



# SPN2302D

## N-Channel Enhancement Mode MOSFET

### DESCRIPTION

The SPN2302D 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, and low in-line power loss are needed in a very small outline surface mount package.

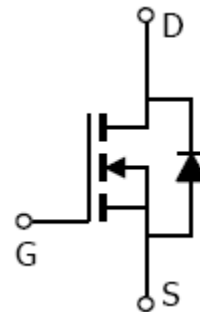
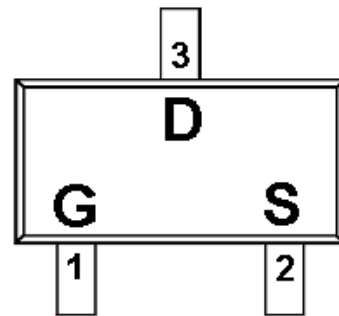
### FEATURES

- ◆ 20V/3.6A,  $R_{DS(ON)} = 97m\Omega @ V_{GS} = 4.5V$
- ◆ 20V/3.1A,  $R_{DS(ON)} = 113m\Omega @ V_{GS} = 2.5V$
- ◆ Super high density cell design for extremely low  $R_{DS(ON)}$
- ◆ Exceptional on-resistance and maximum DC current capability
- ◆ SOT-23 package design

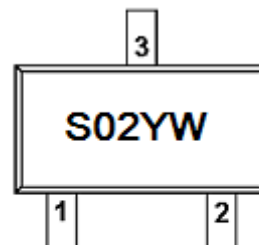
### APPLICATIONS

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

### PIN CONFIGURATION(SOT-23)



### PART MARKING



Y : Year Code  
W : Week Code

### PIN DESCRIPTION



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

### ORDERING INFORMATION

Part Number	Package	Part Marking
SPN2302DS23RG	SOT-23	S02YW
SPN2302DS23RGB	SOT-23	S02YW

- ※ Week Code : A ~ Z( 1 ~ 26 ) ; a ~ z( 27 ~ 52 )
- ※ SPN2302DS23RG : Tape Reel ; Pb – Free
- ※ SPN2302DS23RGB : 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>	±12	V	
Continuous Drain Current(T <sub>J</sub> =150°C)	I <sub>D</sub>	T <sub>A</sub> =25°C	3.2	A
		T <sub>A</sub> =70°C	2.6	
Pulsed Drain Current	I <sub>DM</sub>	10	A	
Continuous Source Current(Diode Conduction)	I <sub>S</sub>	1.6	A	
Power Dissipation	P <sub>D</sub>	T <sub>A</sub> =25°C	1.25	W
		T <sub>A</sub> =70°C	0.8	
Operating Junction Temperature	T <sub>J</sub>	150	°C	
Storage Temperature Range	T <sub>STG</sub>	-55/150	°C	
Thermal Resistance-Junction to Ambient	R <sub>θJA</sub>	100	°C/W	



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### ELECTRICAL CHARACTERISTICS

