



# SPN4416

## N-Channel Enhancement Mode MOSFET

### DESCRIPTION

The SPN4416 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 .

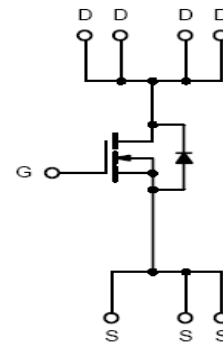
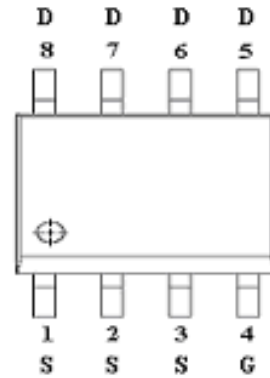
### FEATURES

- ◆ 20V/10.0A, $R_{DS(ON)}=14m\Omega@V_{GS}=4.5V$
- ◆ 20V/ 5.0A, $R_{DS(ON)}=28m\Omega@V_{GS}=2.5V$
- ◆ Super high density cell design for extremely low  $R_{DS(ON)}$
- ◆ Exceptional on-resistance and maximum DC current capability
- ◆ SOP-8 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-8)



### PART MARKING



A : Lot Code  
B : Date Code



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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
SPN4416S8RGB	SOP-8	SPN4416
SPN4416S8TGB	SOP-8	SPN4416

※ SPN4416S8RGB : 13" Tape Reel ; Pb – Free ; Halogen – Free

※ SPN4416S8TGB : Tube ; 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>	±12	V	
Continuous Drain Current(T <sub>J</sub> =150°C)	I <sub>D</sub>	TA=25°C	10.0	A
		TA=70°C	7.6	
Pulsed Drain Current	I <sub>DM</sub>	35	A	
Continuous Source Current(Diode Conduction)	I <sub>S</sub>	2.3	A	
Power Dissipation	P <sub>D</sub>	TA=25°C	2.5	W
		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

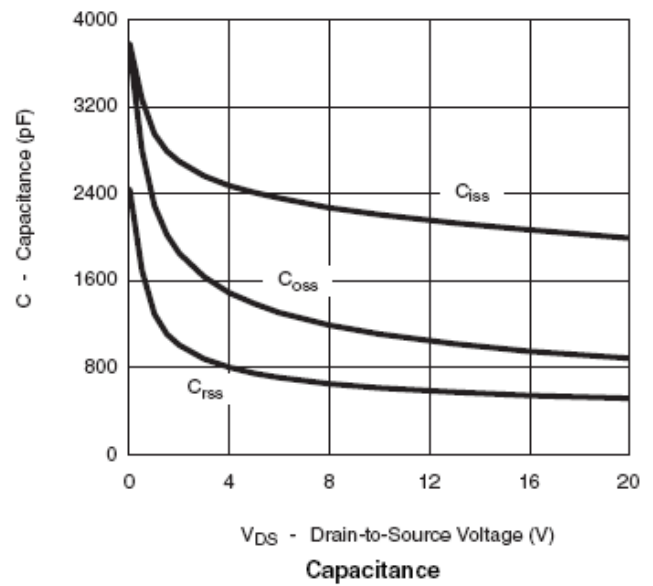
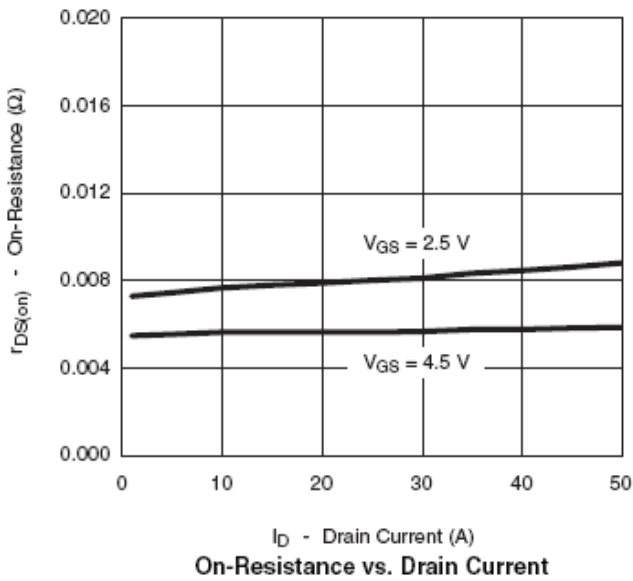
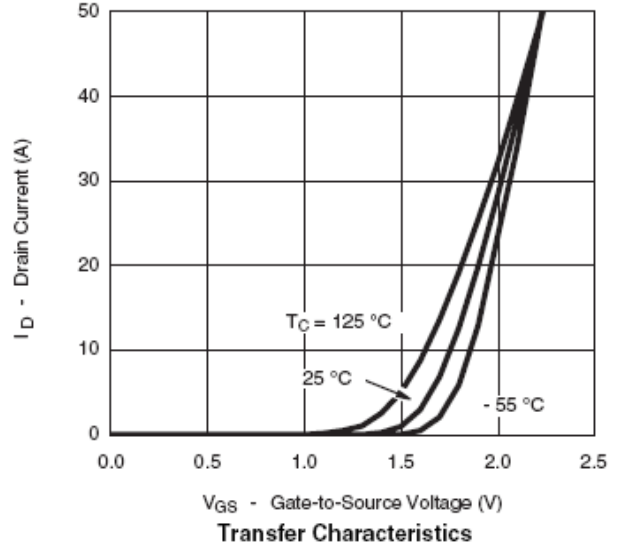
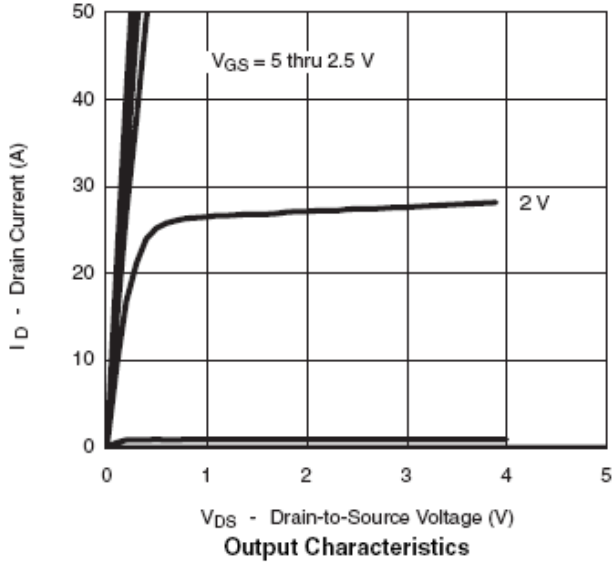
(TA=25°C Unless otherwise noted)

