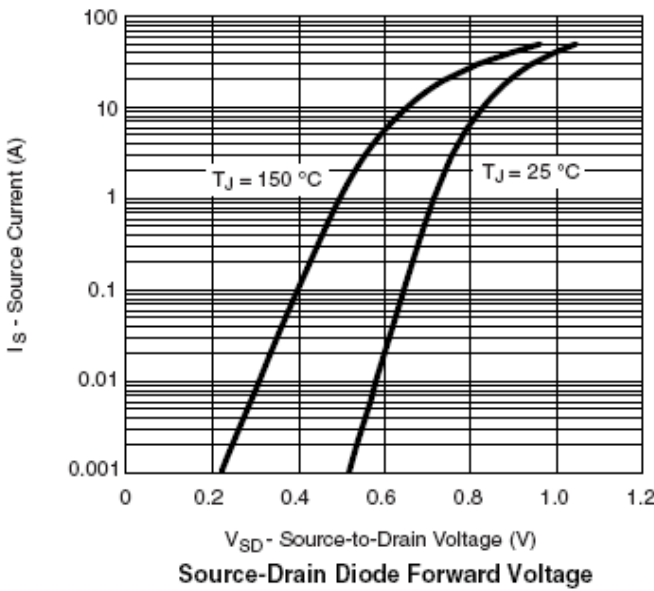
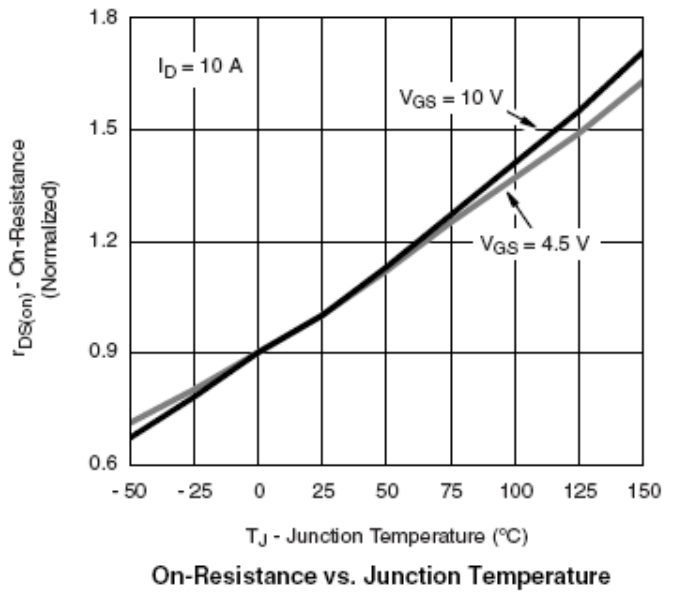
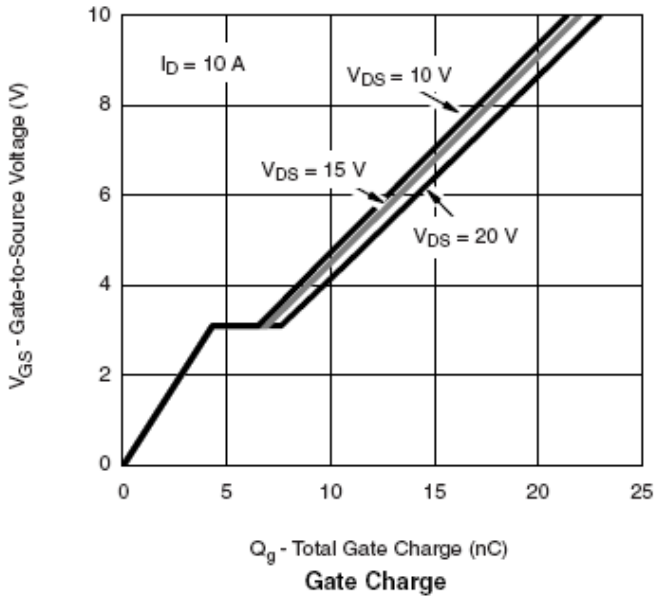
### TYPICAL CHARACTERISTICS