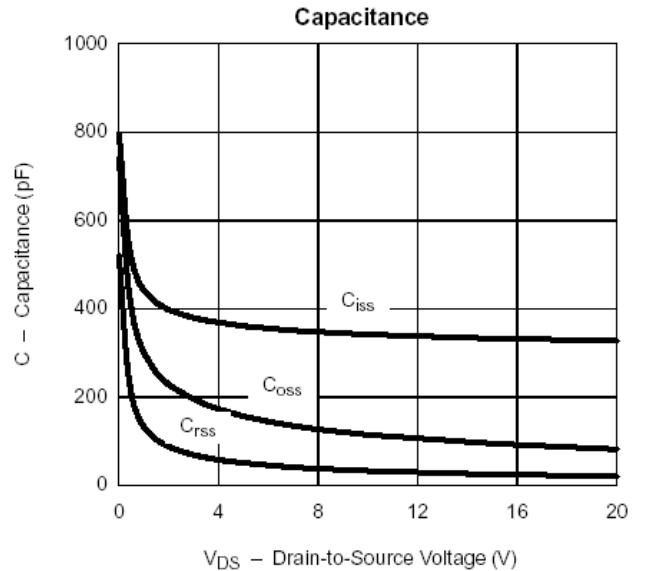
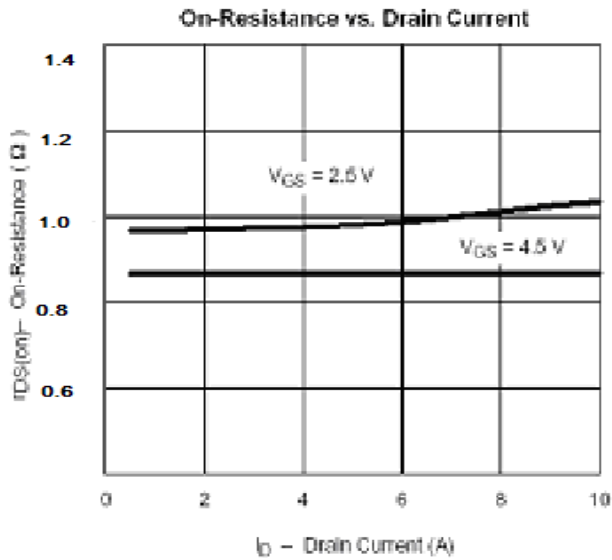
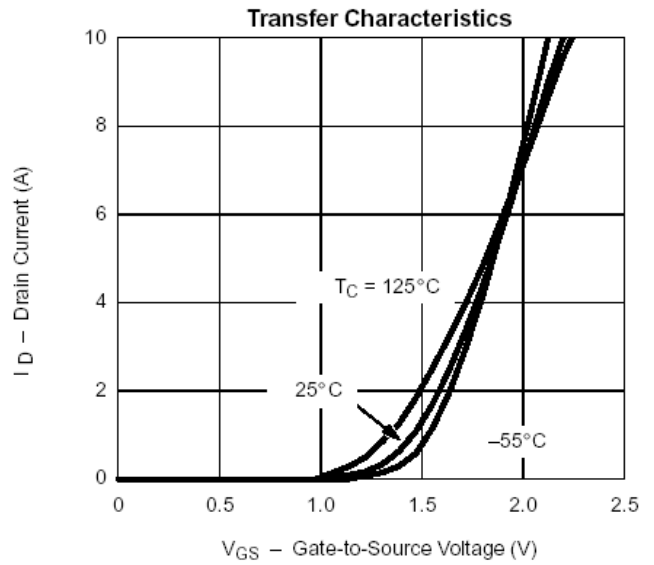
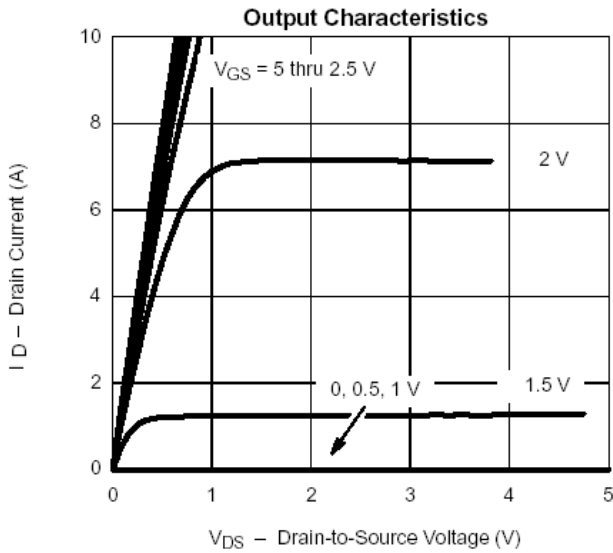
( $T_A=25^\circ\text{C}$  Unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	20			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.45		1.2	
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
		$V_{DS}=20V, V_{GS}=0V$ $T_J=55^\circ\text{C}$			10	
On-State Drain Current	$I_{D(on)}$	$V_{DS} \geq 5V, V_{GS}=4.5V$	6			A
		$V_{DS} \geq 5V, V_{GS}=2.5V$	4			
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=3.6A$		0.085	0.097	$\Omega$
		$V_{GS}=2.5V, I_D=3.1A$		0.100	0.113	
Forward Transconductance	$g_{fs}$	$V_{DS}=5V, I_D=3.6A$		10		S
Diode Forward Voltage	$V_{SD}$	$I_S=1.6A, V_{GS}=0V$		0.85	1.2	V
<b>Dynamic</b>						
Total Gate Charge	$Q_g$	$V_{DS}=10V, V_{GS}=4.5V$ $I_D=3.6A$		5.4	10	nC
Gate-Source Charge	$Q_{gs}$			0.65		
Gate-Drain Charge	$Q_{gd}$			1.4		
Input Capacitance	$C_{iss}$	$V_{DS}=10V, V_{GS}=0V$ $f=1\text{MHz}$		340		pF
Output Capacitance	$C_{oss}$			115		
Reverse Transfer Capacitance	$C_{rss}$			33		
Turn-On Time	$t_{d(on)}$	$V_{DD}=10V, R_L=5.5\Omega$ $I_D=3.6A, V_{GEN}=4.5V$ $R_G=6\Omega$		12	25	ns
	$t_r$			36	60	
Turn-Off Time	$t_{d(off)}$			34	60	
	$t_f$			10	25	



