



# SPN7402

## N-Channel Enhancement Mode MOSFET

### DESCRIPTION

The SPN7402 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 such as cellular phone and notebook computer power management and other battery powered circuits where high-side switching , and low in-line power loss are needed in a very small outline surface mount package.

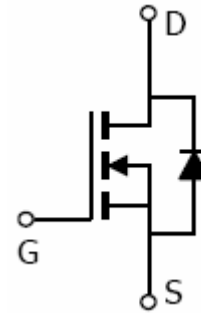
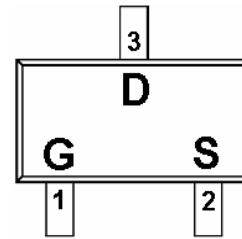
### FEATURES

- ◆ 20V/4.0A, $R_{DS(ON)}=65m\Omega@V_{GS}=4.5V$
- ◆ 20V/3.4A, $R_{DS(ON)}=80m\Omega@V_{GS}=2.5V$
- ◆ 20V/2.8A, $R_{DS(ON)}=95m\Omega@V_{GS}=1.8V$
- ◆ Super high density cell design for extremely low RDS (ON)
- ◆ Exceptional on-resistance and maximum DC current capability
- ◆ SOT-323 ( SC – 70 ) package design

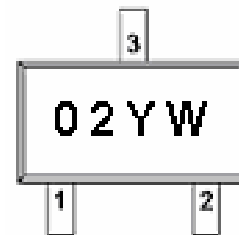
### APPLICATIONS

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

### PIN CONFIGURATION ( SOT-323 ; SC-70 )



### PART MARKING



Y : Year Code  
W : Week Code



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### PIN DESCRIPTION

Pin	Symbol	Description
1	G	Gate
2	S	Source
3	D	Drain

### ORDERING INFORMATION

Part Number	Package	Part Marking
SPN7402S32RG	SOT-323	02YW

Week Code : A ~ Z ( 1 ~ 26 ) ; a ~ z ( 27 ~ 52 )

SPN7402S32RG : Tape Reel ; Pb – Free

### ABSOLUTE MAXIMUM RATINGS

( $T_A=25$  Unless otherwise noted)

Parameter	Symbol	Typical	Unit
Drain-Source Voltage	$V_{DSS}$	20	V
Gate –Source Voltage	$V_{GSS}$	$\pm 12$	V
Continuous Drain Current( $T_J=150$ )	$I_D$	$T_A=25$	2.4
		$T_A=70$	1.7
Pulsed Drain Current	$I_{DM}$	6	A
Continuous Source Current(Diode Conduction)	$I_S$	1.6	A
Power Dissipation	$P_D$	$T_A=25$	0.33
		$T_A=70$	0.21
Operating Junction Temperature	$T_J$	-55/150	
Storage Temperature Range	$T_{STG}$	-55/150	
Thermal Resistance-Junction to Ambient	$R_{\theta JA}$	105	/W



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### ELECTRICAL CHARACTERISTICS

( $T_A=25$  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	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.4		1.0	
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
		$V_{DS}=20V, V_{GS}=0V$ $T_J=55$			5	
On-State Drain Current	$I_{D(on)}$	$V_{DS}=5V, V_{GS}=4.5V$	6			A
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=4.0A$		0.050	0.065	$\Omega$
		$V_{GS}=2.5V, I_D=3.4A$		0.065	0.080	
		$V_{GS}=1.8V, I_D=2.8A$		0.080	0.095	
Forward Transconductance	$g_{fs}$	$V_{DS}=5V, I_D=-3.6A$		10		S
Diode Forward Voltage	$V_{SD}$	$I_S=1.6A, V_{GS}=0V$		0.8	1.2	V
<b>Dynamic</b>						
Total Gate Charge	$Q_g$	$V_{DS}=6V, V_{GS}=4.5V$ $I_D=2.8A$		4.8	8	nC
Gate-Source Charge	$Q_{gs}$			1.0		
Gate-Drain Charge	$Q_{gd}$			1.0		
Input Capacitance	$C_{iss}$	$V_{DS}=6V, V_{GS}=0V$ $f=1MHz$		485		pF
Output Capacitance	$C_{oss}$			85		
Reverse Transfer Capacitance	$C_{rss}$			40		
Turn-On Time	$t_{d(on)}$	$V_{DD}=6V, R_L=6\Omega$ $I_D=1.0A, V_{GEN}=4.5V$ $R_G=6\Omega$		8	14	ns
	$t_r$			12	18	
Turn-Off Time	$t_{d(off)}$			30	35	
	$t_f$			12	16	



