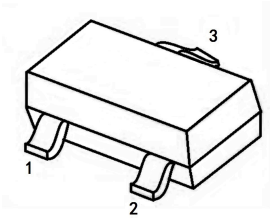
2N7002KL

60V N-Channel Mosfet

FEATURES

- $R_{DS(ON)} \leq 1.6\ \Omega$ @V_{GS}=10V
- $R_{DS(ON)} \leq 2.5\ \Omega$ @V_{GS}=4.5V

SOT-23

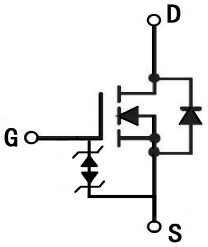


1. GATE
2. SOURCE
3. DRAIN

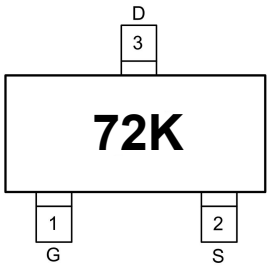
APPLICATIONS

- Portable appliances

N-CHANNEL MOSFET



MARKING



72K : Device Code

MAXIMUM RATINGS (Ta=25°C unless otherwise noted)

Symbol	Parameter	Max.	Units
V_{DSS}	Drain-Source Voltage	60	V
V_{GSS}	Gate-Source Voltage	±20	V
I_D	Continuous Drain Current	0.5	A
I_{DM}	Pulsed Drain Current note1	2.0	A
P_D	Power Dissipation	0.83	W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	150	℃/W
T_J	Junction Temperature	150	℃
T_{STG}	Storage Temperature Range	-55 to +150	℃

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MOSFET ELECTRICAL CHARACTERISTICS Ta=25 °C unless otherwise specified

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS} = 0V,I_D = 250μA	60	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 48V, V_{GS} = 0V, T_J = 25℃	-	-	1	μA
I_{GSS}	Gate to Body Leakage Current	V_{GS} = ±20V,V_{DS} = 0V	-	-	±10	uA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} =V_{GS},I_D = 250μA	0.5	-	1.5	V
$R_{DS(on)}$	Static Drain-Source On-Resistance note2	V_{GS} =10V, I_D =0.5A	-	-	1.6	Ω
		V_{GS} =4.5V, I_D =0.1A	-	-	2.5	
Dynamic Characteristics note3						
R_G	Gate Resistance	V_{GS} = V_{DS} = 0 V f = 1 MHz	-	100	-	Ω
C_{iss}	Input Capacitance	V_{DS} =25V, V_{GS} = 0V, f = 1.0MHz	-	22.8	-	pF
C_{oss}	Output Capacitance		-	3.5	-	pF
C_{rss}	Reverse Transfer Capacitance		-	2.9	-	pF
Q_g	Total Gate Charge	V_{DS}=10V, I_D=0.5A, V_{GS}=4.5V	-	280	-	pC
Q_{gs}	Gate-Source Charge		-	82	-	pC
Q_{gd}	Gate-Drain(“Miller”) Charge		-	201	-	pC
Switching Characteristics note3						
$t_{d(on)}$	Turn-On Delay Time	V_{GS} = 10V, V_{DS}=30V, R_G =25Ω, I_D=0.5A R_L =60Ω	-	3.8	-	ns
t_r	Turn-On Rise Time		-	3.4	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	19	-	ns
t_f	Turn-Off Fall Time		-	12	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	0.5	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS} = 0V, I_{SD}=0.5A, T_J = 25℃	-	-	1.3	V
t_{rr}	Reverse Recovery Time	V_{GS} = 0V, I_S =0.5A, di/dt =100A/μs	-	42	-	ns
Q_{rr}	Reverse Recovery Charge		-	41	-	nC