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## TYPICAL CHARACTERISTICS

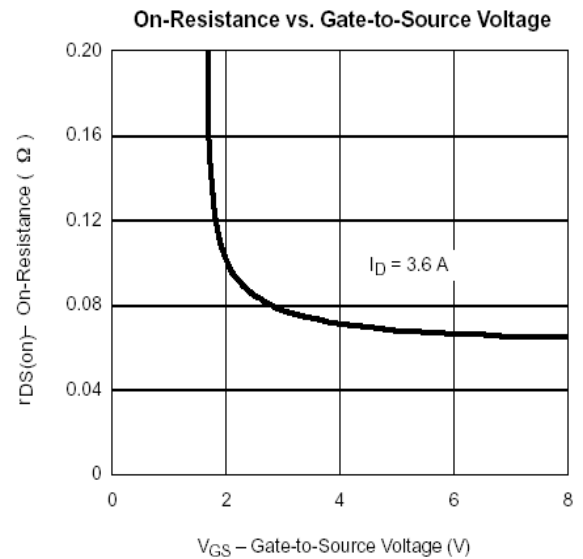
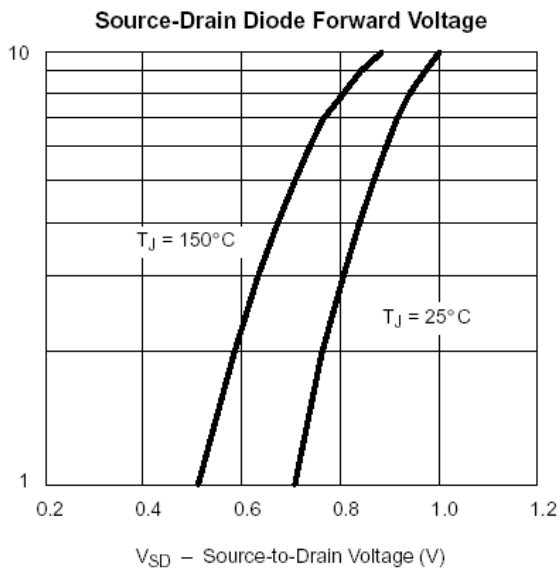
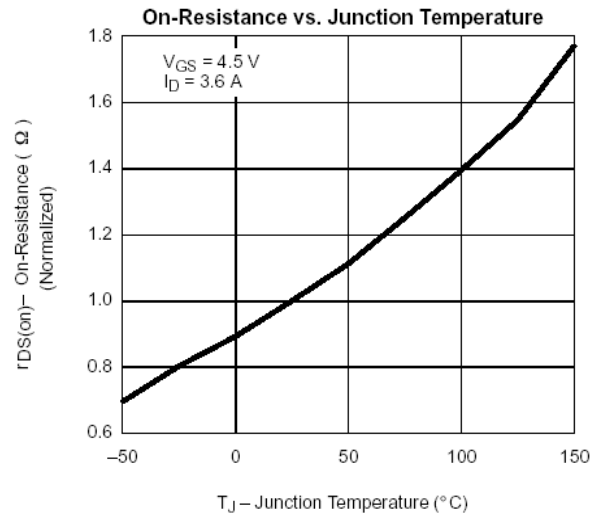
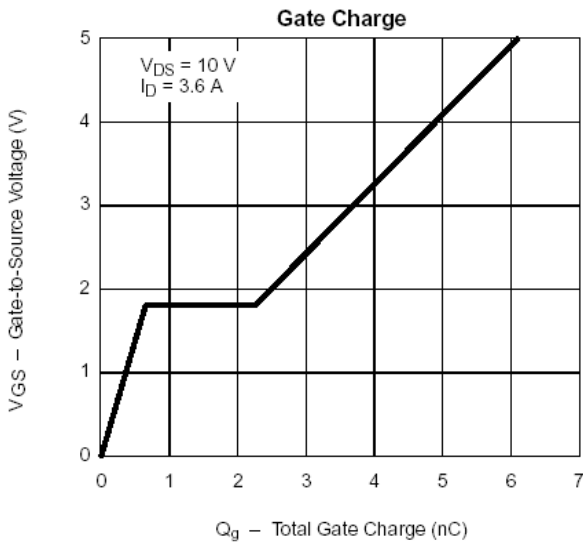




