



# SPN7002U

## N-Channel Enhancement Mode MOSFET

### DESCRIPTION

The SPN7002U is the N-Channel enhancement mode field effect transistors are produced using high cell density DMOS technology. These products have been designed to minimize on-state resistance while provide rugged, reliable, and fast switching performance. They can be used in most applications requiring up to 640mA DC and can deliver pulsed currents up to 950mA. These products are particularly suited for low voltage, low current applications such as small servo motor control, power MOSFET gate drivers, and other switching applications.

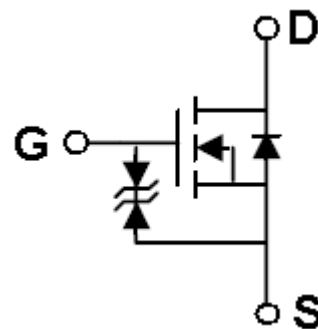
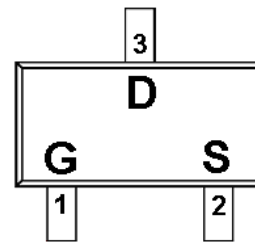
### APPLICATIONS

- Drivers: Relays, Solenoids, Lamps, Hammers, Display, Memories, Transistors, etc.
- High saturation current capability. Direct Logic-Level Interface: TTL/CMOS
- Battery Operated Systems
- Solid-State Relays

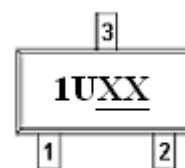
### FEATURES

- ◆ 60V/0.50A ,  $R_{DS(ON)} = 2.0\Omega @ V_{GS} = 10V$
- ◆ 60V/0.20A ,  $R_{DS(ON)} = 4.0\Omega @ V_{GS} = 4.5V$
- ◆ Super high density cell design for extremely low  $R_{DS(ON)}$
- ◆ Exceptional on-resistance and maximum DC current capability
- ◆ SOT-323 package design

### PIN CONFIGURATION(SOT-323)



### PART MARKING



XX : Date 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
SPN7002US32RGB	SOT-323	1UXX

※ SPN7002US32RGB : 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>	60	V
Gate –Source Voltage - Continuous	V <sub>GSS</sub>	±20	V
Continuous Drain Current(T <sub>J</sub> =150°C)	I <sub>D</sub>	0.64	A
	TA=25°C		
Pulsed Drain Current (*)	I <sub>DM</sub>	0.95	A
Power Dissipation	P <sub>D</sub>	1.35	W
	TA=25°C		
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>	375	°C/W

(\*) Pulse width limited by safe operating area



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### ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=25°C Unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	60			V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA	1.0	1.7	2.5	
Gate Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V			±30	uA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =60V, V <sub>GS</sub> =0V T <sub>J</sub> =25°C			10	uA
		V <sub>DS</sub> =48V, V <sub>GS</sub> =0V T <sub>J</sub> =70°C			100	
Drain-Source On-Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =0.50A			2.0	Ω
		V <sub>GS</sub> = 4.5V, I <sub>D</sub> =0.20A			4.0	
Forward Transconductance	G <sub>fs(1)</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 0.6 A		0.6		S
Diode Forward Voltage	V <sub>SD(1)</sub>	V <sub>GS</sub> = 0 V, I <sub>S</sub> = 0.45A			1.2	V
<b>Dynamic</b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>DD</sub> = 50 V, I <sub>D</sub> = 0.6 A, V <sub>GS</sub> = 4.5 V		1.0	1.6	nC
Gate-Source Charge	Q <sub>gs</sub>			0.5		
Gate-Drain Charge	Q <sub>gd</sub>			0.5		
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 25 V, f = 1 MHz, V <sub>GS</sub> = 0		32	50	pF
Output Capacitance	C <sub>oss</sub>			8		
Reverse Transfer Capacitance	C <sub>rss</sub>			6		
Turn-On Time	t <sub>d(on)</sub>	V <sub>DD</sub> = 30 V, I <sub>D</sub> = 0.6 A R <sub>G</sub> = 3.3Ω V <sub>GS</sub> = 10.0 V R <sub>D</sub> = 52Ω		12		ns
	t <sub>r</sub>			10		
Turn-Off Time	t <sub>d(off)</sub>			56		
	t <sub>f</sub>			29		

(1) Pulsed: Pulse duration = 300 μs, duty cycle 1.5 %.

