

2N7002K-AU

60V N-Channel Enhancement Mode MOSFET – ESD Protected

Voltage

60 V

Current

300mA

Features

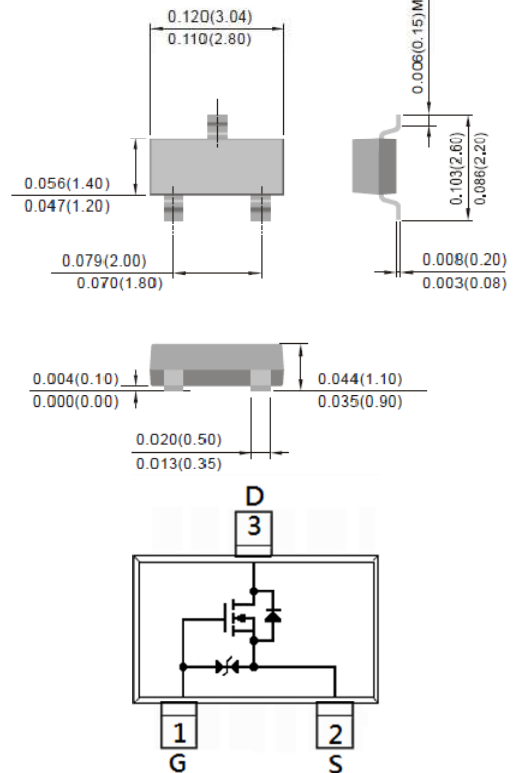
- $R_{DS(ON)}$, $V_{GS}@10V$, $I_D@500mA < 3\Omega$
- $R_{DS(ON)}$, $V_{GS}@4.5V$, $I_D@200mA < 4\Omega$
- Advanced Trench Process Technology
- High Density Cell Design For Ultra Low On-Resistance
- Very Low Leakage Current In Off Condition
- Specially Designed for Battery Operated Systems, Solid-State Relays Drivers: Relay, Displays, Memories, etc
- ESD Protected 2KV HBM
- AEC-Q101 qualified
- Lead free in compliance with EU RoHS 2.0
- Green molding compound as per IEC 61249 standard

Mechanical Data

- Case: SOT-23 Package
- Terminals: Solderable per MIL-STD-750, Method 2026
- Approx. Weight: 0.0003 ounces, 0.0084 grams

SOT-23

Unit : inch(mm)



Maximum Ratings and Thermal Characteristics ($T_A=25^\circ\text{C}$ unless otherwise noted)

PARAMETER		SYMBOL	LIMIT	UNITS
Drain-Source Voltage		V _{DS}	60	V
Gate-Source Voltage		V _{GS}	±20	
Continuous Drain Current ^(Note 4)		I _D	300	mA
Pulsed Drain Current ^(Note 1)		I _{DM}	2000	
Power Dissipation	T _A =25°C	P _D	500	mW
	Derate above 25°C		4	mW/°C
Operating Junction and Storage Temperature Range		T _J ,T _{STG}	-55~150	°C
Typical Thermal Resistance		R _{θJA}	250	°C/W
- Junction to Ambient ^(Note 3,4)				



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

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNITS
Static						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =10uA	60	-	-	V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250uA	1	-	2.5	
Drain-Source On-State Resistance	R _{DS(on)}	V _{GS} =10V, I _D =500mA	-	-	3	Ω
		V _{GS} =4.5V, I _D =200mA	-	-	4	
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =60V, V _{GS} =0V	-	-	1	uA
Gate-Source Leakage Current	I _{GSS}	V _{GS} =+20V, V _{DS} =0V	-	-	+10	
Forward Transconductance	g _{fs}	V _{DS} =15V, I _D =250mA	100	-	-	mS
Dynamic (Note 5)						
Total Gate Charge	Q _g	V _{DS} =15V, I _D =250mA, V _{GS} =5V (Note 1,2)	-	0.8	-	nC
Gate-Source Charge	Q _{gs}		-	0.35	-	
Gate-Drain Charge	Q _{gd}		-	0.2	-	
Input Capacitance	C _{iss}	V _{DS} =25V, V _{GS} =0V, f=1MHZ	-	35	-	pF
Output Capacitance	C _{oss}		-	13	-	
Reverse Transfer Capacitance	C _{rss}		-	8	-	
Turn-On Delay Time	td _(on)	V _{DD} =30V, I _D =200mA, V _{GS} =10V, R _G =10Ω (Note 1,2)	-	2.7	-	ns
Turn-On Rise Time	tr		-	19	-	
Turn-Off Delay Time	td _(off)		-	15	-	
Turn-Off Fall Time	tf		-	23	-	
Drain-Source Diode						
Maximum Continuous Drain-Source Diode Forward Current	I _S	---	-	-	300	mA
Diode Forward Voltage	V _{SD}	I _S =200mA, V _{GS} =0V	-	0.82	1.3	V

