



# SPN1012

## N-Channel Enhancement Mode MOSFET

### DESCRIPTION

The SPN1012 is the N-Channel 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 and provide superior switching performance. These devices are particularly suited for low voltage applications such as notebook computer power management and other battery powered circuits where high-side switching , low in-line power loss, and resistance to transients are needed.

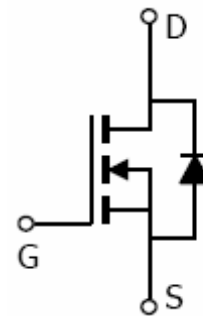
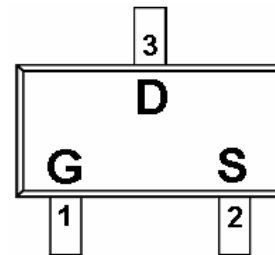
### FEATURES

- ◆ N-Channel  
20V/0.65A,  $R_{DS(ON)}=380m\Omega@V_{GS}=4.5V$   
20V/0.55A,  $R_{DS(ON)}=450m\Omega@V_{GS}=2.5V$   
20V/0.45A,  $R_{DS(ON)}=800m\Omega@V_{GS}=1.8V$
- ◆ Super high density cell design for extremely low  $R_{DS(ON)}$
- ◆ Exceptional on-resistance and maximum DC current capability
- ◆ SOT-523 (SC-89) package design

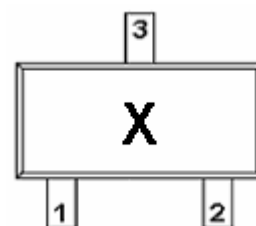
### APPLICATIONS

- Drivers : Relays/Solenoids/Lamps/Hammers
- Power Supply Converter Circuits
- Load/Power Switching Cell Phones, Pagers

### PIN CONFIGURATION( SOT-523 / SC-89 )



### PART MARKING





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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
SPN1012S52RG	SOT-523	X
SPN1012S52RGB	SOT-523	X

※ SPN1012S52RG : Tape Reel ; Pb – Free  
SPN1012S52RGB: 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>	TA=25°C	0.65	A
		TA=80°C	0.45	
Pulsed Drain Current	I <sub>DM</sub>	1.0	A	
Continuous Source Current(Diode Conduction)	I <sub>S</sub>	0.3	A	
Power Dissipation	P <sub>D</sub>	TA=25°C	0.27	W
		TA=70°C	0.16	
Operating Junction Temperature	T <sub>J</sub>	-55/150	°C	
Storage Temperature Range	T <sub>STG</sub>	-55/150	°C	



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### ELECTRICAL CHARACTERISTICS

(TA=25°C Unless otherwise noted)

