

2N7002K N-Channel 60-V(D-S) MOSFET

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
60V	2.5Ω@ 10V	0.5A
	3.0Ω@ 4.5V	

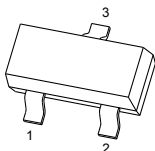
General FEATURE

- High density cell design for Low $R_{DS(on)}$
- Voltage controlled small signal switch
- Rugged and reliable
- High saturation current capability
- ESD protected 2KV HBM

APPLICATION

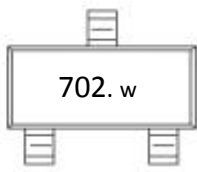
- Load Switch for Portable Devices
- DC/DC Converter

SOT-23



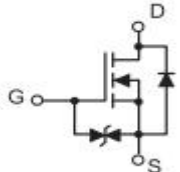
1.GATE
2.SOURCE
3.DRAIN

MARKING



*w: week code

Equivalent Circuit



Maximum ratings ($T_a=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	±20	
Continuous Drain Current	I_D	0.5	A
Pulsed Drain Current*1,2	I_{DM}	0.95	
Continuous Source-Drain Diode Current	I_S	0.5	
Maximum Power Dissipation	P_D	0.35	W
Thermal Resistance from Junction to Ambient($t \leq 5s$)* 2	$R_{\theta JA}$	90	$^{\circ}\text{C/W}$
Junction Temperature	T_J	150	$^{\circ}\text{C}$
Storage Temperature	T_{stg}	-55 ~+150	

Note :

*1. Pulse Width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$

*2. When the device is mounted on 1in² copper pad of FR-4 board; 270 $^{\circ}\text{C/W}$ when mounted on minimum copper pad.