Notes: 1. Repetitive Rating: Pulse width limited by maximum junction temperature

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

3 . Guaranteed by design, not subject to production testing

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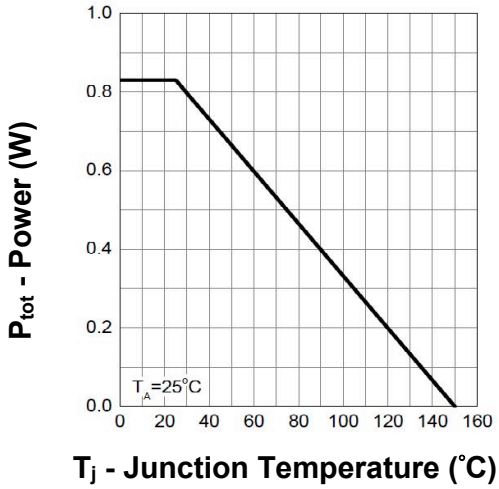
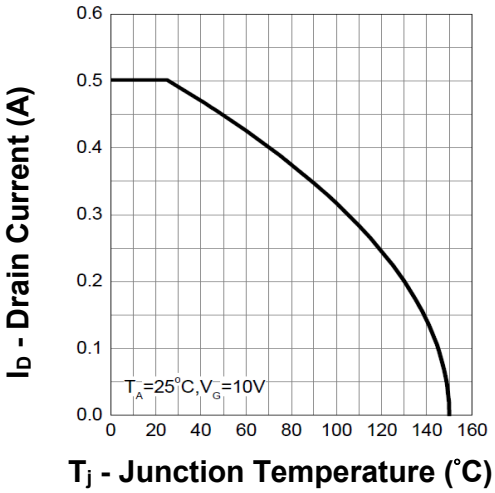
TYPICAL PERFORMANCE CHARACTERISTICS