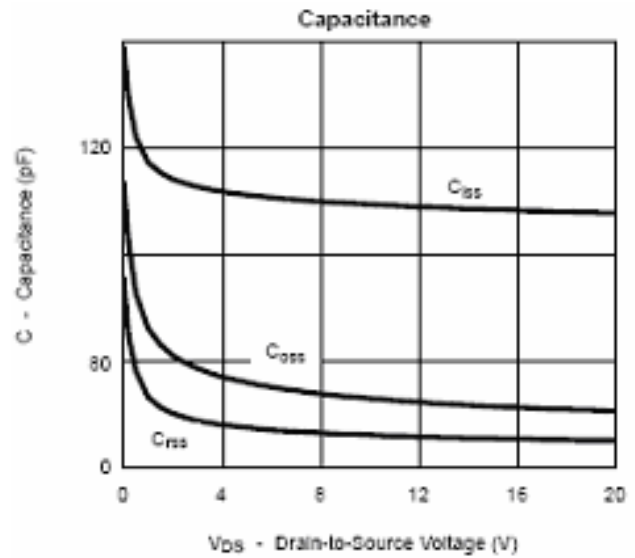
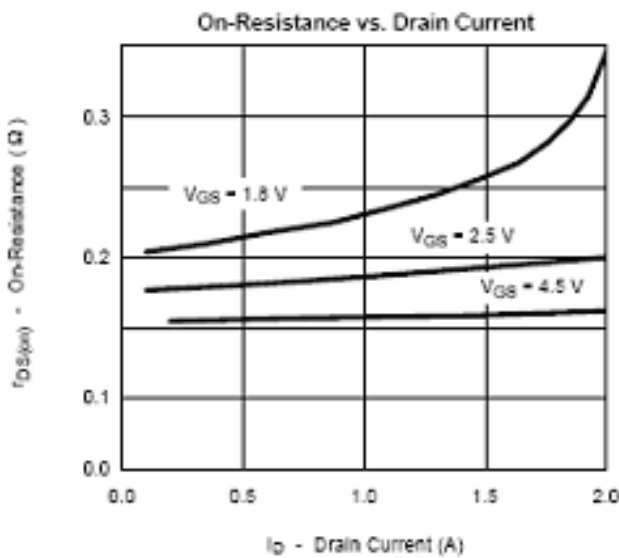
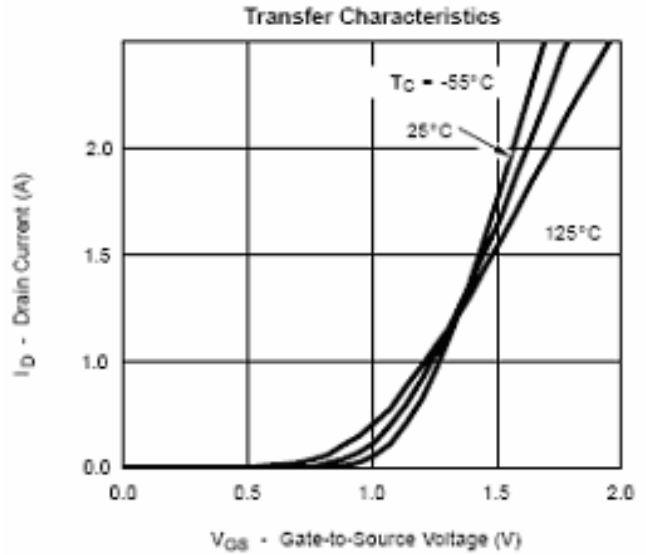
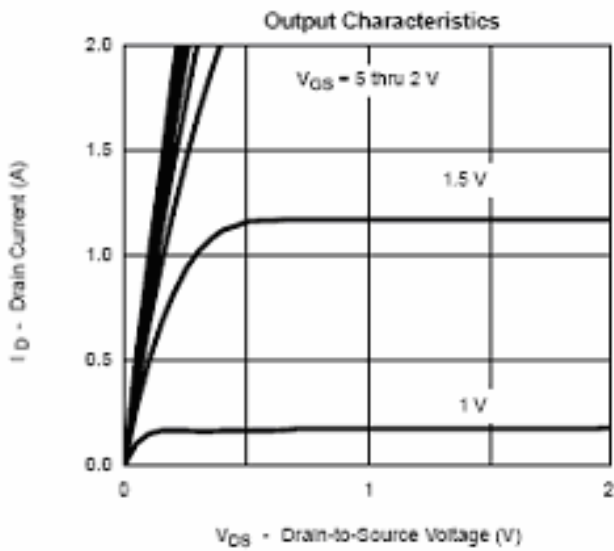
Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	20			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.35		1.0	
Gate Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 12V$			100	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=20V, V_{GS}=0V$			1	uA
		$V_{DS}=20V, V_{GS}=0V$ $T_J=55^\circ C$			5	
On-State Drain Current	$I_{D(on)}$	$V_{DS} \geq 4.5V, V_{GS}=5V$	0.7			A
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=0.65A$		0.26	0.38	Ω
		$V_{GS}=2.5V, I_D=0.55A$		0.32	0.45	
		$V_{GS}=1.8V, I_D=0.45A$		0.42	0.80	
Forward Transconductance	$g_{fs}$	$V_{DS}=10V, I_D=0.4A$		1.0		S
Diode Forward Voltage	$V_{SD}$	$I_S=0.15A, V_{GS}=0V$		0.8	1.2	V
<b>Dynamic</b>						
Total Gate Charge	$Q_g$	$V_{DS}=10V, V_{GS}=4.5V,$ $I_D=0.6A$		1.2	1.5	nC
Gate-Source Charge	$Q_{gs}$			0.2		
Gate-Drain Charge	$Q_{gd}$			0.3		
Turn-On Time	$t_{d(on)}$	$V_{DD}=10V, R_L=10\Omega,$ $I_D=0.5A$ $V_{GEN}=4.5V, R_G=6\Omega$		5	10	ns
	$t_r$			8	15	
Turn-Off Time	$t_{d(off)}$			10	18	
	$t_f$			1.2	2.8	



