

GENERAL FEATURES

- $V_{DS} = 60V, I_D = 0.3A$

$R_{DS(ON)} < 3\Omega @ V_{GS}=5V$

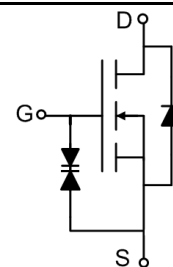
$R_{DS(ON)} < 2\Omega @ V_{GS}=10V$

ESD Rating: 1000V HBM

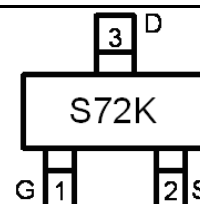
- High Power and current handling capability
- Lead free product is acquired
- Surface Mount Package

APPLICATION

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



Schematic diagram



Marking and pin Assignment



SOT23 top view

PACKAGE MARKING AND ORDERING INFORMATION

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
S72K	2N7002K	SOT23	Ø180mm	8 mm	3000 units

ABSOLUTE MAXIMUM RATINGS(TA=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous@ Current-Pulsed (Note 1)	I_D	0.3	A
	I_{DM}	0.8	A
Maximum Power Dissipation	P_D	0.35	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	°C

THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	350	°C/W
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ELECTRICAL CHARACTERISTICS (TA=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	60			V

Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =50V,V _{GS} =0V			10	nA
		V _{DS} =60V,V _{GS} =0V			1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±5V,V _{DS} =0V			100	nA
		V _{GS} =±10V,V _{DS} =0V			150	nA
		V _{GS} =±20V,V _{DS} =0V			10	uA
Gate-Source Breakdown Voltage	BV _{GSO}	V _{DS} =0V, I _G =±250uA	±20			V
ON CHARACTERISTICS (Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} ,I _D =250μA	1		2.5	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =0.5A			2	Ω
		V _{GS} =5V, I _D =0.05A			3	
Forward Transconductance	g _{FS}	V _{DS} =10V,I _D =0.2A	0.08			S
DYNAMIC CHARACTERISTICS (Note4)						
Input Capacitance	C _{ISS}	V _{DS} =25V,V _{GS} =0V, F=1.0MHz		30		PF
Output Capacitance	C _{OSS}			6		PF
Reverse Transfer Capacitance	C _{rss}			3		PF
SWITCHING CHARACTERISTICS (Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =30V,V _{GS} =10V, R _{GEN} =10Ω, R _L =150Ω I _D =0.2A			25	nS
Turn-Off Delay Time	t _{d(off)}				35	nS
Total Gate Charge	Q _g	V _{DS} =10V,I _D =0.25A,V _{GS} =4.5V		0.4	0.6	nC
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode Forward Voltage (Note 3)	V _{SD}	V _{GS} =0V,I _S =0.2A			1.3	V

NOTES:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production testing.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