MOSFET ELECTRICAL CHARACTERISTICS

T_a =25 °C unless otherwise specified

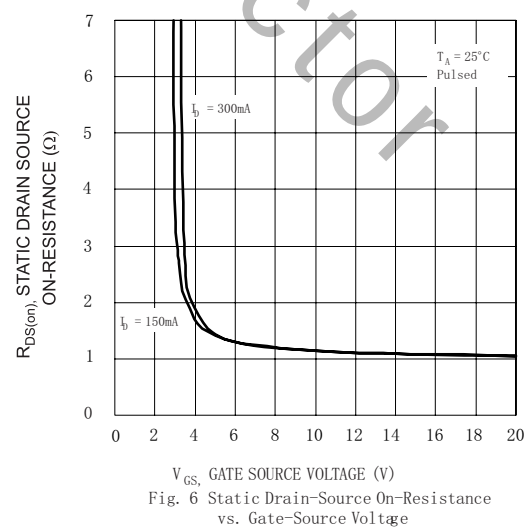
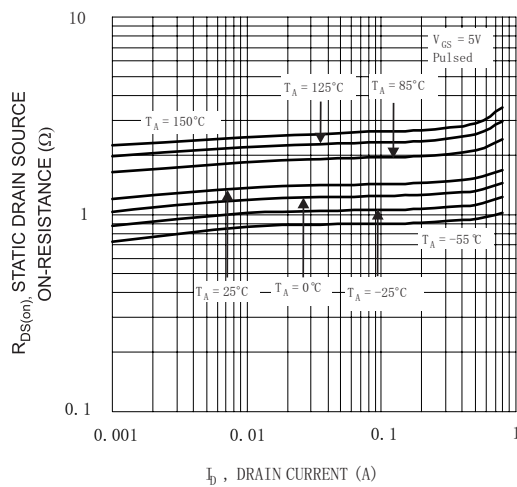
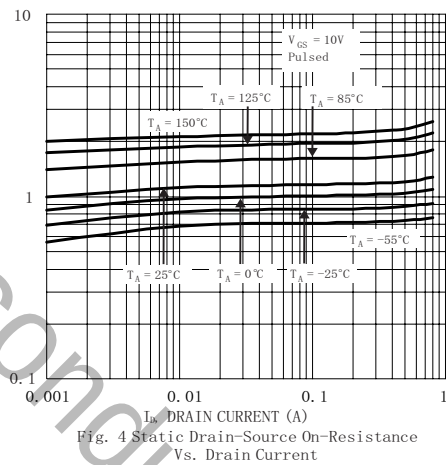
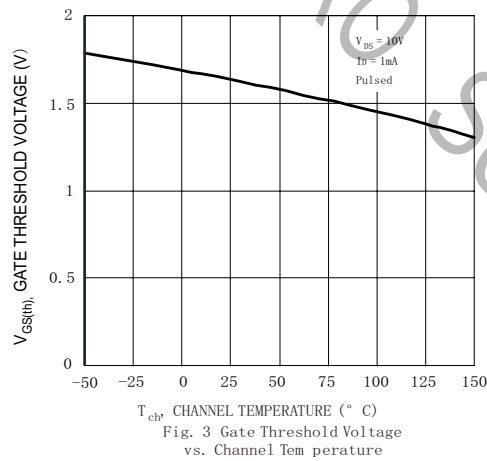
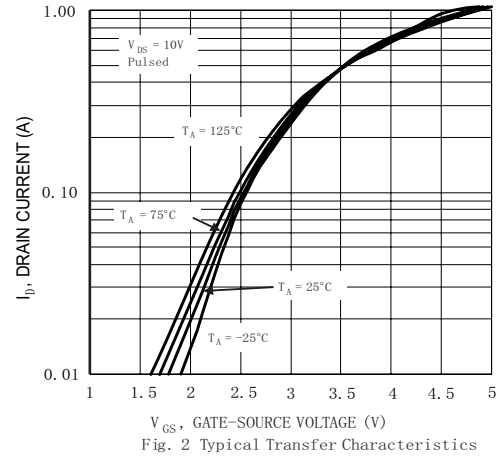
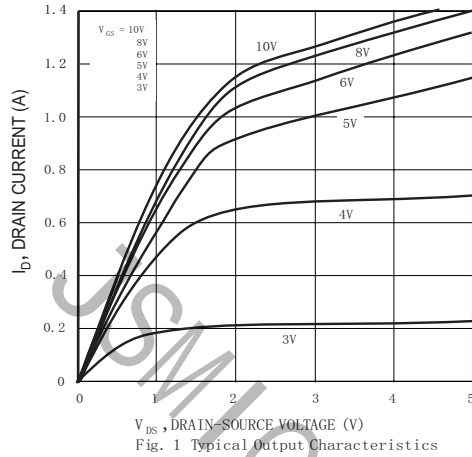
Parameter	Symbol	Test Condition	Min	Typ	Max	Units
Static Characteristics						
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0V, I _D =250μA	60			V
Gate Threshold Voltage*	V _{GS(th)}	V _{DS} =V _{GS} , I _D =1mA	1.2	1.6	2	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =48V,V _{GS} = 0V			1	μA
Gate –Source leakage current	I _{GSS}	V _{GS} =±20V, V _{DS} = 0V			±100	nA
Drain-Source On-Resistance*	R _{DS(on)}	V _{GS} = 10V, I _D =500mA		2.0	2.5	Ω
		V _{GS} =4.5V,I _D =500mA		2.5	3.0	Ω
Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =500mA		0.7	1.3	V
Total gate charge	Q _g	V _{DS} =15V,V _{GS} =4.5V,I _D =0.2A			0.8	nC
Dynamic Characteristics**						
Input Capacitance	C _{iss}	V _{DS} =25V,V _{GS} =0V,f =1MHz			50	pF
Output Capacitance	C _{oss}				25	pF
Reverse Transfer Capacitance	C _{rss}				5	pF
Switching Characteristics**						
Turn-On Delay Time	t _{d(on)}	V _{DD} =30V,I _D =0.2A			20	ns
Turn-Off Delay Time	t _{d(off)}	R _L =150Ω, V _{GEN} =10V,R _g =10Ω			40	ns

Notes :

*Pulse Test : Pulse Width ≤300μs, Duty Cycle ≤2%.