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### TYPICAL CHARACTERISTICS

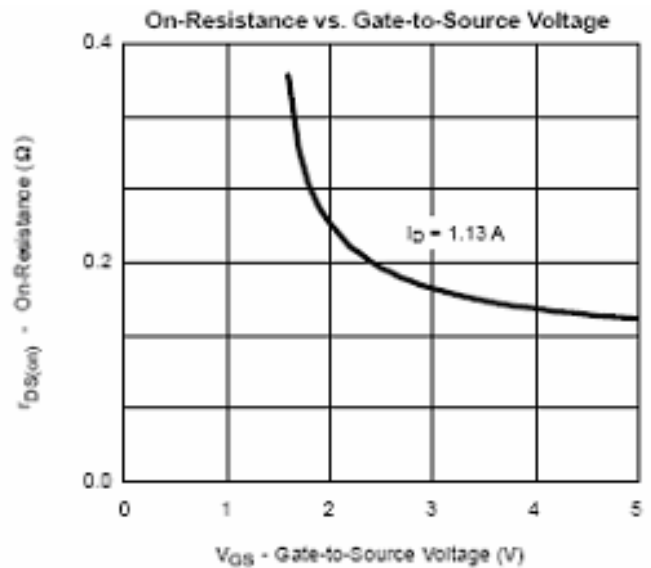
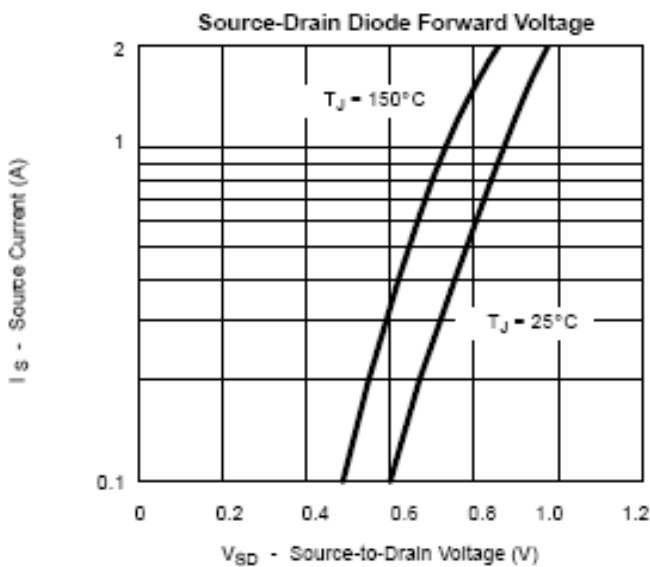
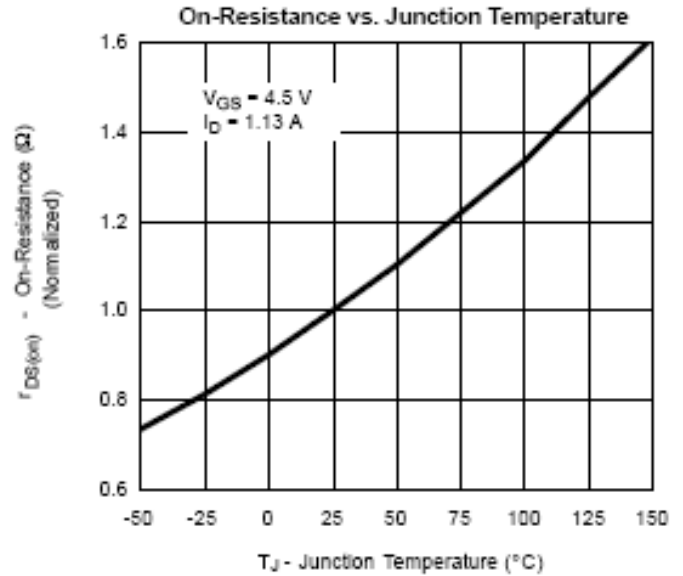
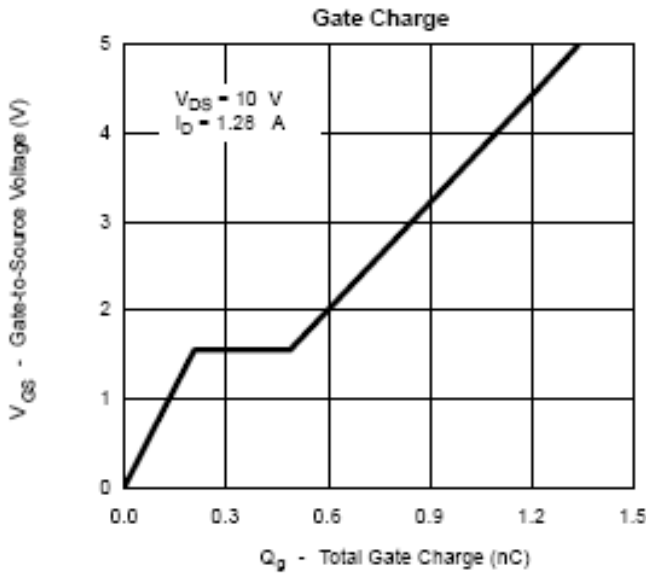