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	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.6		1.4	
Gate Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 12V$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=20V, V_{GS}=0V$			1	uA
		$V_{DS}=20V, V_{GS}=0V$ $T_J=55^\circ C$			10	
On-State Drain Current	$I_{D(on)}$	$V_{DS}\geq 5V, V_{GS}=4.5V$	6			A
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=10.0A$		0.011	0.014	$\Omega$
		$V_{GS}=2.5V, I_D=5.0A$		0.023	0.028	
Forward Transconductance	$g_{fs}$	$V_{DS}=15V, I_D=5.0A$		30		S
Diode Forward Voltage	$V_{SD}$	$I_S=1.0A, V_{GS}=0V$		0.8	1.2	V
<b>Dynamic</b>						
Total Gate Charge	$Q_g$	$V_{DS}=10V, V_{GS}=4.5V$ $I_D=5.0A$		25	35	nC
Gate-Source Charge	$Q_{gs}$			5.6		
Gate-Drain Charge	$Q_{gd}$			9.6		
Input Capacitance	$C_{iss}$	$V_{DS}=10V, V_{GS}=0V$ $f=1MHz$		1250		pF
Output Capacitance	$C_{oss}$			235		
Reverse Transfer Capacitance	$C_{rss}$			195		
Turn-On Time	$t_{d(on)}$	$V_{DD}=10V, R_L=10\Omega$ $I_D=1.0A, V_{GEN}=4.5V$ $R_G=6\Omega$		20	30	nS
	$t_r$			18	28	
Turn-Off Time	$t_{d(off)}$			75	90	
	$t_f$			65	85	