**These parameters have no way to verify.

Typical Characteristics



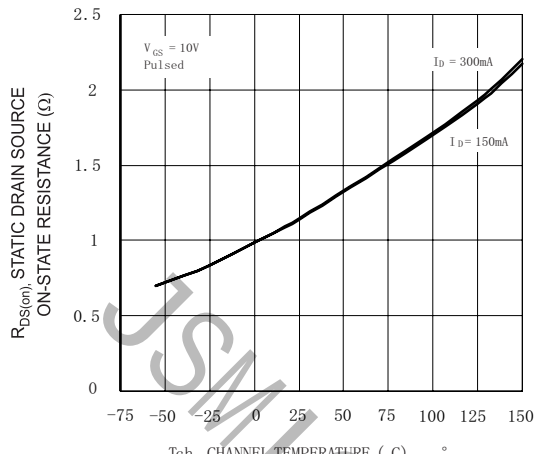


Fig. 7 Static Drain-Source On-State Resistance vs. Channel Temperature

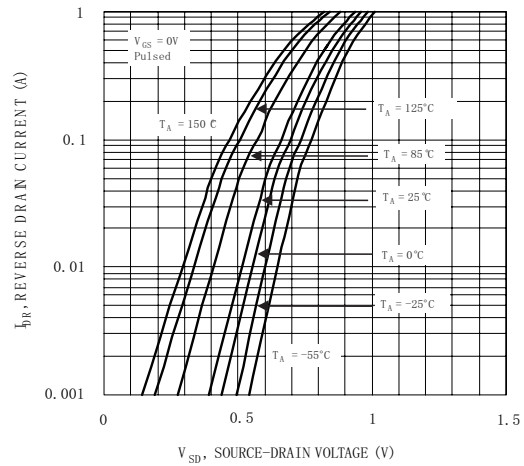


Fig. 8 Reverse Drain Current vs. Source-Drain Voltage

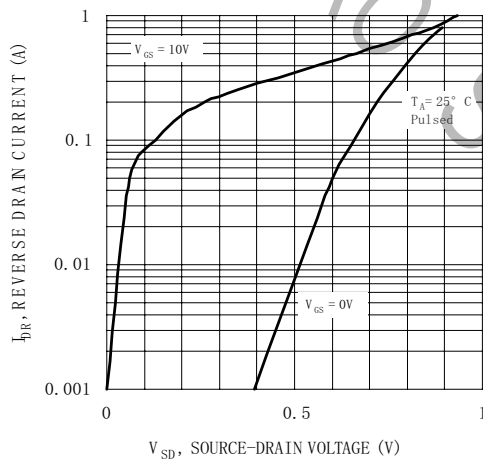


Fig. 9 Reverse Drain Current vs. Source-Drain Voltage

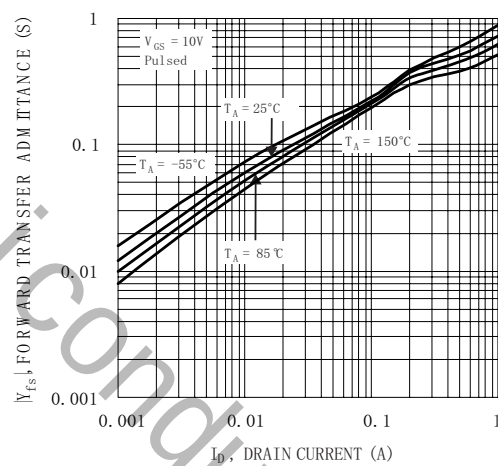
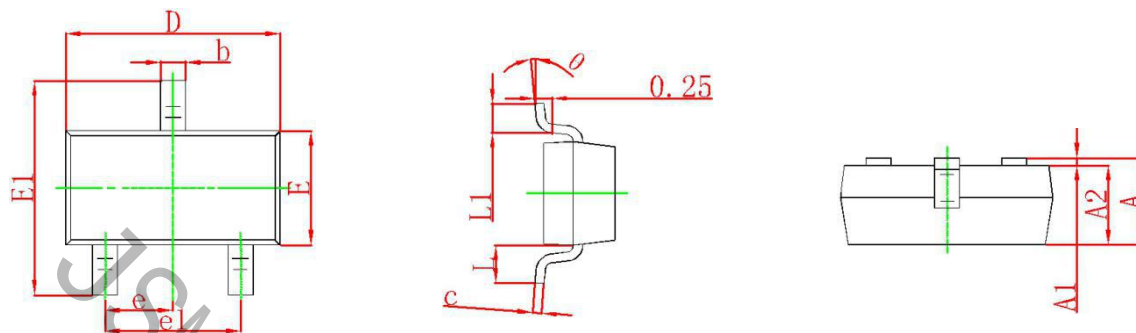


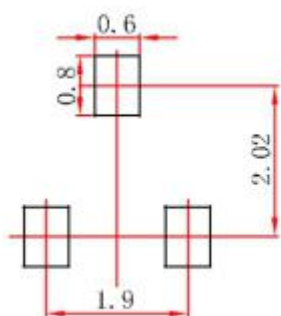
Fig. 10 Forward Transfer Admittance vs. Drain Current

SOT-23 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
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	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF		0.022 REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

SOT-23 Suggested Pad Layout



Note:

1. Controlling dimension: in millimeters.
2. General tolerance: $\pm 0.05\text{mm}$.
3. The pad layout is for reference purposes only.