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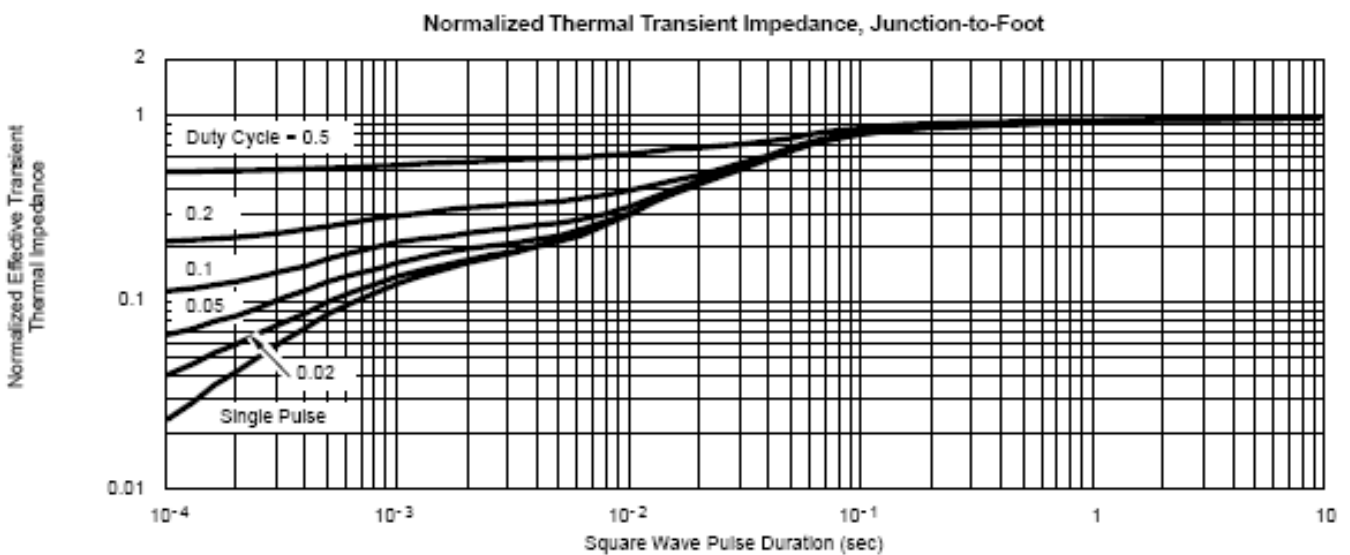
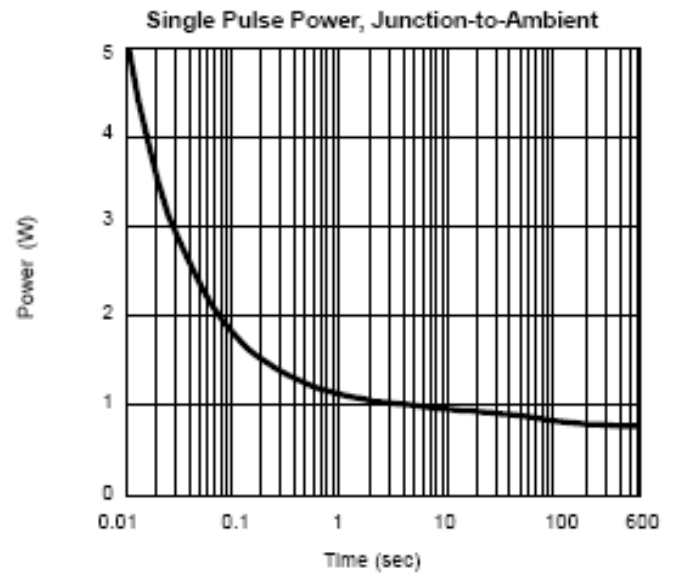
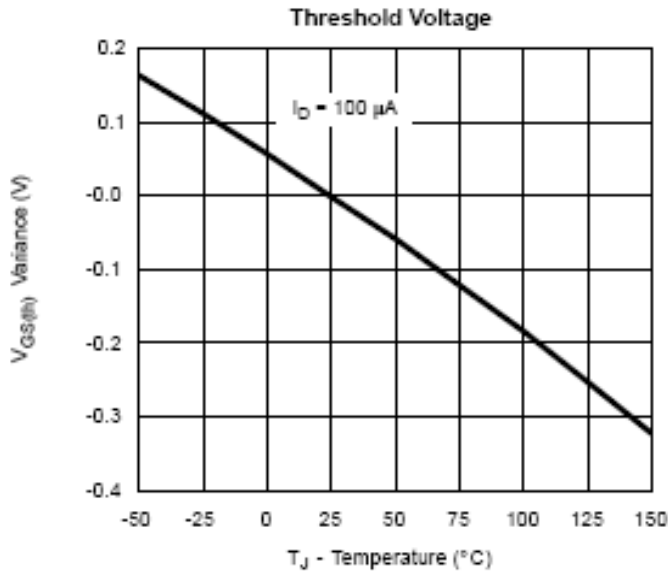




