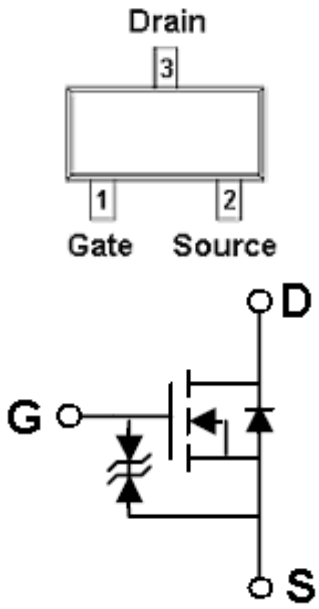
SPN2N7002K
N-Channel Enhancement Mode MOSFET

DESCRIPTION
The SPN2N7002K 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.

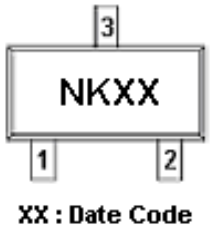
APPLICATIONS
- Drivers: Relays, Solenoids, Lamps, Hammers, Display, Memories, Transistors, etc.
- High saturation current capability. Direct Logic-Level Interface: TTL/CMOS
- Battery Operated Systems
- Solid-State Relays

FEATURES
- 60V/0.50A , $R_{DS(ON)}$=3.0Ω@V_{GS}=10V
- 60V/0.20A , $R_{DS(ON)}$=3.5Ω@V_{GS}=4.5V
- Super high density cell design for extremely low $R_{DS\ (ON)}$
- Exceptional on-resistance and maximum DC current capability
- SOT-23 package design

PIN CONFIGURATION(SOT-23)



PART MARKING



XX : Date Code

SPN2N7002K
N-Channel Enhancement Mode MOSFET

PIN DESCRIPTION

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

ORDERING INFORMATION

Part Number	Package	Part Marking
SPN2N7002KS23RGB	SOT-23	NKXX

※ SPN2N7002KS23RGB : Tape Reel ; Pb – Free ; Halogen – Free

ABSOULTE MAXIMUM RATINGS (T_A=25℃ Unless otherwise noted)

Parameter		Symbol	Typical	Unit
Drain-Source Voltage		V_{DSS}	60	V
Gate –Source Voltage - Continuous		V_{GSS}	±20	V
Continuous Drain Current(T_J=150℃)	T_A=25℃	I_D	0.3	A
Pulsed Drain Current ( )		I_{DM}	0.8	A
Power Dissipation	T_A=25℃	P_D	0.35	W
Operating Junction Temperature		T_J	-55 ~ 150	℃
Storage Temperature Range		T_{STG}	-55 ~ 150	℃
Thermal Resistance-Junction to Ambient		$R_{\theta JA}$	350	℃/W

(*) Pulse width limited by safe operating area

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ELECTRICAL CHARACTERISTICS (T_A=25℃ Unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V,I_D=250Ua	60			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250uA	1.0	1.7	2.5	
Gate Leakage Current	I_{GSS}	V_{DS}=0V,V_{GS}=±20V			±30	uA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=60V,V_{GS}=0V T_J=25℃			1	uA
		V_{DS}=48V,V_{GS}=0V T_J=70℃			100	
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS}=10V,I_D=0.50A		2.0	3.0	Ω
		V_{GS}= 4.5V,I_D=0.20A		3.0	3.5	
Forward Transconductance	Gfs(1)	V_{DS} = 10 V, I_D = 0.6 A	0.08			S
Diode Forward Voltage	V_{SD}(1)	V_{GS} = 0 V, I_S = 0.5A			1.3	V
Dynamic						
Total Gate Charge	Q_g	V_{DD} = 50 V, I_D = 0.6 A, V_{GS} = 4.5 V		0.6	0.8	nC
Gate-Source Charge	Q_{gs}			0.2		
Gate-Drain Charge	Q_{gd}			0.2		
Input Capacitance	C_{iss}	V_{DS} = 25 V, f = 1 MHz, V_{GS} = 0		30	50	pF
Output Capacitance	C_{oss}			7		
Reverse Transfer Capacitance	C_{rss}			4		
Turn-On Time	$t_{d(on)}$	V_{DD} = 30 V, I_D = 0.6 A R_G = 3.3Ω V_{GS} = 10.0 V R_D = 52Ω		2		ns
	t_r			15		
Turn-Off Time	$t_{d(off)}$			8		
	t_f			11		

(1) Pulsed: Pulse duration ≦ 300 μs, duty cycle≦ 2 %.