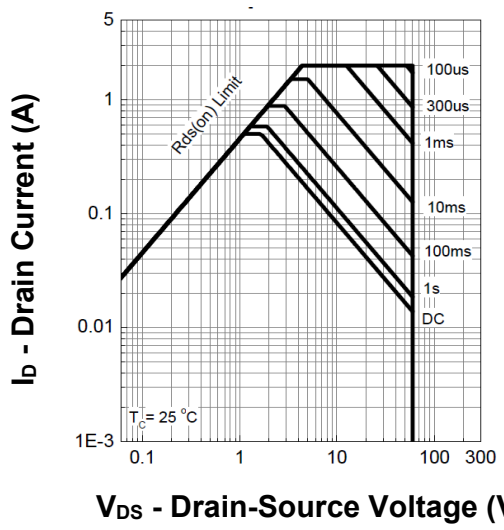
Power Dissipation



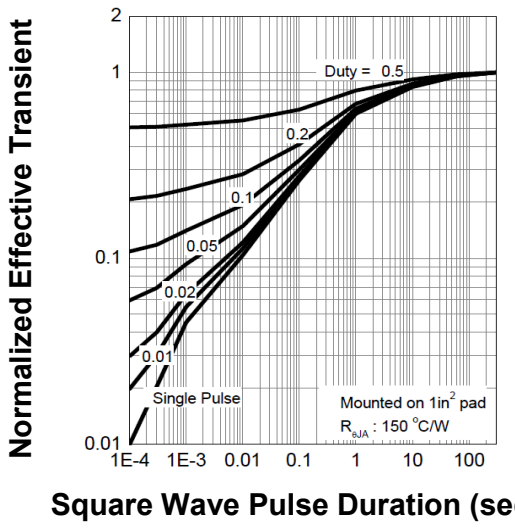
Drain Current



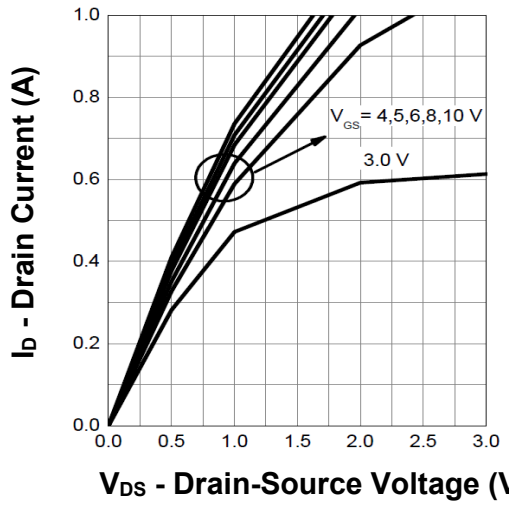
Safe Operation Area



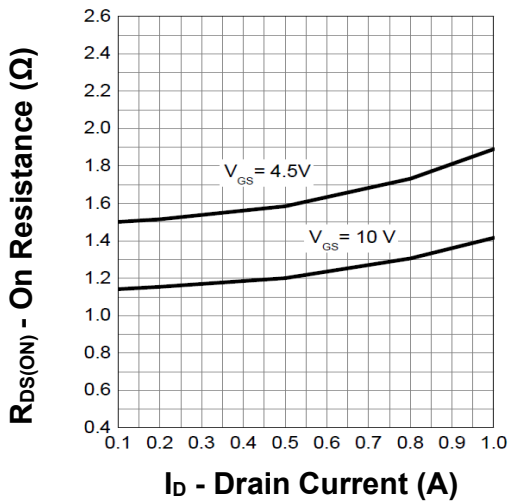
Thermal Transient Impedance



Output Characteristics



Drain-Source On Resistance



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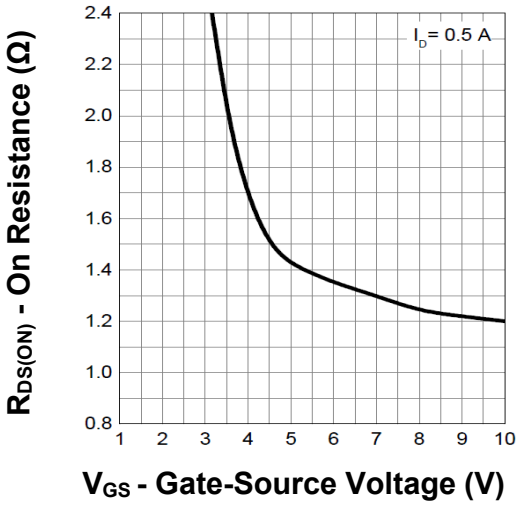
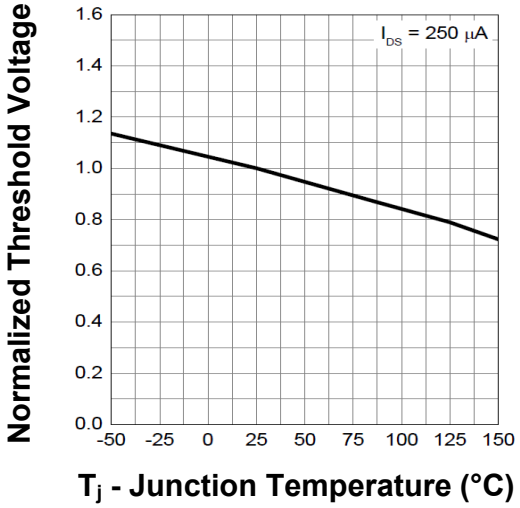
TYPICAL PERFORMANCE CHARACTERISTICS (cont.)

