

60V N-Channel MOSFET

MOSFET Product Summary

V_{DS}	$R_{DS(ON)}(Max.)$	I_D
60V	3.0Ω @ $V_{GS}=10V$	0.3A
	3.5Ω @ $V_{GS}=5V$	

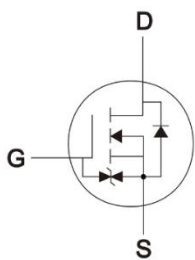
Description

The 2N7002KL uses advanced Trench technology and designs to provide excellent $R_{DS(ON)}$ with low gate charge. This device is suitable for use in PWM, load switching and general purpose applications.

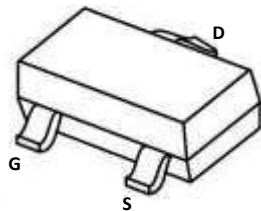
Features

- Advanced MOSFET process technology
- Special designed for PWM, load switching and general purpose applications
- Ultra low on-resistance with low gate charge
- Fast switching and reverse body recovery
- 150°C operating temperature

Dimensions and Pin configuration



Circuit diagram



SOT-23

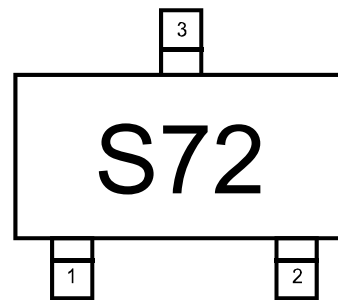
Mechanical Characteristics

- Package: SOT-23
- Case Material: "Green" Molding Compound
- Marking Information: See Below

Applications

- Load Switch for Portable Devices
- DC/DC Converter
- Power management
- Battery operated systems
- Level Shift Circuits

Marking Information



S72 = Device Marking Code

Ordering Information

Part Number	Shipping	Reel Size
2N7002KL	3000/Tape & Reel	7 inch

Absolute Maximum Ratings ($T_A=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	±20	V

Continuous Drain Current ¹	I_D	0.3	A
Pulsed Drain Current ²	I_{DM}	0.8	A
Power Dissipation ³	P_D	0.43	W
Thermal Resistance from Junction to Ambient ⁴	$R_{\theta JA}$	350	°C/W
Junction Temperature	T_J	-55~ +150	°C
Storage Temperature	T_{STG}	-55~ +150	°C

Electrical Characteristics ($T_A=25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	60	-	-	V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 60V, V_{GS} = 0V$	-	-	1	μA
Gate-body leakage current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$	-	-	± 10	μA
Gate threshold voltage	$V_{GS(TH)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.0	-	2.5	V
Drain-source on-resistance	$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 0.5A$	-	-	3.0	Ω
		$V_{GS} = 5V, I_D = 0.05A$	-	-	3.5	
Diode Forward Voltage	V_{SD}	$V_{GS} = 0V, I_S = 0.3A$	-	0.85	1.3	V
Dynamic characteristics						
Gate-to-Source charge	Q_g	$V_{DS} = 10V, I_D = 0.25A, V_{GS} = 4.5V$	-	0.4	-	nC
Input Capacitance	C_{iss}	$V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz$	-	30	-	pF
Output Capacitance	C_{oss}		-	6	-	
Reverse Transfer Capacitance	C_{rss}		-	3	-	
Switching Characteristics						
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 30V, V_{GS} = 10V, I_D = 0.2A$ $R_{GEN} = 10\Omega, R_L = 150\Omega$	-	25	-	ns
Turn-off delay time	$t_{d(off)}$		-	35	-	

Notes:

1. Calculated continuous current based on maximum allowable junction temperature.
2. Repetitive rating; pulse width limited by max. junction temperature.
3. The power dissipation P_D is based on max. junction temperature, using junction-to-case thermal resistance.
4. The value of $R_{\theta JA}$ is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^{\circ}\text{C}$.

Typical Characteristics ($T_A=25^\circ\text{C}$ unless otherwise specified)