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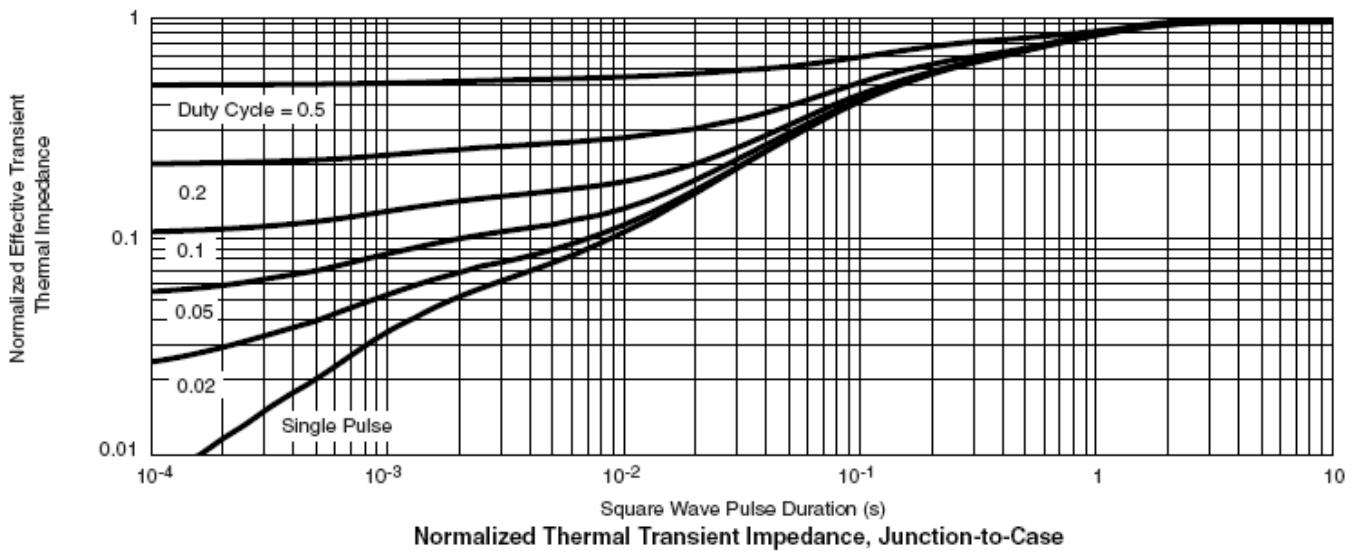
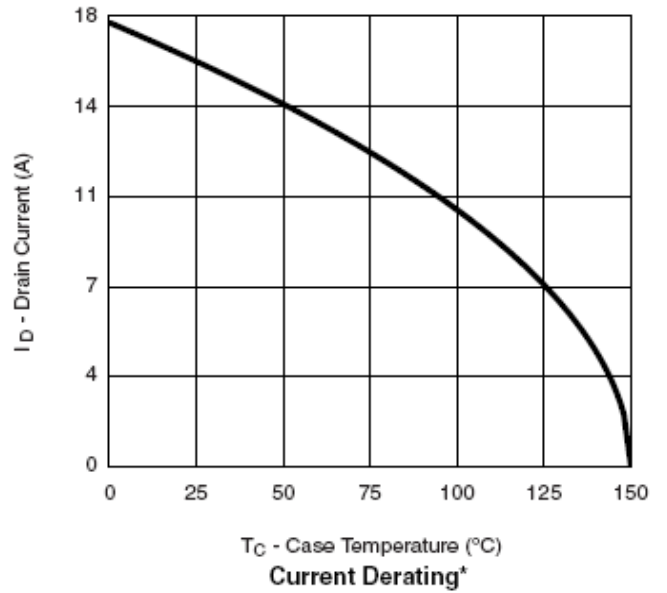
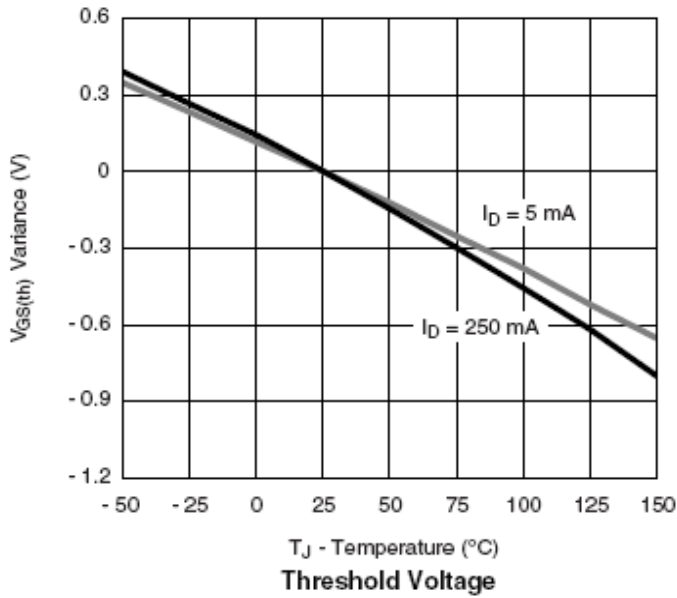




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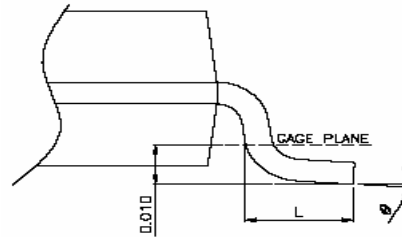
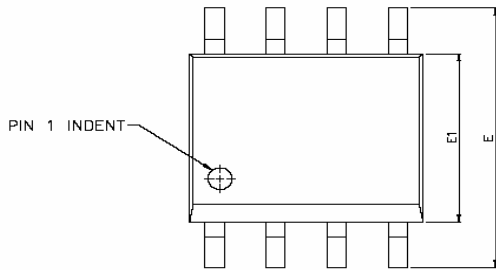
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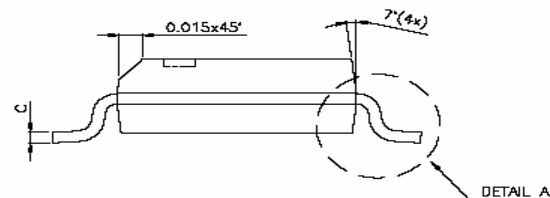
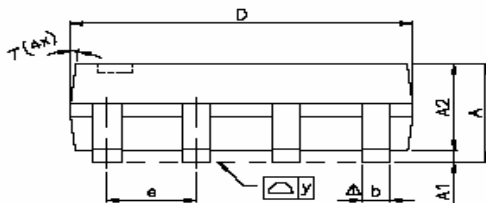


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## SOP- 8 PACKAGE OUTLINE



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
$\theta$	0°	—	8°	0°	—	8°



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