

60V N-Channel MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
60V	5Ω@10V	340mA
	5.3Ω@4.5V	

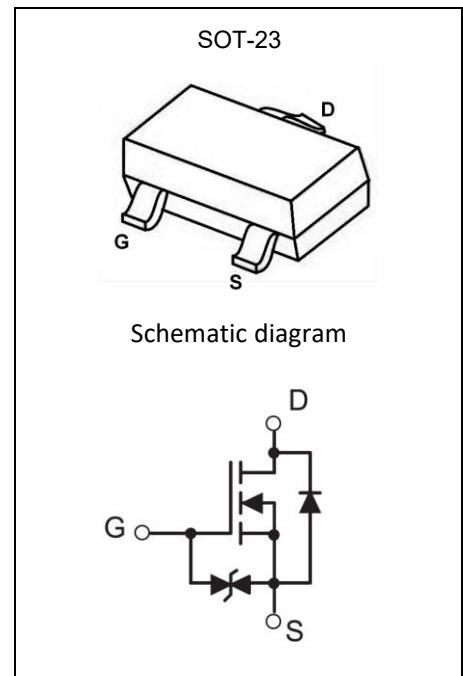
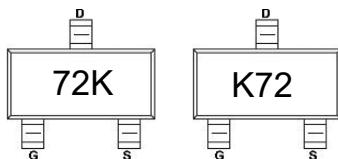
Feature

- High density cell design for Low $R_{DS(on)}$
- Voltage controlled small signal switch
- Rugged and reliable
- ESD protected GateHBM2.0KV
- AEC-Q101 qualified (Automotive grade with suffix "Q")
- Expsemi electronics

Application

- DC/DC Converter
- Load Switch for Portable Devices
- Battery Switch

MARKING:



ABSOLUTE 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	V
Continuous Drain Current	I_D	340	mA
Power Dissipation	P_D	0.35	W
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	357	°C/W
Junction Temperature	T_J	150	°C
Storage Temperature	T_{STG}	-55~+150	°C

MOSFET ELECTRICAL CHARACTERISTICS($T_a=25^\circ\text{C}$ unless otherwise noted)