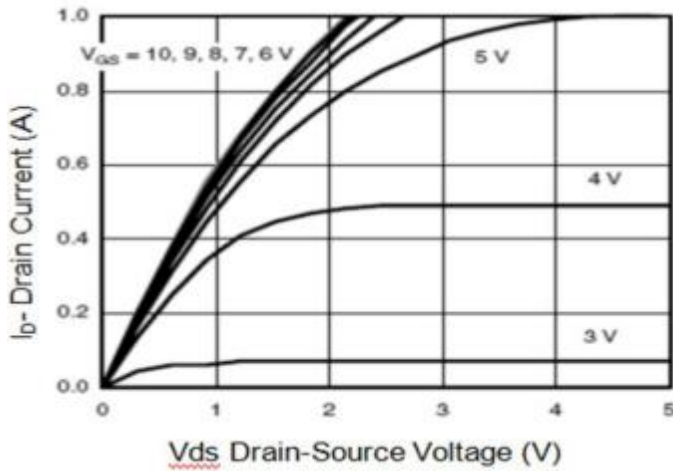


Figure1. Typical Output Characteristics

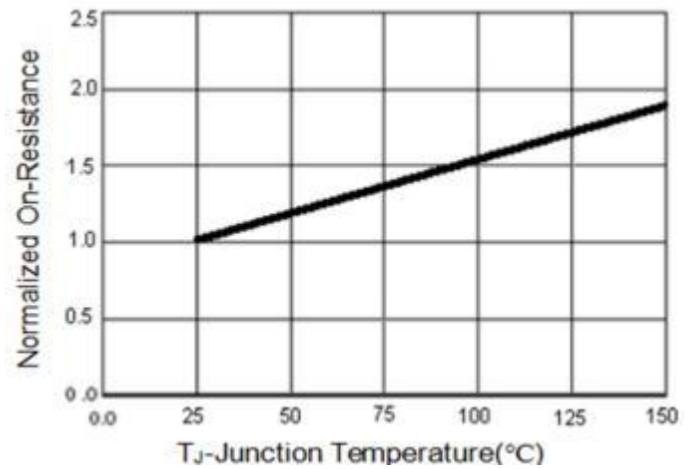


Figure2. Drain-Source On-Resistance Voltage

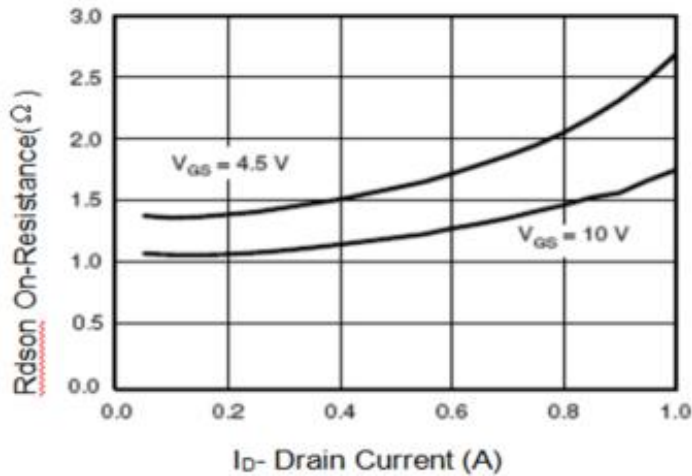


Figure3. Drain-Source On-Resistance