(2) Pulse width limited by safe operating area.

TYPICAL CHARACTERISTICS

Fig. 1 I_D - V_{DS}

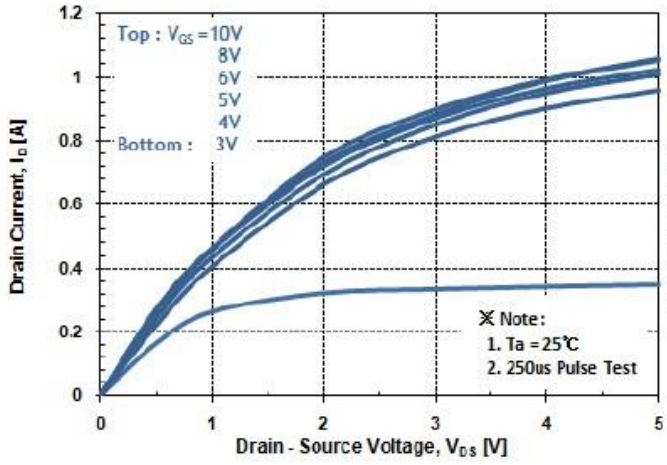


Fig. 2 I_D – V_{GS}

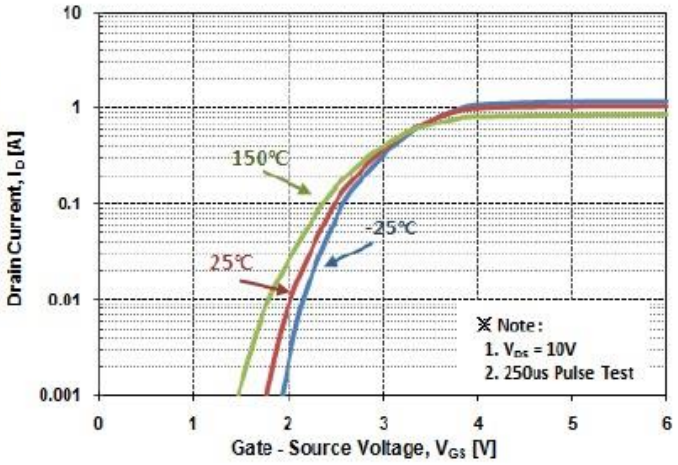


Fig. 3 $R_{DS(ON)}$ - I_D

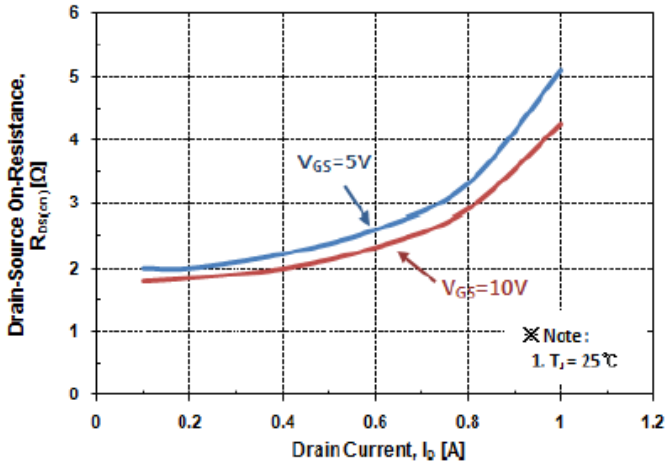
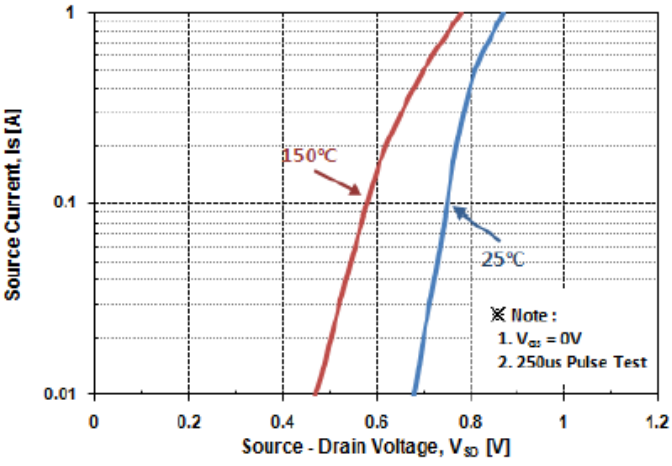