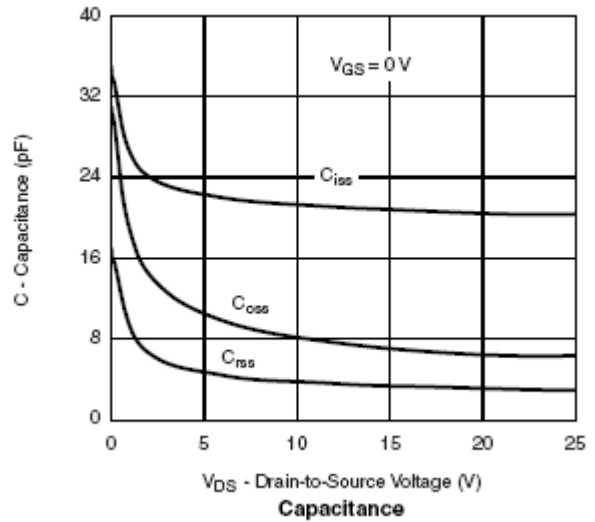
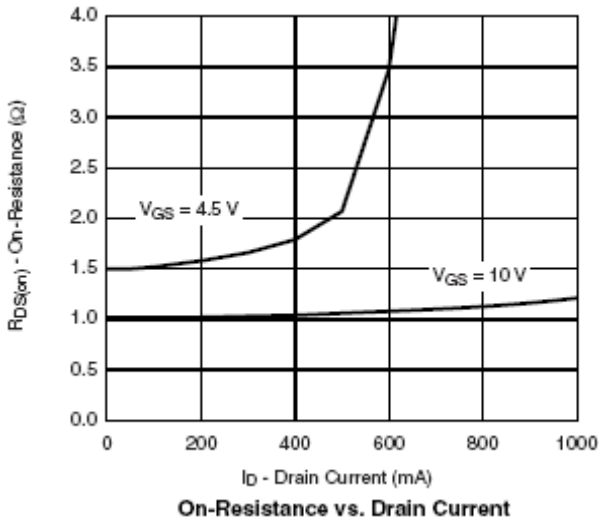
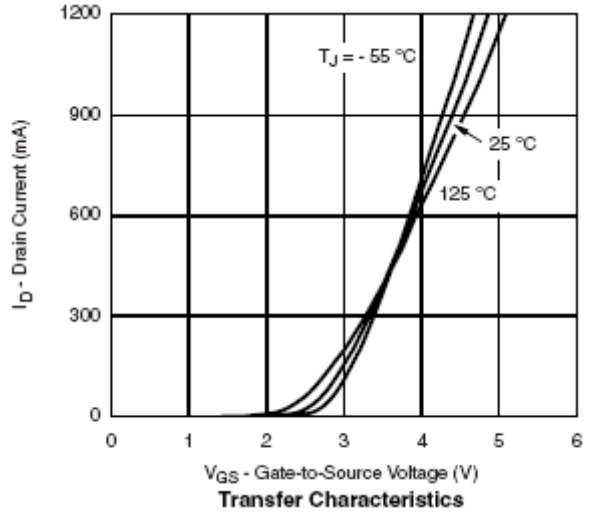
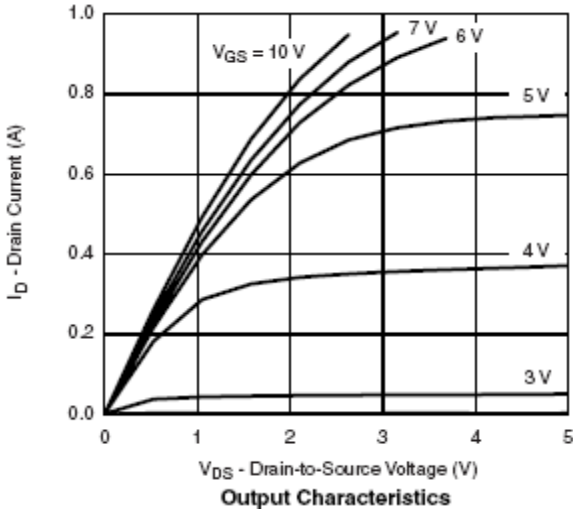
(2) Pulse width limited by safe operating area.