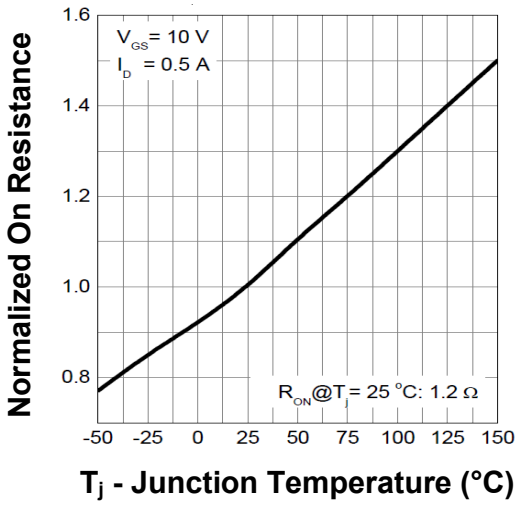
Transfer Characteristics



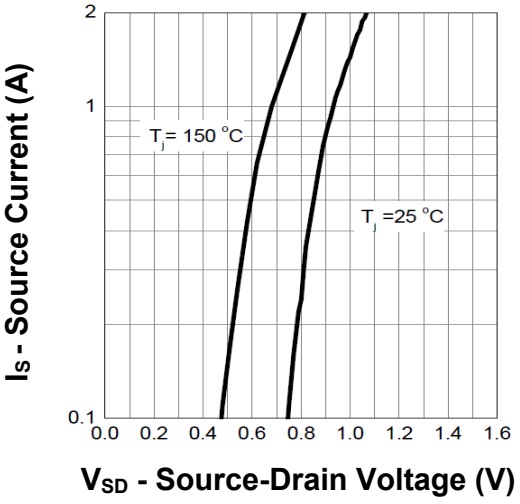
Gate Threshold Voltage



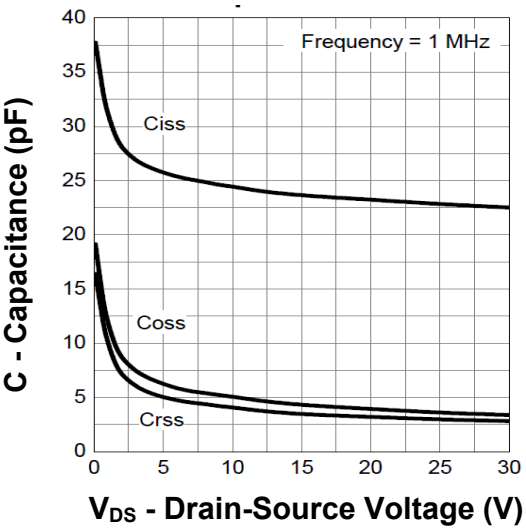
Drain-Source On Resistance



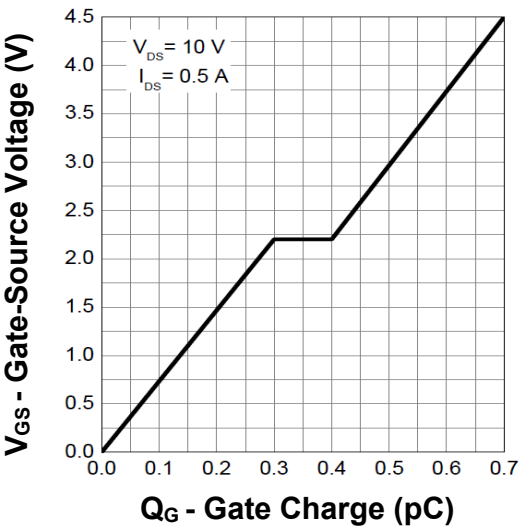
Source-Drain Diode Forward



Capacitance



Gate Charge



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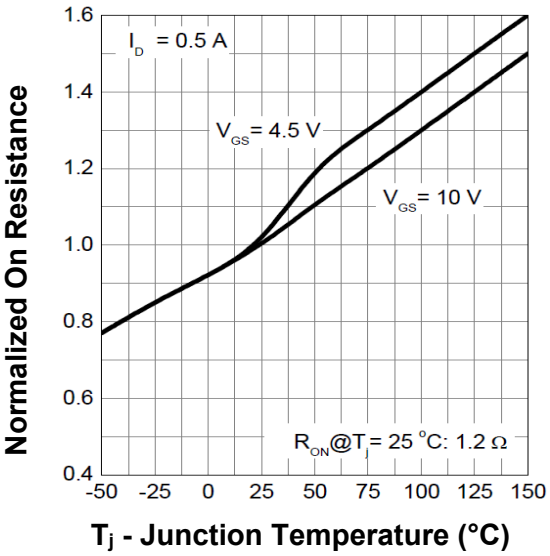
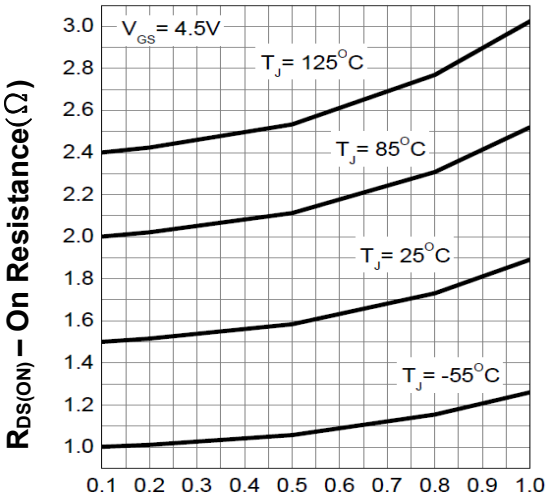
TYPICAL PERFORMANCE CHARACTERISTICS (cont.)