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## TYPICAL CHARACTERISTICS

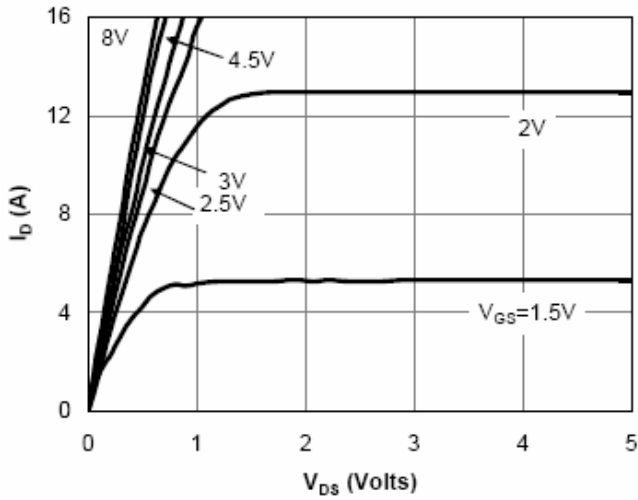


Fig 1: On-Region Characteristics

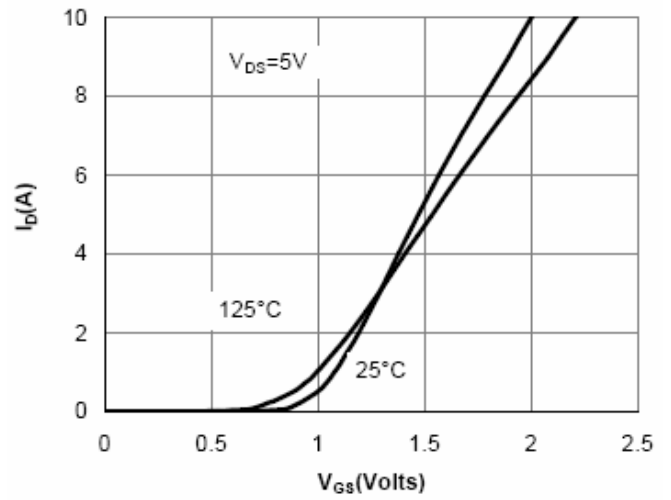


Figure 2: Transfer Characteristics

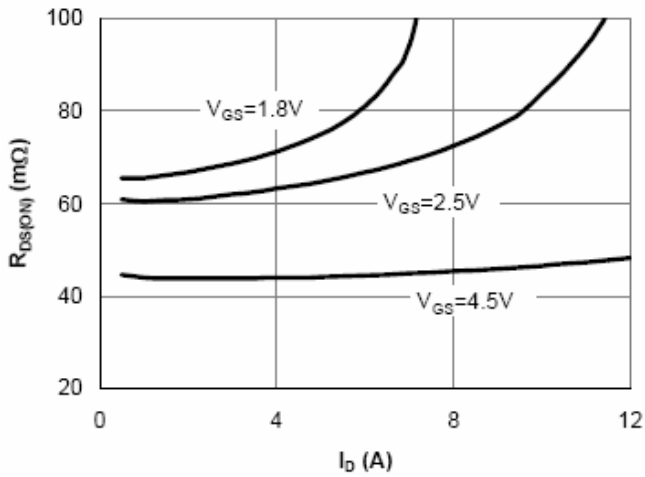


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

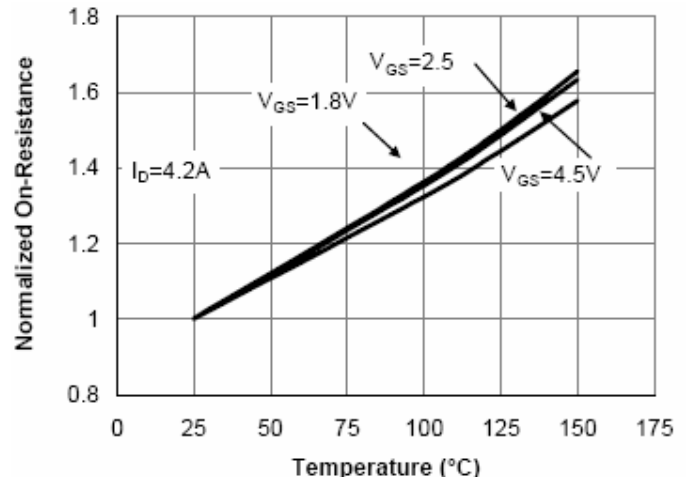


Figure 4: On-Resistance vs. Junction Temperature