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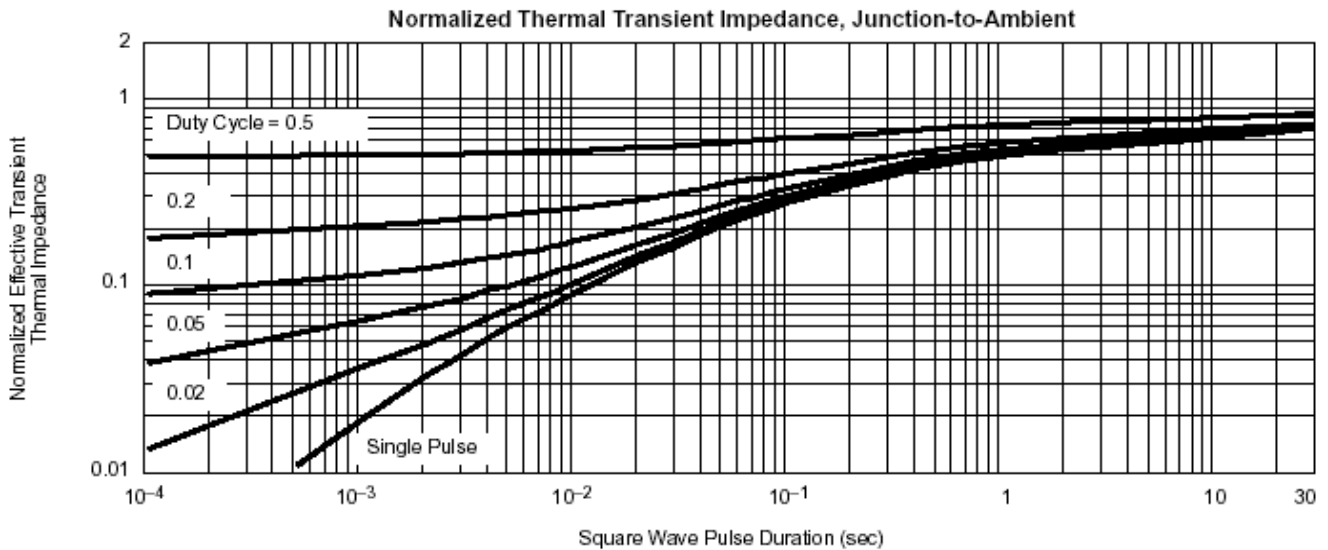
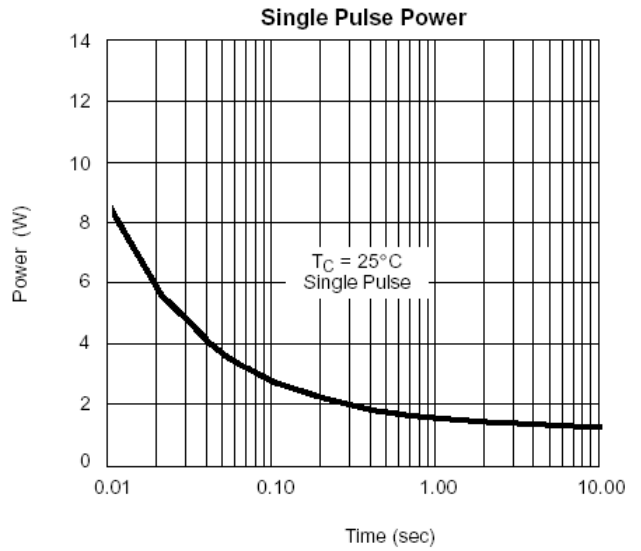
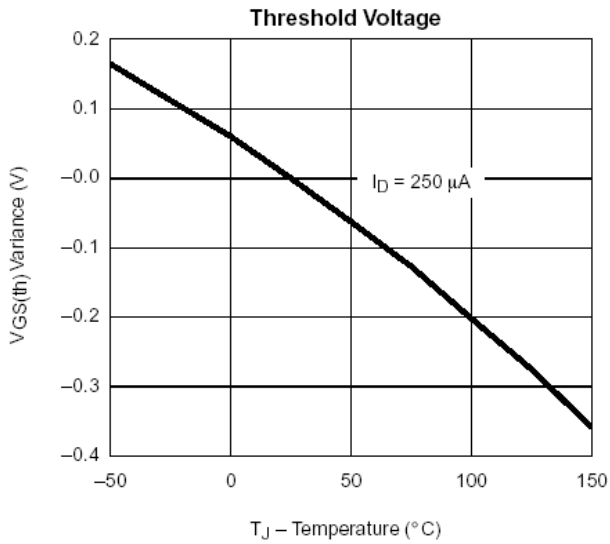