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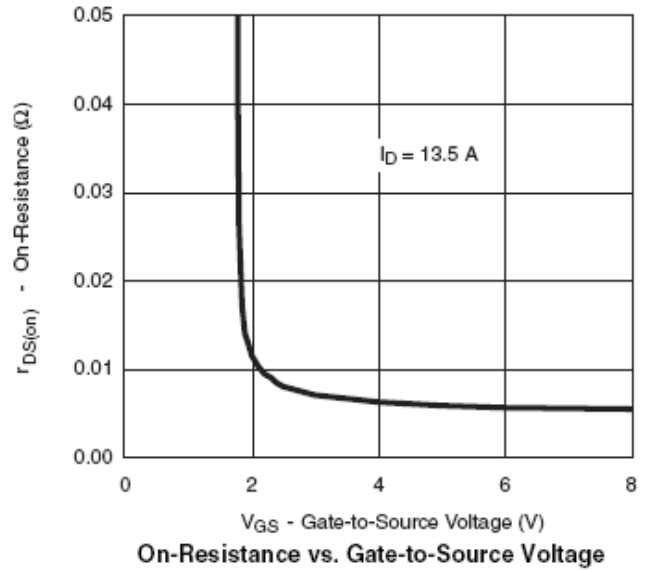
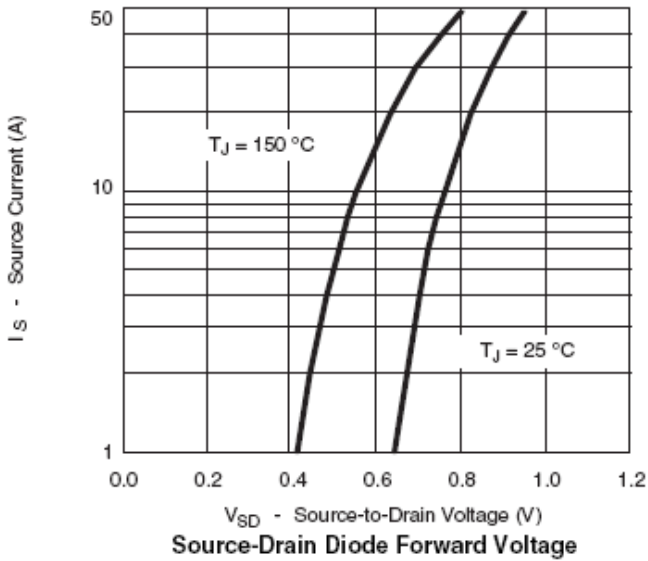
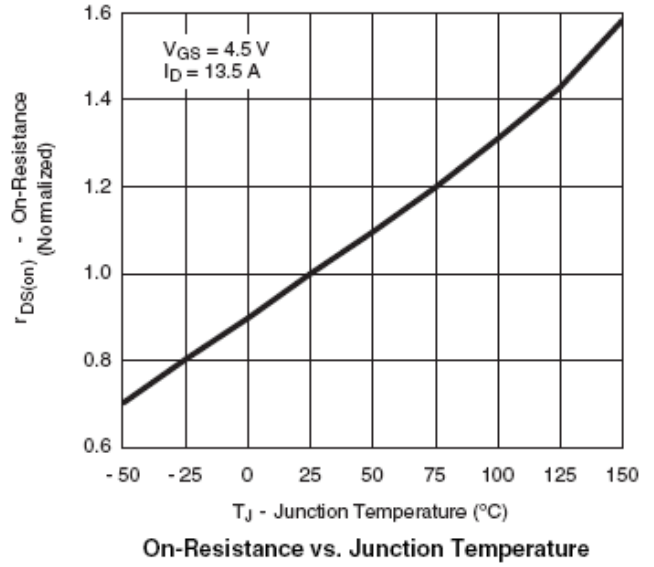
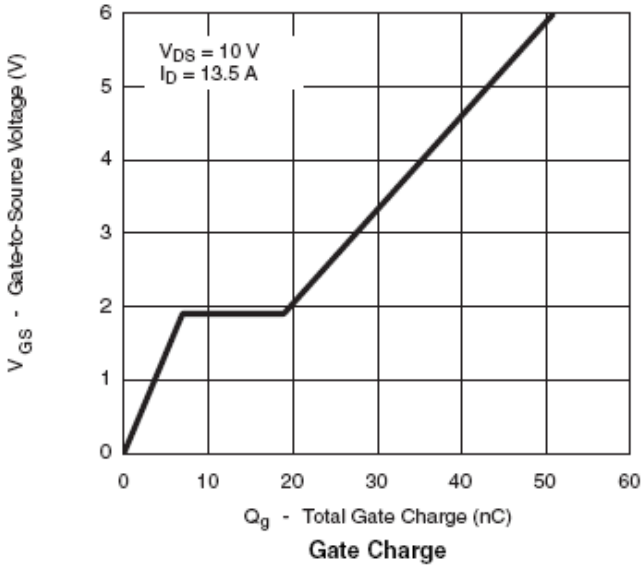
## TYPICAL CHARACTERISTICS