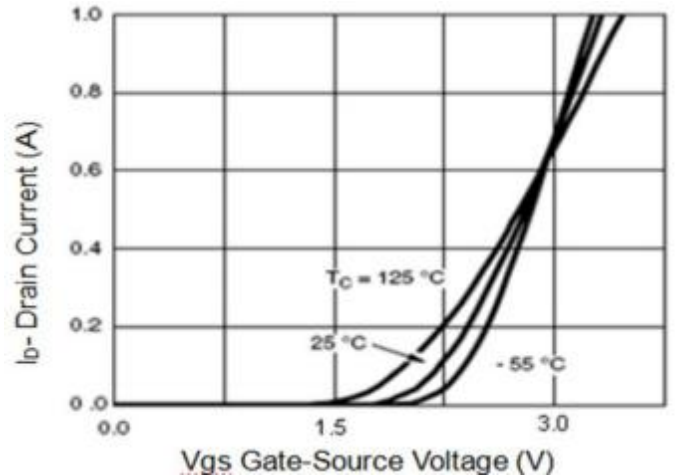


Figure4. Transfer Characteristics

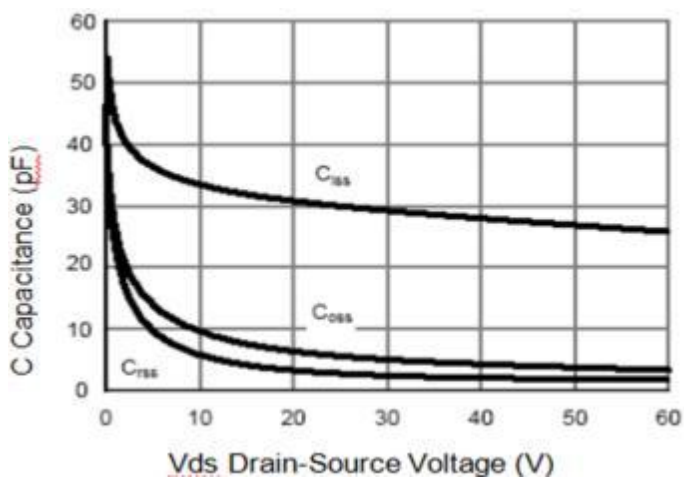


Figure5. Capacitance

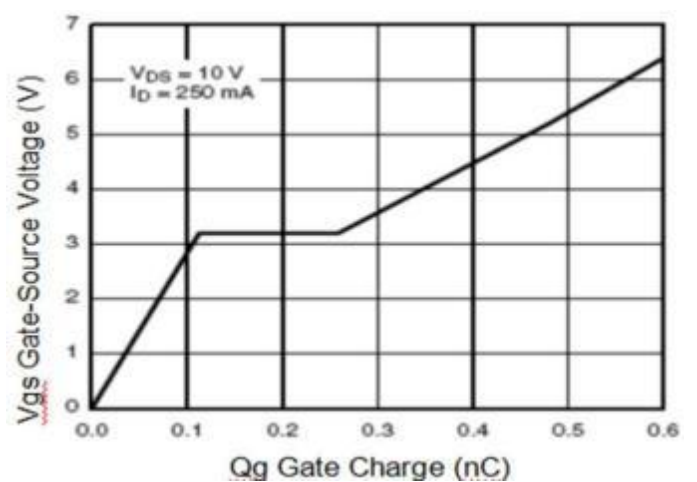
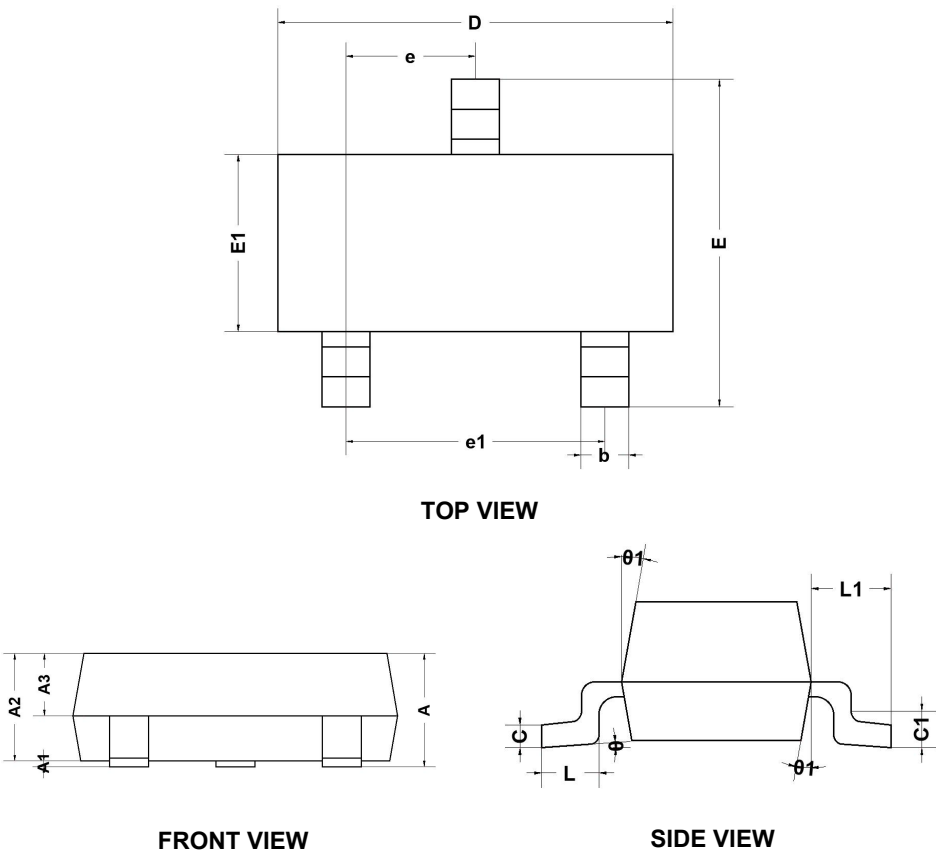