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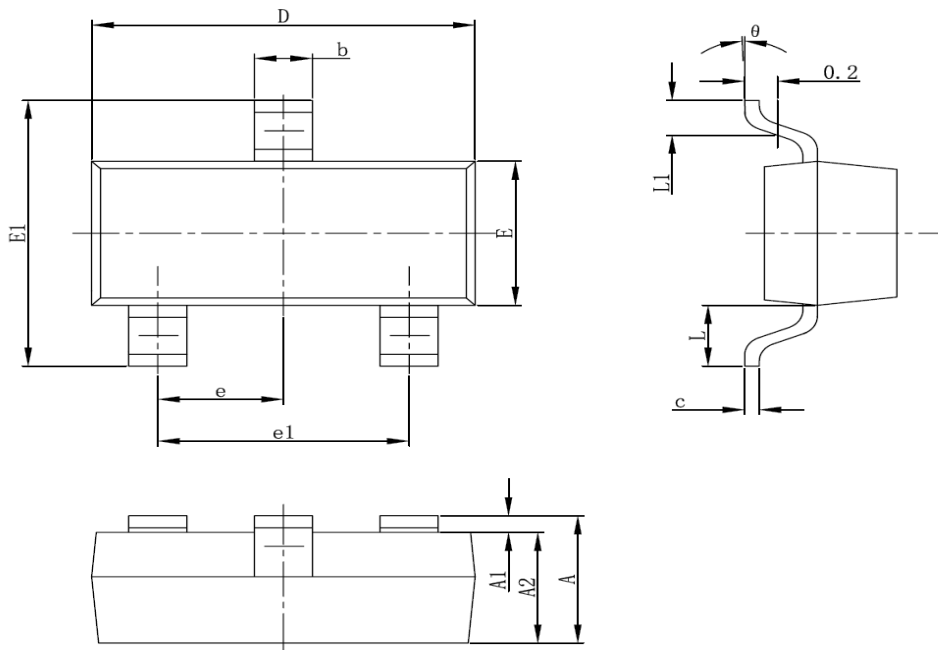




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### SOT-23 PACKAGE OUTLINE



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	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950TYP		0.037TYP	
e1	1.800	2.000	0.071	0.079
L	0.550REF		0.022REF	
L1	0.300	0.500	0.012	0.020
theta	0°	8°	0°	8°



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