Drain-Source On Resistance



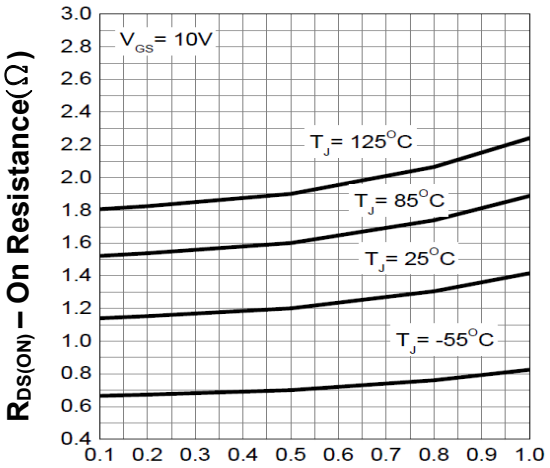
T_j - Junction Temperature (°C)

Drain-Source On Resistance

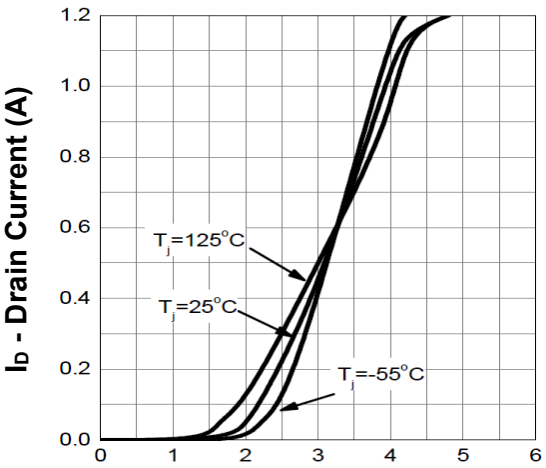


I_D - Drain Current (A)

Drain-Source On Resistance



I_D - Drain Current (A)



V_{GS} – Gate Voltage (V)

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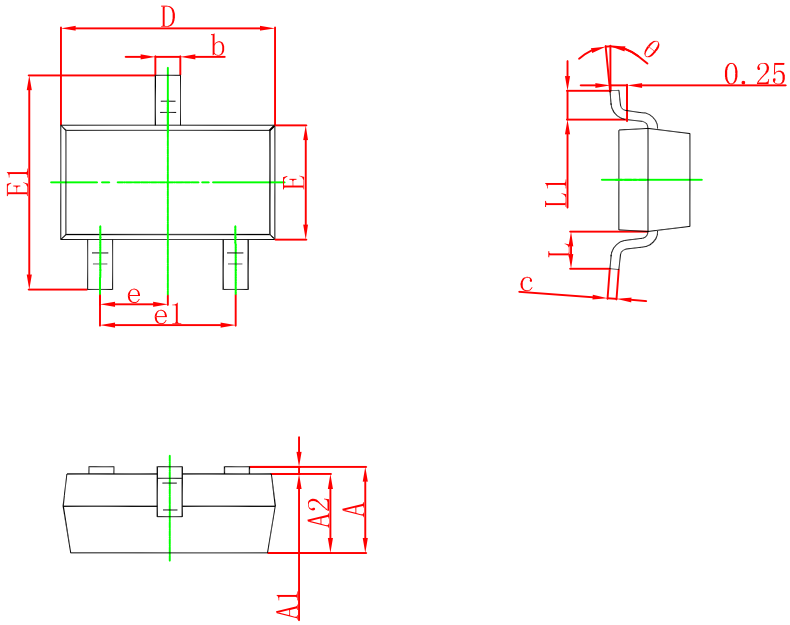
SOT-23 PACKAGE OUTLINE DRAWING



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°

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