Fig. 4 I_S - V_{SD}



TYPICAL CHARACTERISTICS

Fig. 5 Capacitance - V_{DS}

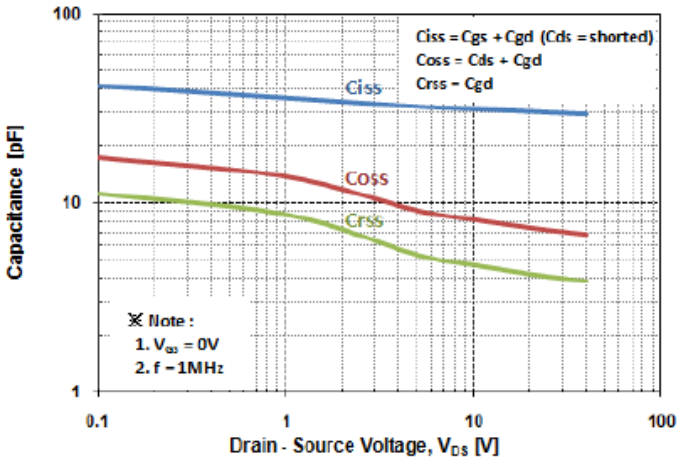


Fig. 6 V_{GS} - Q_G

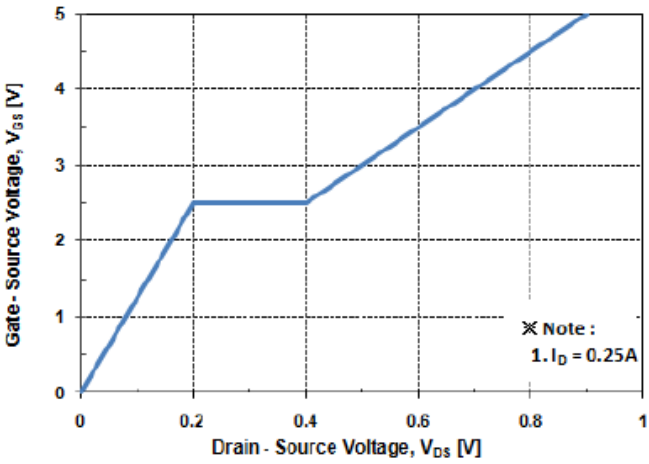


Fig. 7 V_{DSS} - T_J

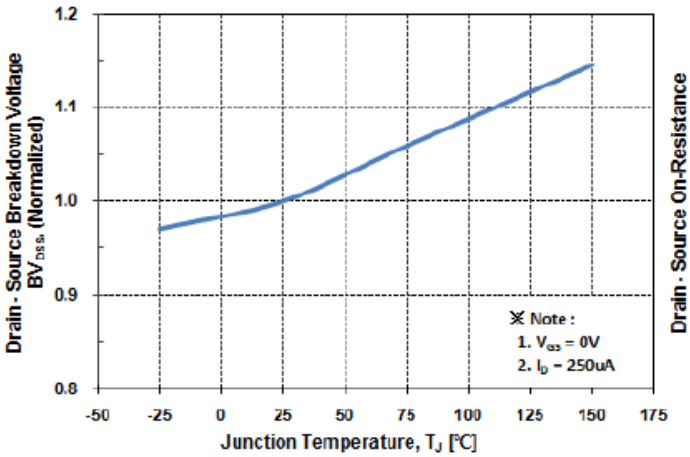
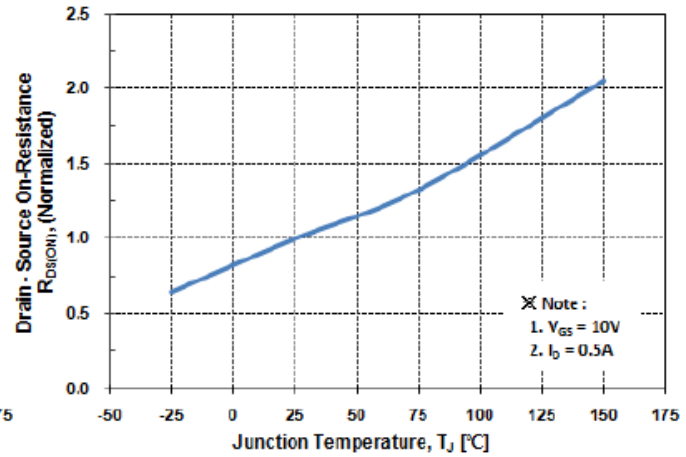