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### TYPICAL CHARACTERISTICS

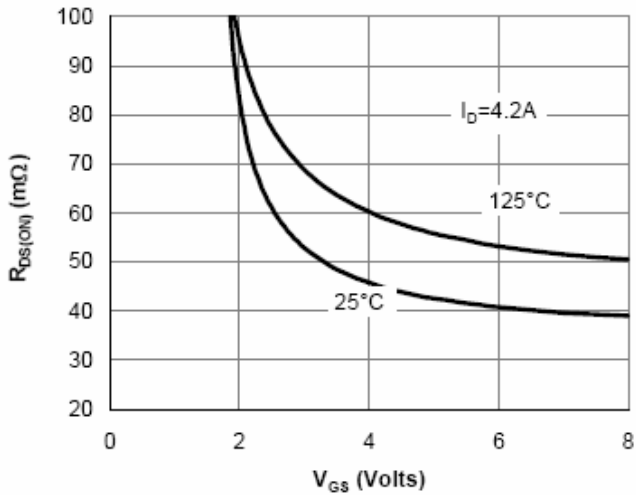


Figure 5: On-Resistance vs. Gate-Source Voltage

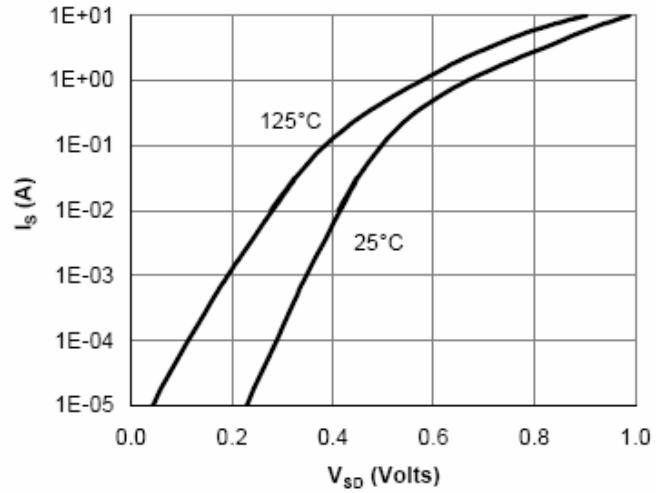


Figure 6: Body-Diode Characteristics

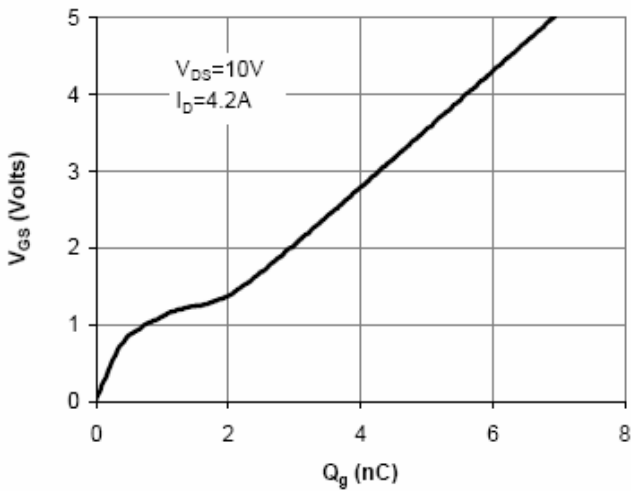


Figure 7: Gate-Charge Characteristics

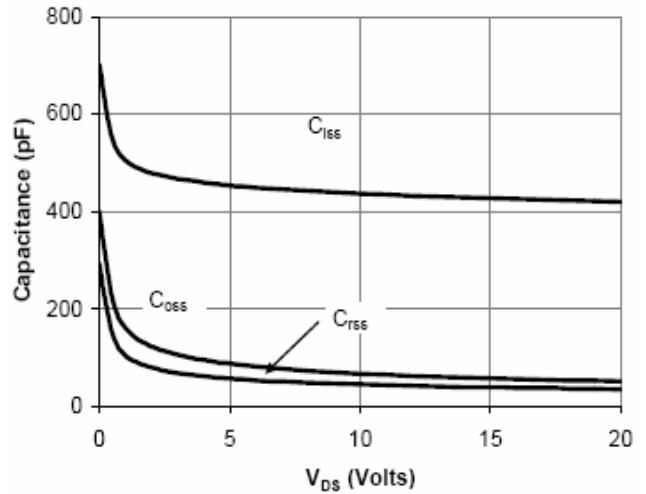


Figure 8: Capacitance Characteristics