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### TYPICAL CHARACTERISTICS

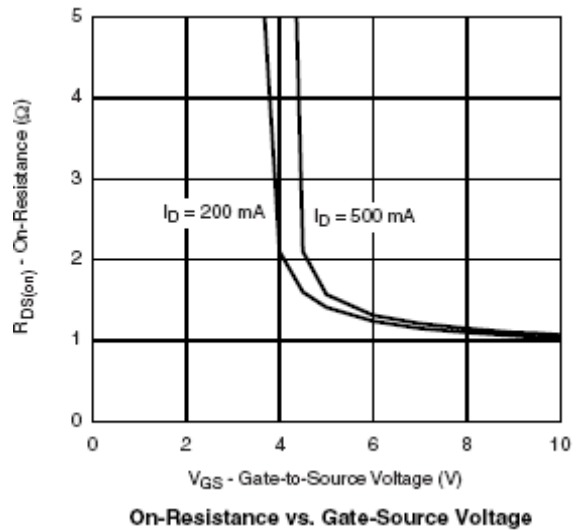
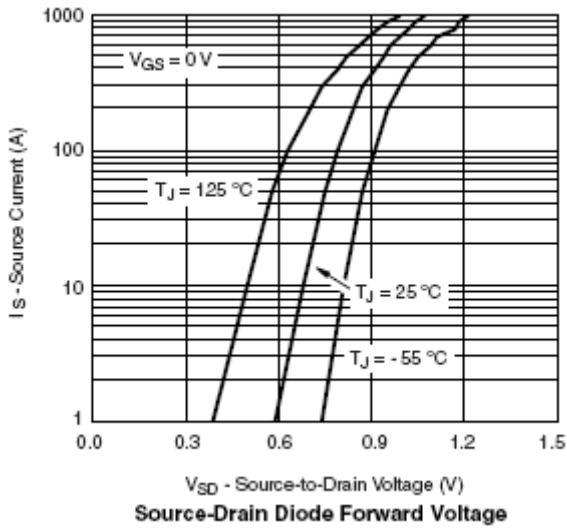
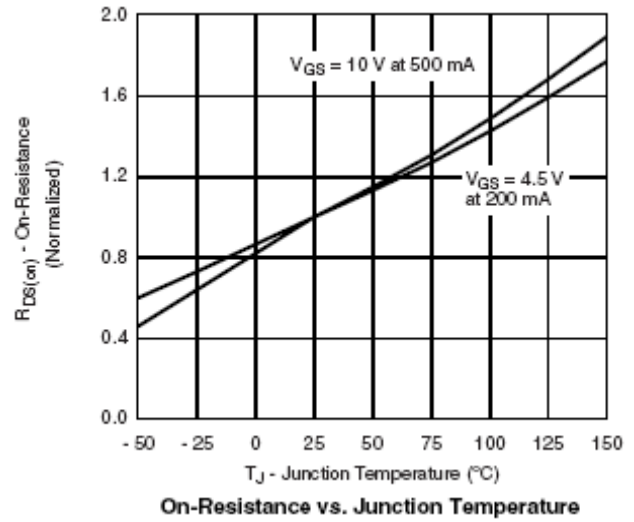
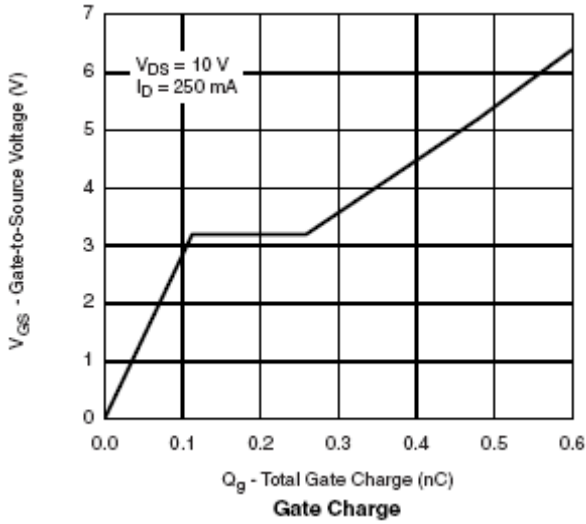