Fig. 8 $R_{DS(on)}$ – T_J



TYPICAL CHARACTERISTICS

Fig. 9 I_D - T_C

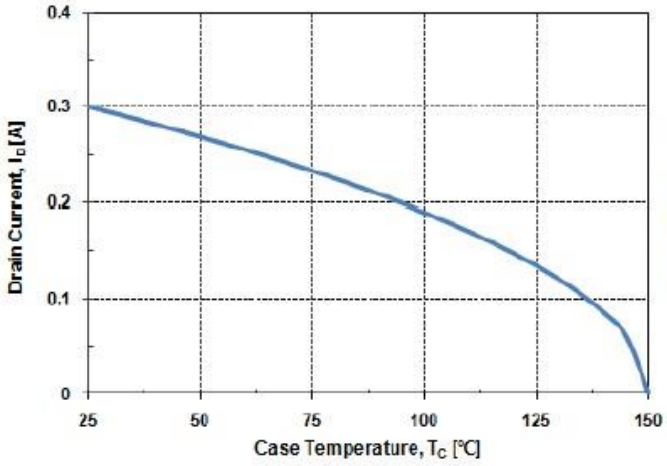


Fig. 10 Safe Operating Area

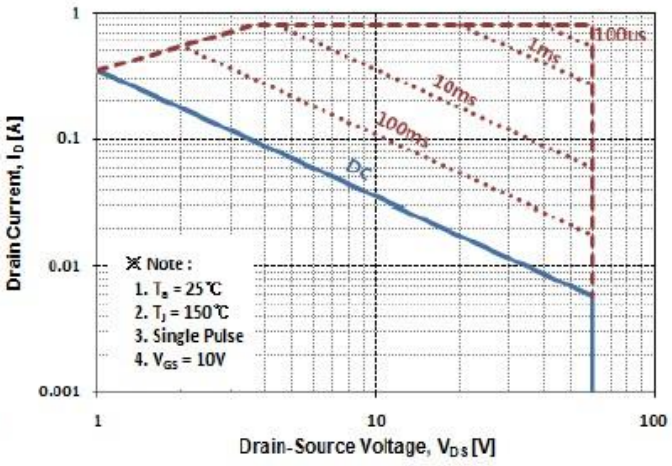
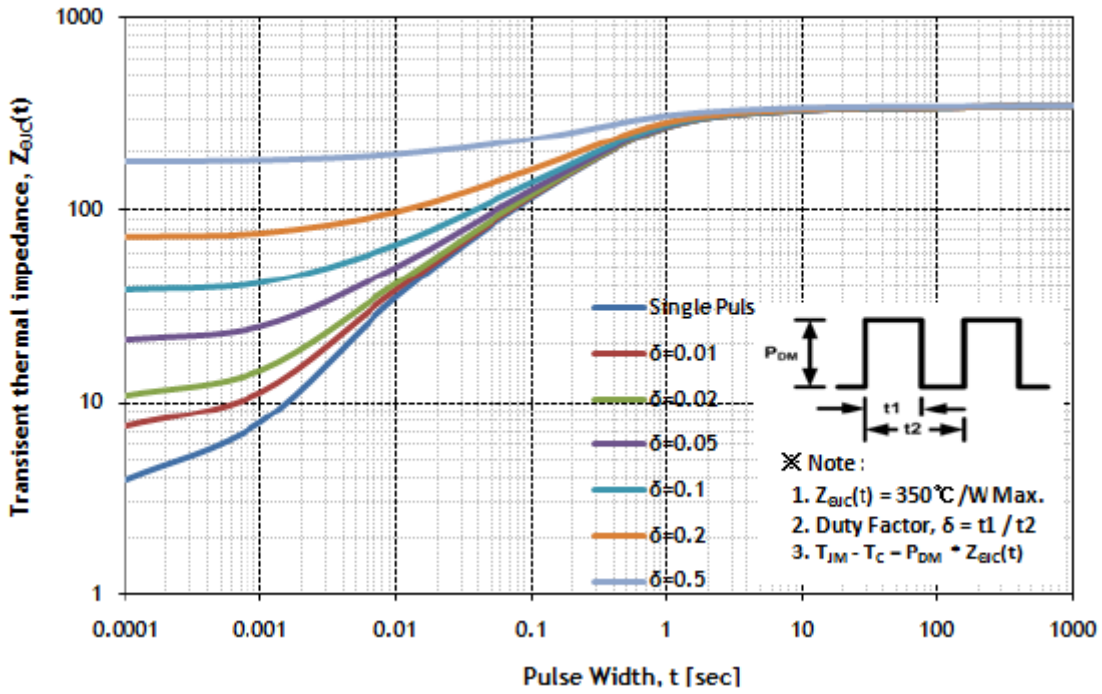
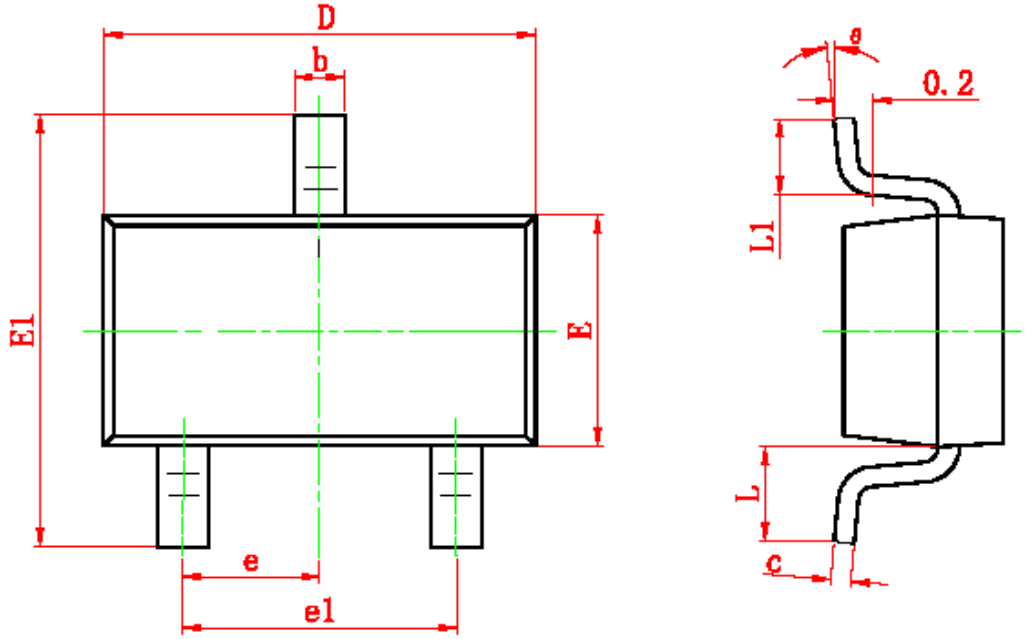
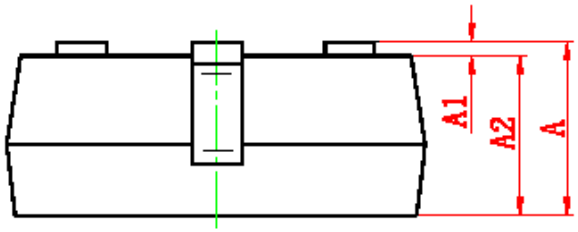


Fig. 11 Transient Thermal Impedance



SOT-23 PACKAGE OUTLINE





Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.820	1.200	0.0323	0.0430
A1	0.000	0.100	0.0000	0.0040
A2	0.820	1.100	0.0323	0.0390
b	0.300	0.500	0.0120	0.0200
c	0.080	0.150	0.0030	0.0060
D	2.800	3.000	0.1100	0.1180
E	1.200	1.400	0.0470	0.0550
E1	2.200	2.550	0.0866	0.1000
e	0.95 TYP		0.037 TYP	
e1	1.800	2.000	0.0710	0.0790
L	0.529 REF		0.0208 REF	
L1	0.200	0.500	0.0079	0.0200
θ	0?	8?	0?	8?

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