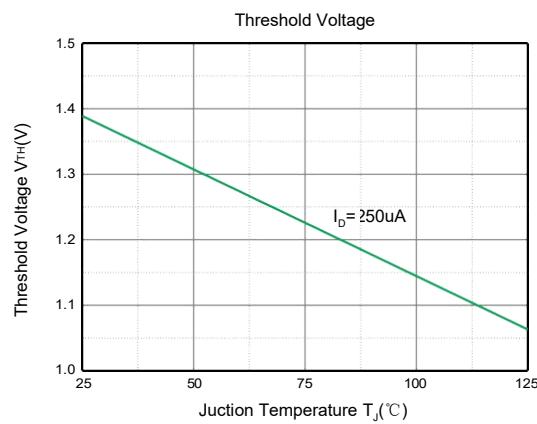
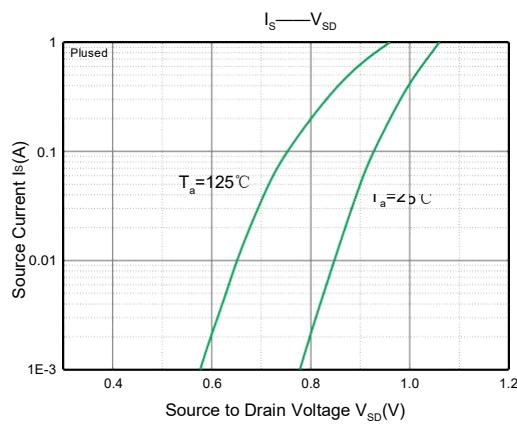
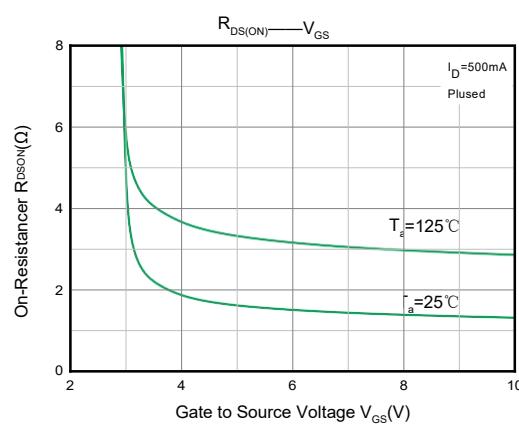
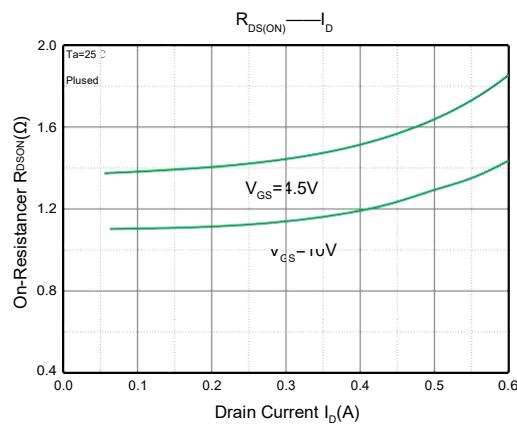
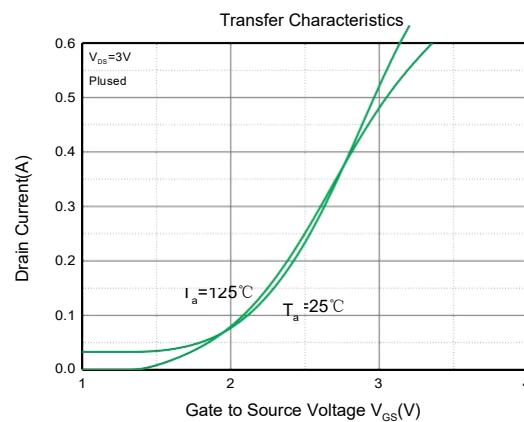
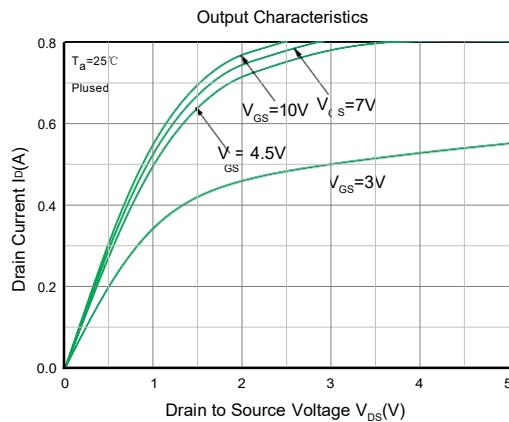
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(\text{BR})\text{DSS}}$	$V_{\text{GS}} = 0\text{V}, I_D = 250\mu\text{A}$	60			V
Zero gate voltage drain current	I_{DSS}	$V_{\text{DS}} = 48\text{V}, V_{\text{GS}} = 0\text{V}$			1	μA
	$I_{\text{GSS}1}$	$V_{\text{GS}} = \pm 20\text{V}, V_{\text{DS}} = 0\text{V}$			± 10	μA
Gate-body leakage current	$I_{\text{GSS}2}$	$V_{\text{GS}} = \pm 10\text{V}, V_{\text{DS}} = 0\text{V}$			± 200	nA
	$I_{\text{GSS}2}$	$V_{\text{GS}} = \pm 5\text{V}, V_{\text{DS}} = 0\text{V}$			± 100	nA
Gate threshold voltage*	$V_{\text{GS}(\text{th})}$	$V_{\text{DS}} = V_{\text{GS}}, I_D = 250\mu\text{A}$	1	1.4	2.5	V
Drain-source on-resistance*	$R_{\text{DS}(\text{on})}$	$V_{\text{GS}} = 10\text{V}, I_D = 500\text{mA}$		1.3	5	Ω
		$V_{\text{GS}} = 4.5\text{V}, I_D = 200\text{mA}$		1.4	5.3	
Recovered charge	Q_r	$V_{\text{GS}} = 0\text{V}, I_S = 300\text{mA}, V_R = 25\text{V},$ $dI_s/dt = -100\text{A}/\mu\text{s}$		30		nC
Dynamic characteristics**						
Input Capacitance	C_{iss}	$V_{\text{DS}} = 10\text{V}, V_{\text{GS}} = 0\text{V}, f = 1\text{MHz}$			40	pF
Output Capacitance	C_{oss}				30	
Reverse Transfer Capacitance	C_{rss}				10	
Switching Characteristics**						
Turn-on delay time	$t_{d(\text{on})}$	$V_{\text{GS}} = 10\text{V}, V_{\text{DD}} = 50\text{V}, R_G = 50\Omega$ $R_{\text{GS}} = 50\Omega, R_L = 250\Omega$			10	ns
Turn-off delay time	$t_{d(\text{off})}$				15	
Reverse recovery Time	t_{rr}	$V_{\text{GS}} = 0\text{V}, I_S = 300\text{mA}, V_R = 25\text{V},$ $dI_s/dt = -100\text{A}/\mu\text{s}$		30		
Source-Drain Diode characteristics						
Diode Forward voltage	V_{SD}	$V_{\text{GS}} = 0\text{V}, I_S = 300\text{mA}$		0.97	1.5	V
GATE-SOURCE ZENER DIODE						
Gate-Source Breakdown Voltage	BV_{GSO}	$IGS = \pm 1\text{mA}(\text{Open Drain})$	± 21.5		± 30	V