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### TYPICAL CHARACTERISTICS

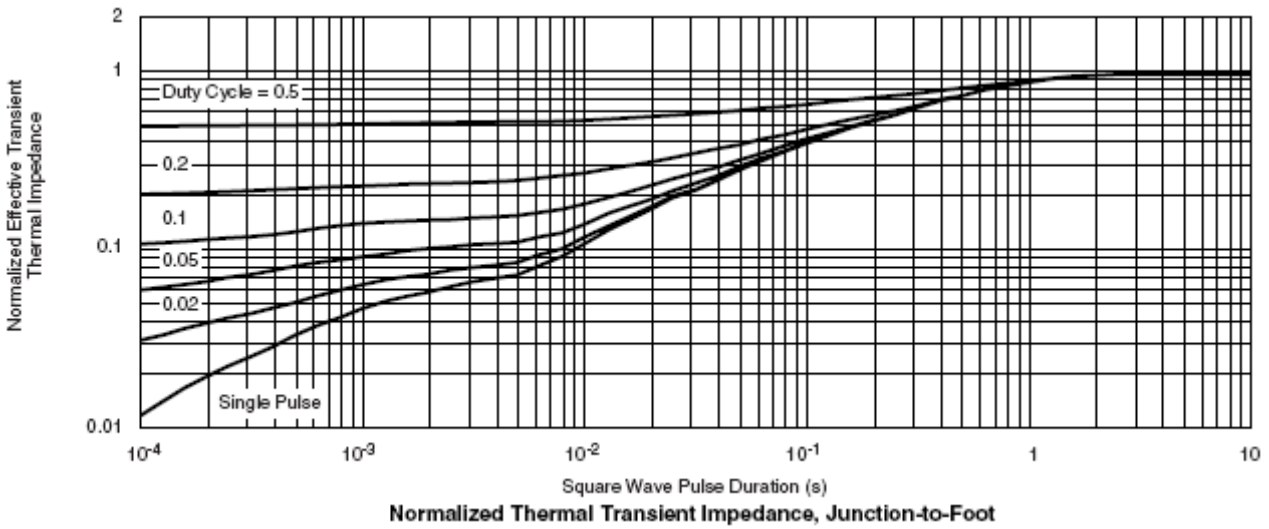
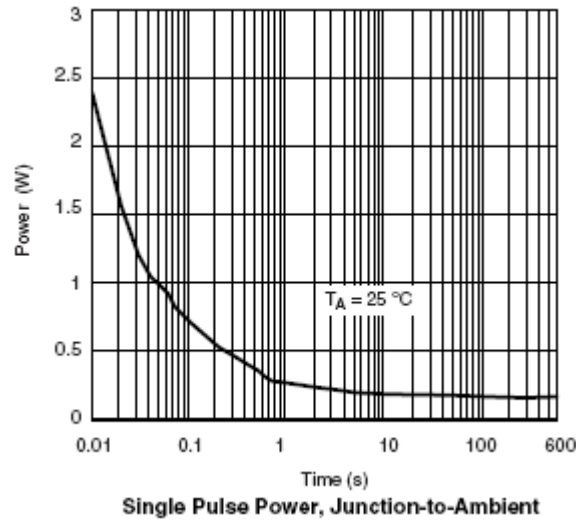
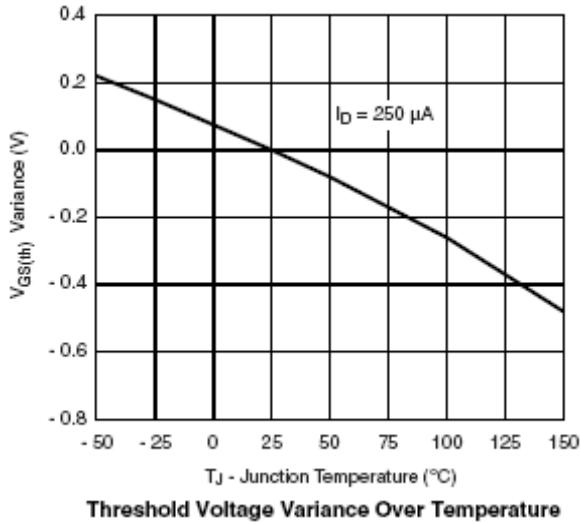