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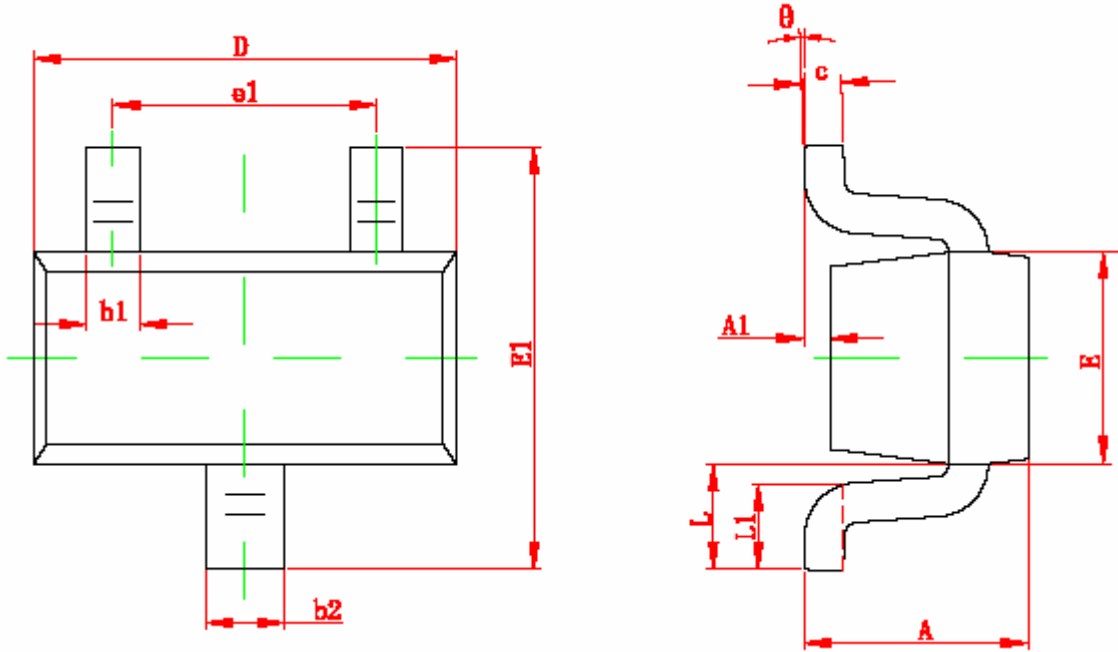




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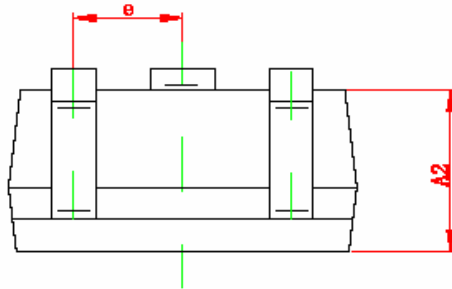
### SOT-523 PACKAGE OUTLINE





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Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.700	0.900	0.028	0.035
A1	0.000	0.100	0.000	0.004
A2	0.700	0.800	0.028	0.031
b1	0.150	0.250	0.006	0.010
b2	0.250	0.325	0.010	0.013
c	0.100	0.200	0.004	0.008
D	1.500	1.700	0.059	0.067
E	0.750	0.850	0.030	0.033
E1	1.450	1.750	0.057	0.069
e	0.500 TYP		0.020 TYP	
e1	0.900	1.100	0.035	0.043
L	0.550 REF		0.022 REF	
L1	0.280	0.440	0.011	0.017
θ	0°	4°	0°	4°





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