Notes:

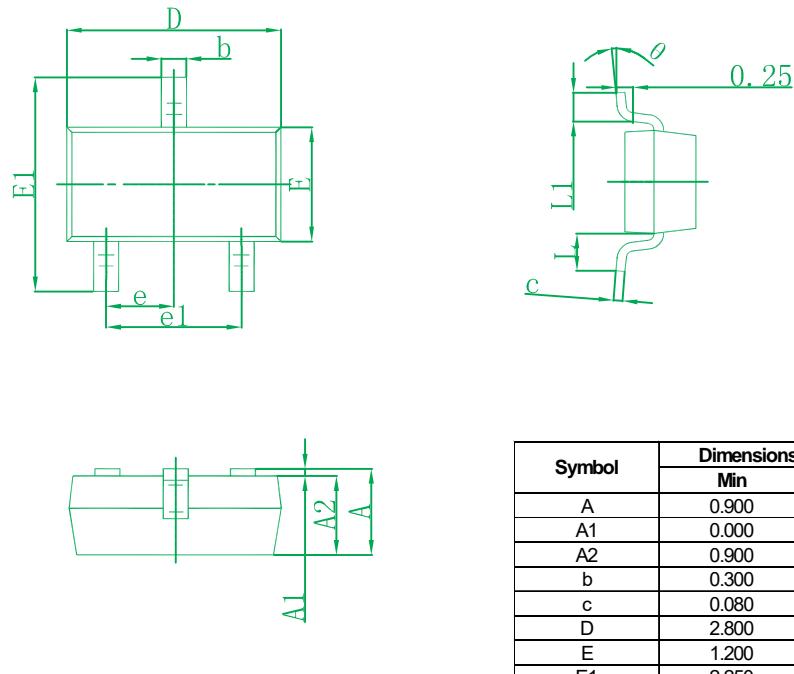
 *Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$.

**These parameters have no way to verify.

Typical Characteristics

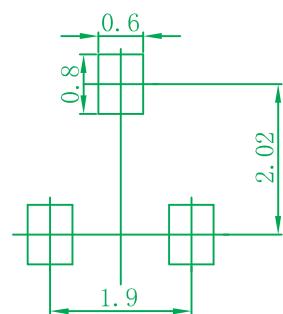


SOT-23 Package Information



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	1.150	0.035	0.045
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.050	0.110	0.120
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	0.360 REF		0.014 REF	
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.

Ordering information

Device	Package	Shipping
2N7002K	SOT-23	3000/Tape&Reel(7inches)