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## TYPICAL CHARACTERISTICS

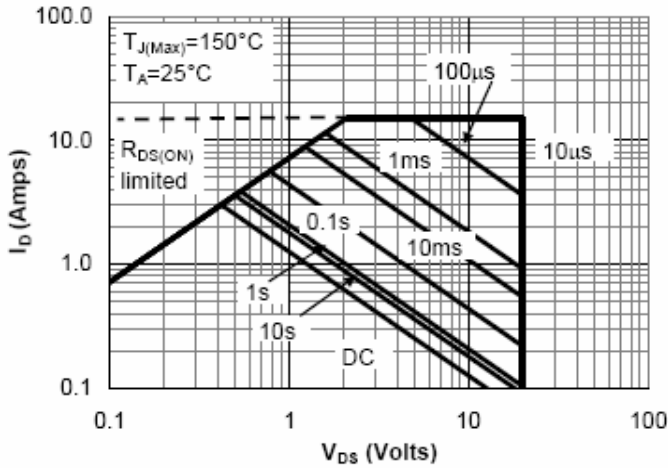


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

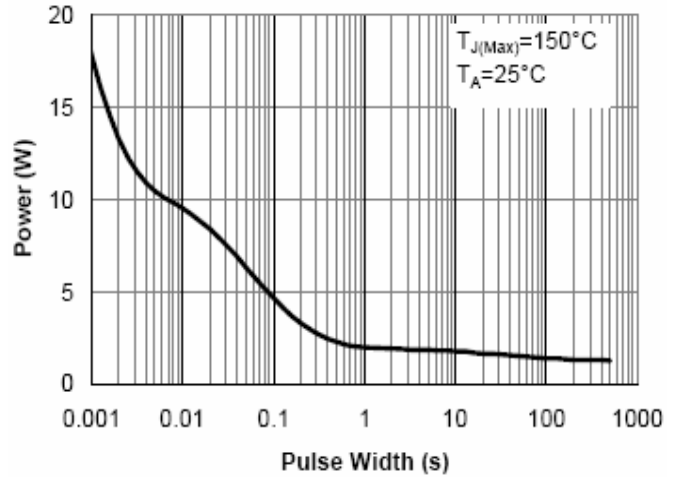


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

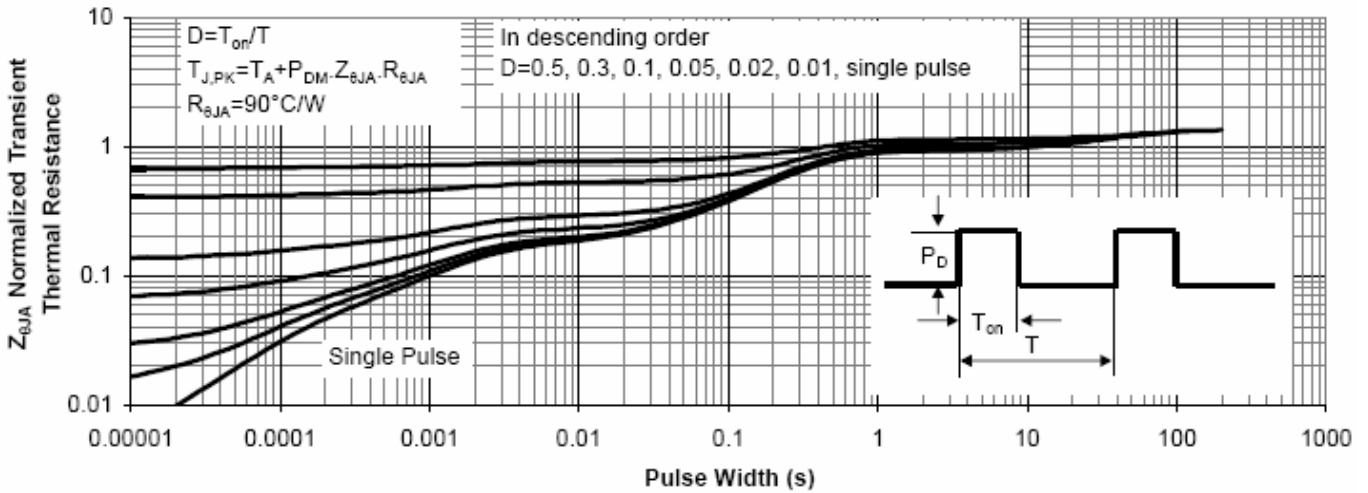


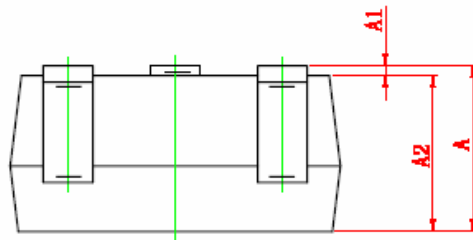
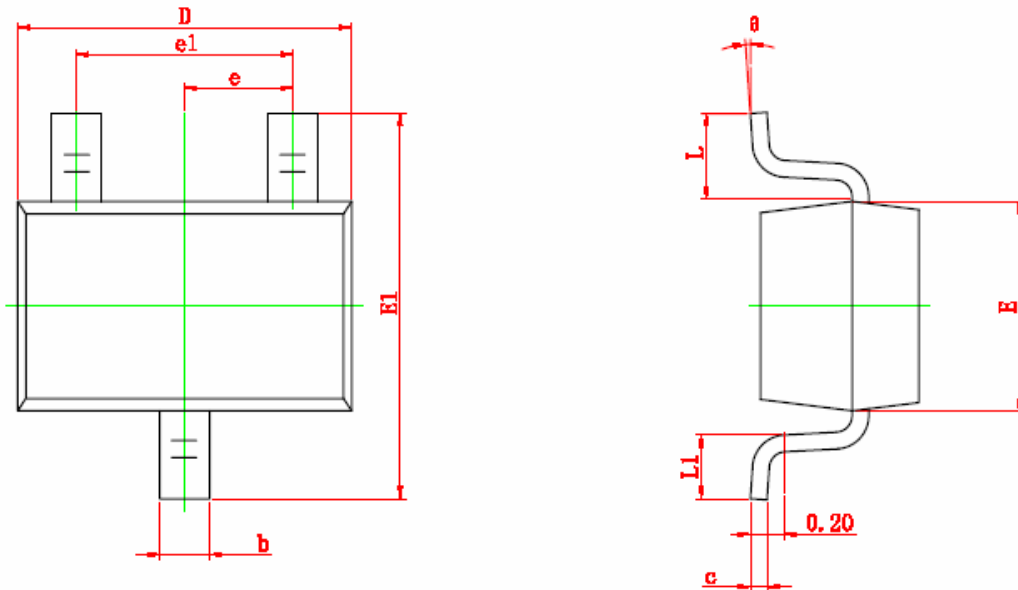
Figure 11: Normalized Maximum Transient Thermal Impedance



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### SOT-323 PACKAGE OUTLINE



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.200	0.400	0.008	0.016
c	0.080	0.150	0.003	0.006
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.650 TYP		0.026 TYP	
e1	1.200	1.400	0.047	0.055
L	0.525 REF		0.021 REF	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°



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