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### TYPICAL CHARACTERISTICS

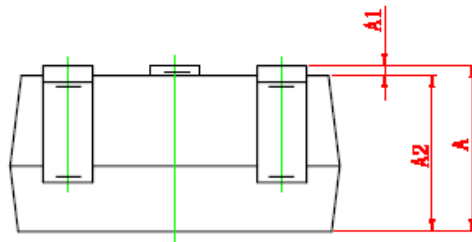
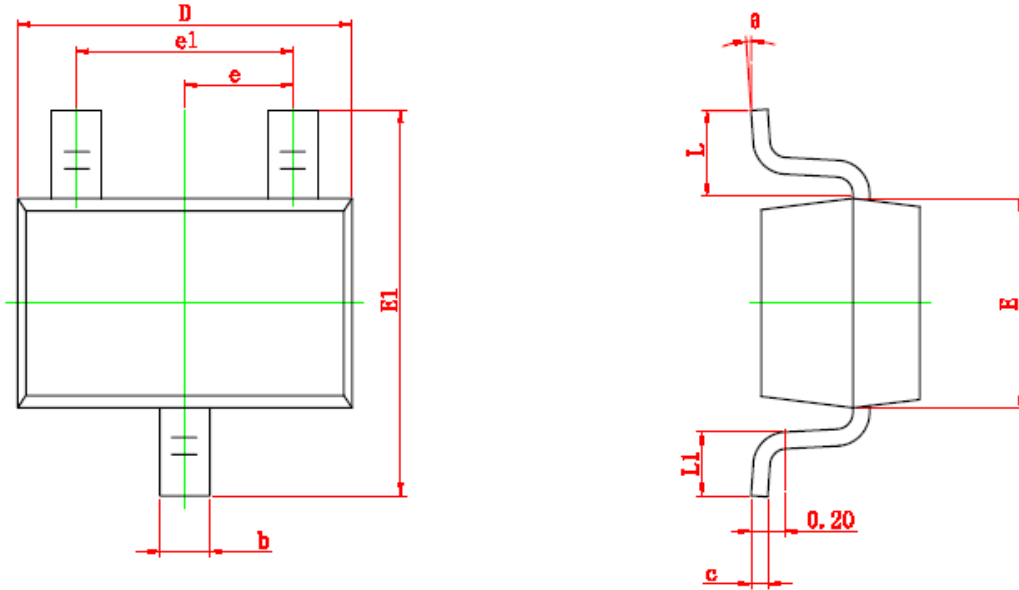




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### SOT-323 PACKAGE OUTLINE



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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