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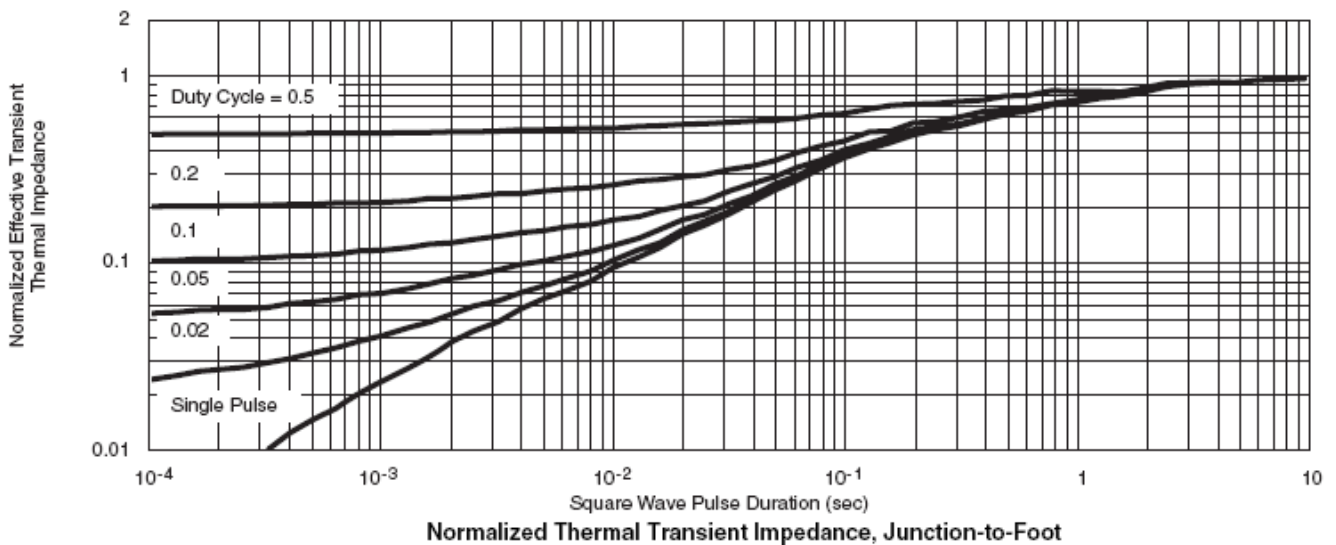
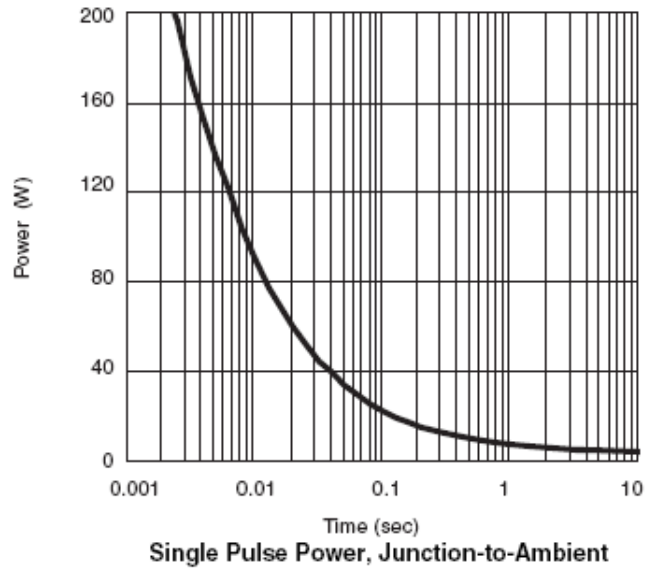
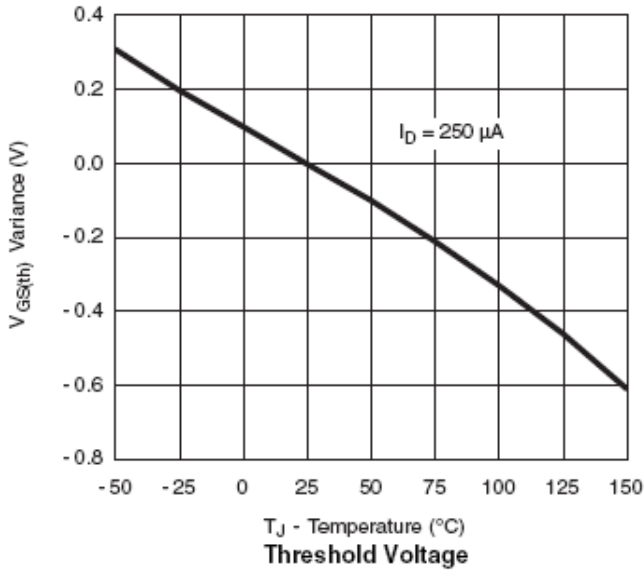




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### TYPICAL CHARACTERISTICS





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