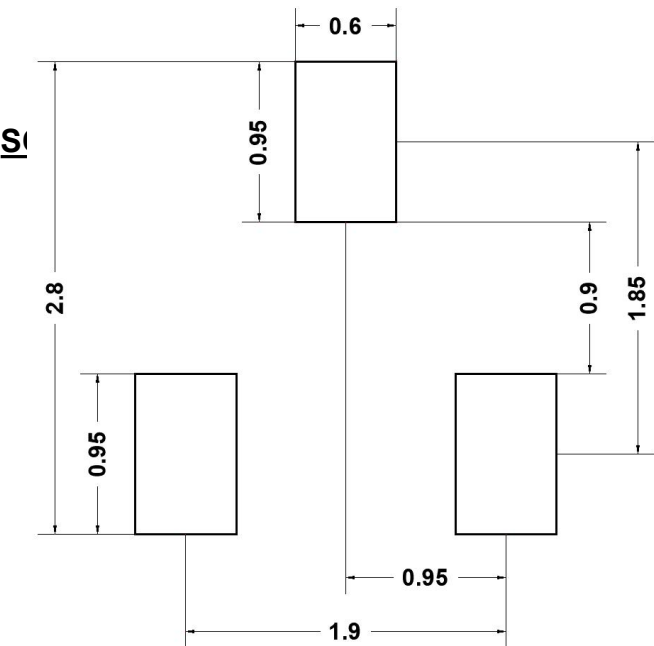
Figure6. Gate Charge

SOT-23 Package Outline Drawing



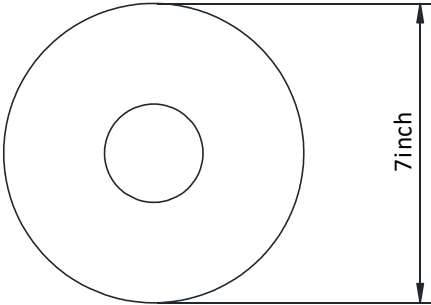
SYM	MILLIMETERS		
	MIN	NOM	MAX
A	-	-	1.30
A1	0.00	-	0.10
A2	0.85	-	1.05
A3	0.55REF		
b	0.30	-	0.50
C	0.10	-	0.25
C1	0.25REF		
D	2.80	2.90	3.00
E	2.25	2.40	2.55
E1	1.20	1.30	1.40
e	0.95BSC		
e1	1.80	-	2.00
L	0.30	-	0.50
L1	0.55REF		
θ	0°	-	-
θ1	-	10°	-

Suggested Land Pattern (Unit: mm)

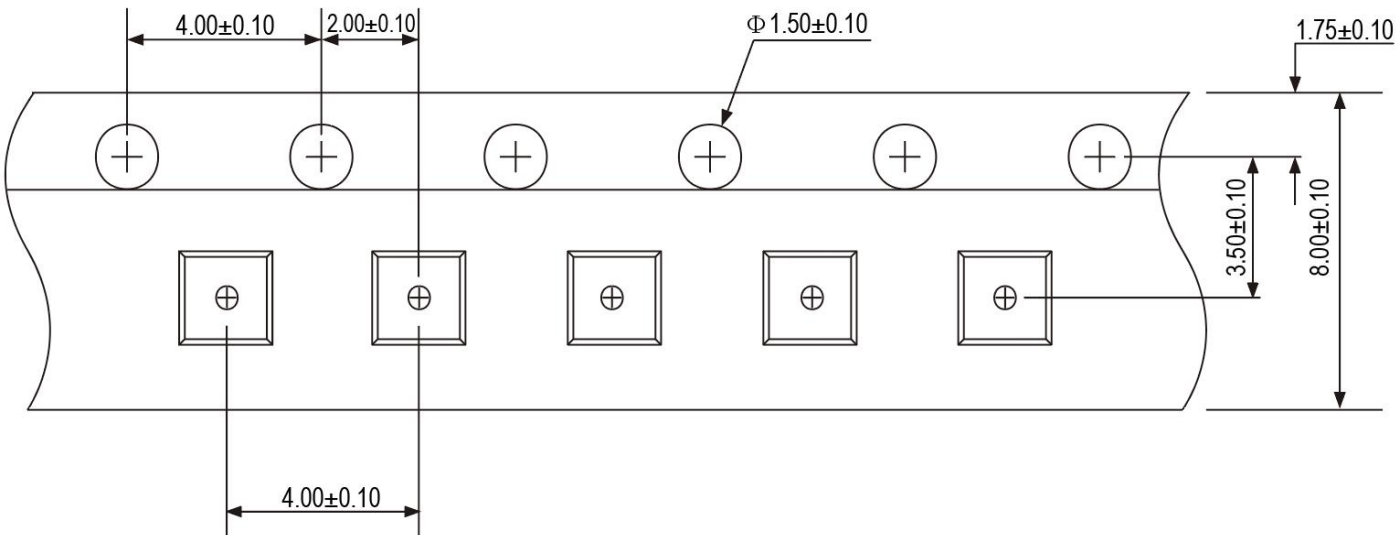


TAPE AND REEL INFORMATION

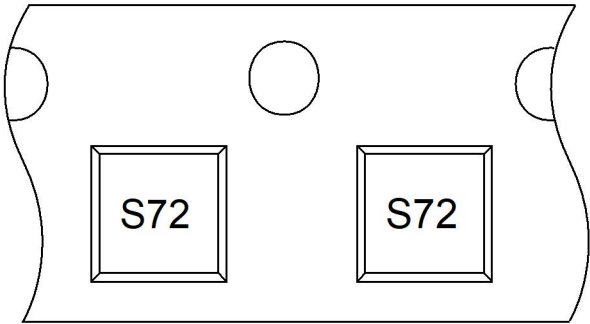
Reel Dimensions



Tape Dimensions



Unit:mm



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