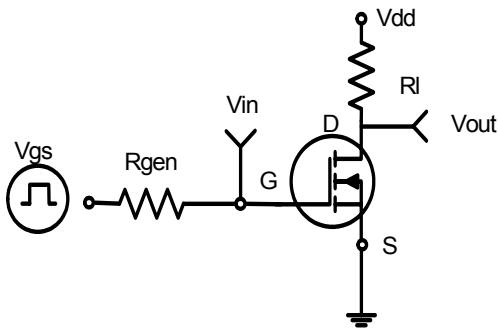


Figure 1: Switching Test Circuit

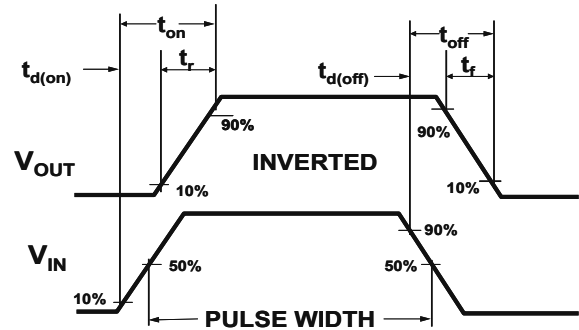


Figure 2: Switching Waveforms

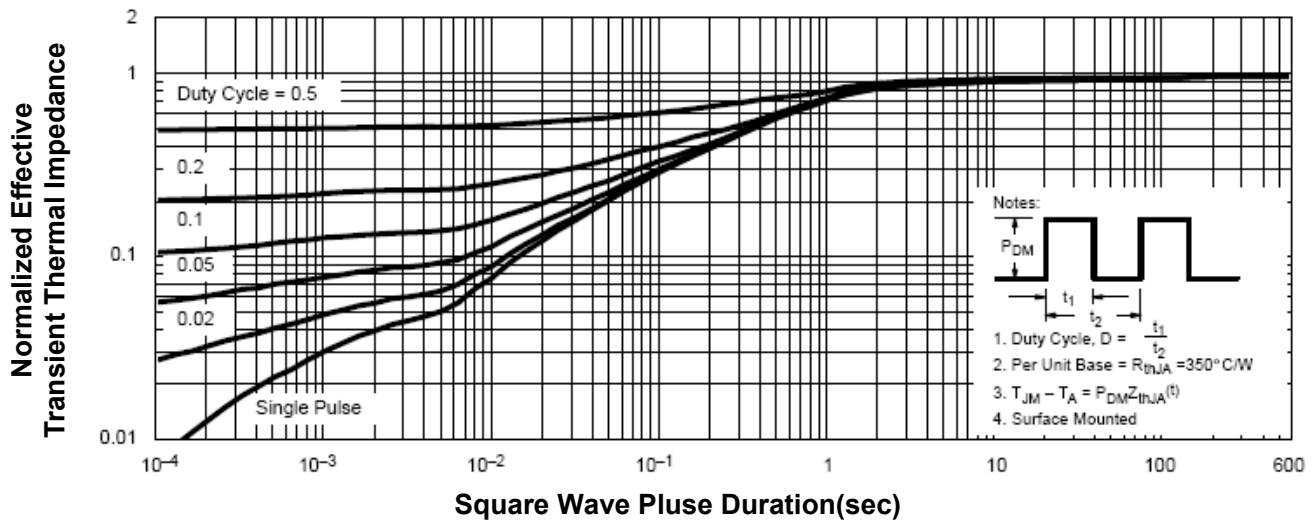
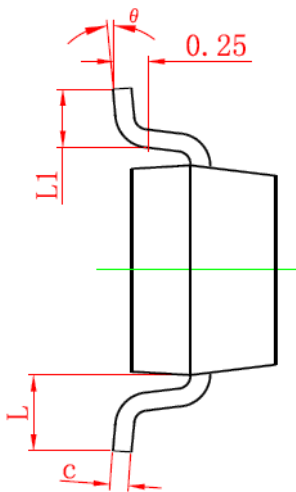
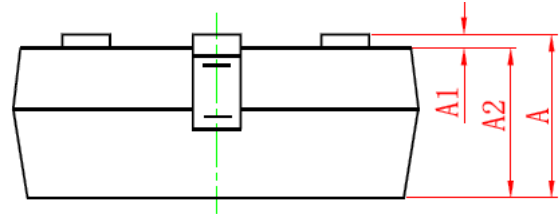
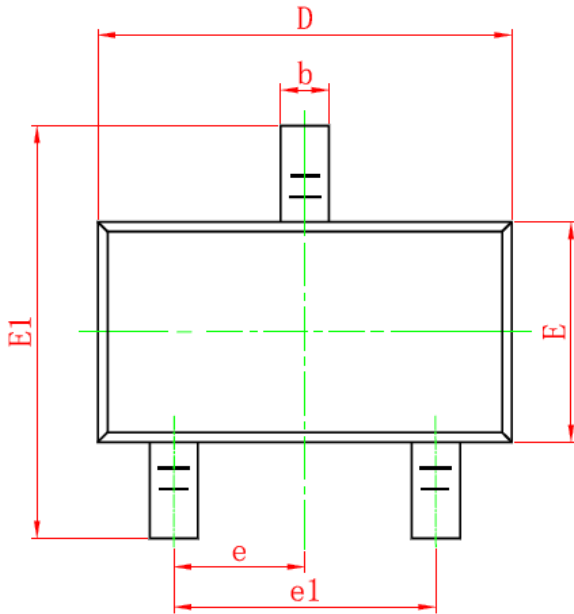


Figure 3: Normalized Maximum Transient Thermal Impedance

SOT-23 PACKAGE INFORMATION

Dimensions in Millimeters (UNIT:mm)



Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.500
θ	0°	8°

NOTES

1. All dimensions are in millimeters.
2. Tolerance $\pm 0.10\text{mm}$ (4 mil) unless otherwise specified
3. Package body sizes exclude mold flash and gate burrs. Mold flash at the non-lead sides should be less than 5 mils.
4. Dimension L is measured in gauge plane.
5. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.

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