NOTES:

- Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$.
- Essentially independent of operating temperature typical characteristics.
- $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins mounted on a 1 inch FR-4 with 2oz. square pad of copper.
- The maximum current rating is package limited.
- Guaranteed by design, not subject to production testing.

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TYPICAL CHARACTERISTIC CURVES

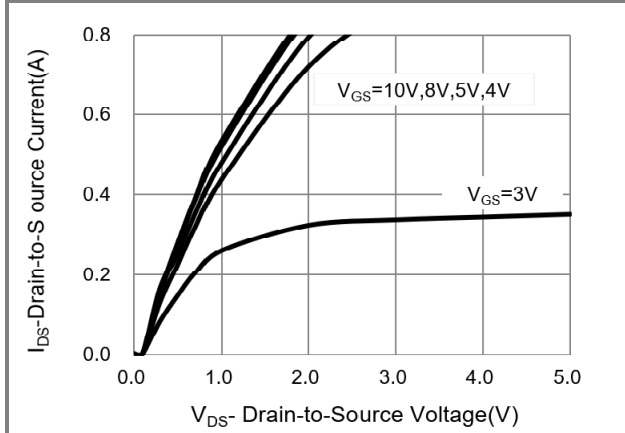


Fig.1 On-Region Characteristics

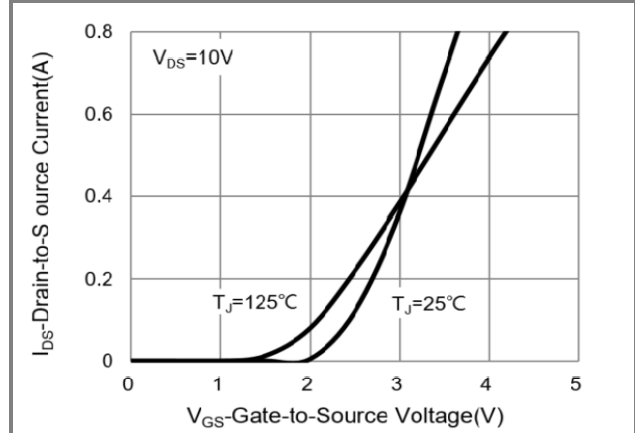


Fig.2 Transfer Characteristics

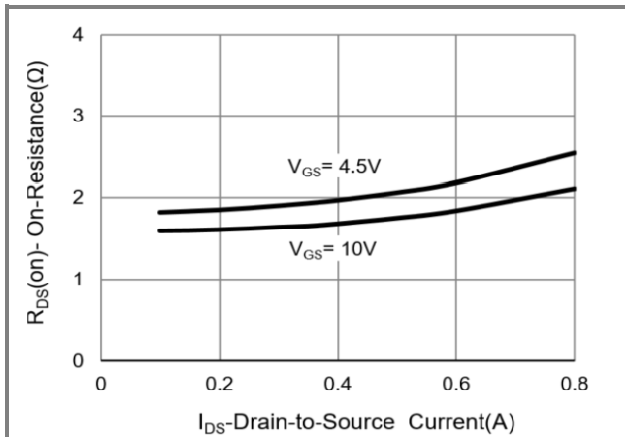


Fig.3 On-Resistance vs. Drain Current

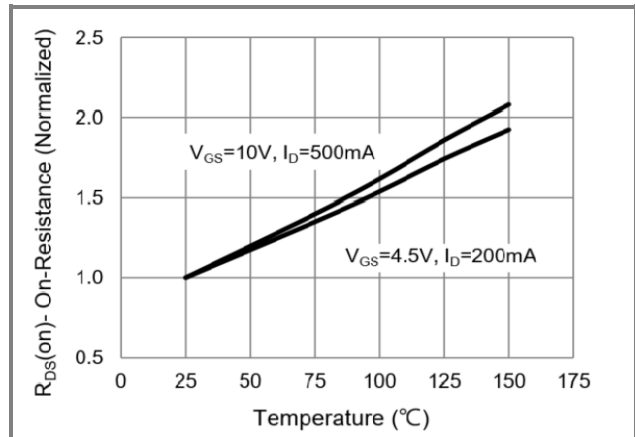


Fig.4 On-Resistance vs. Junction temperature

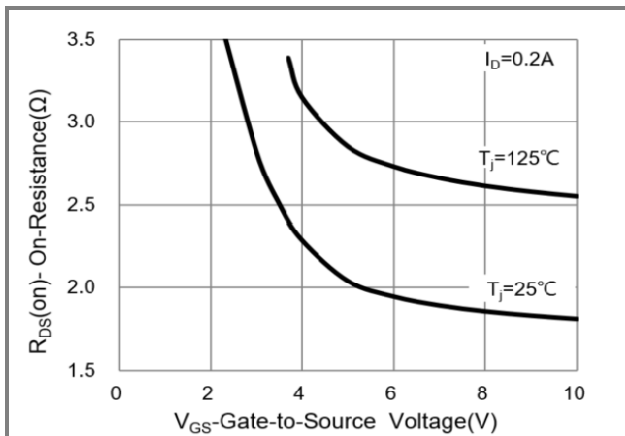


Fig.5 On-Resistance Variation with V_{GS}

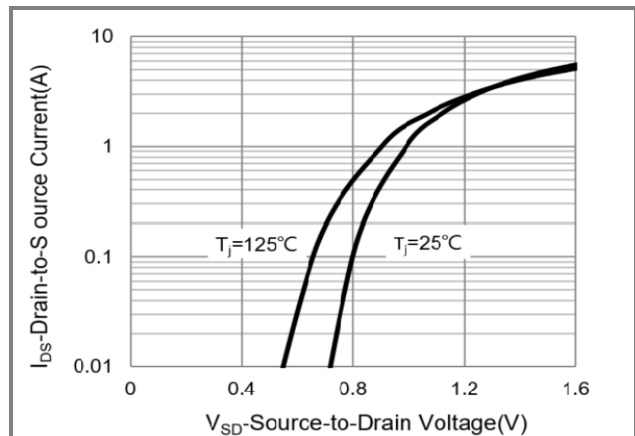


Fig.6 Body Diode Characteristics



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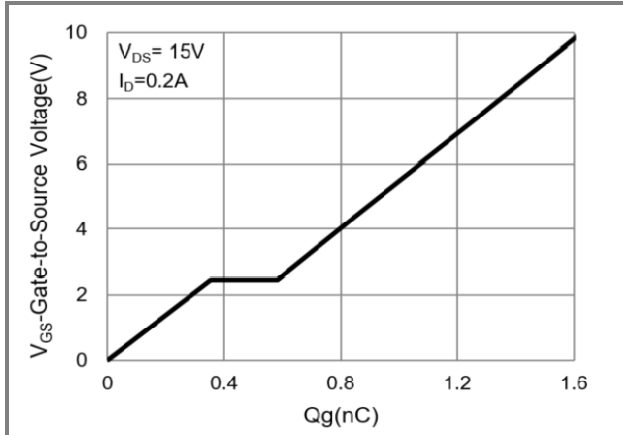


Fig.7 Gate-Charge Characteristics

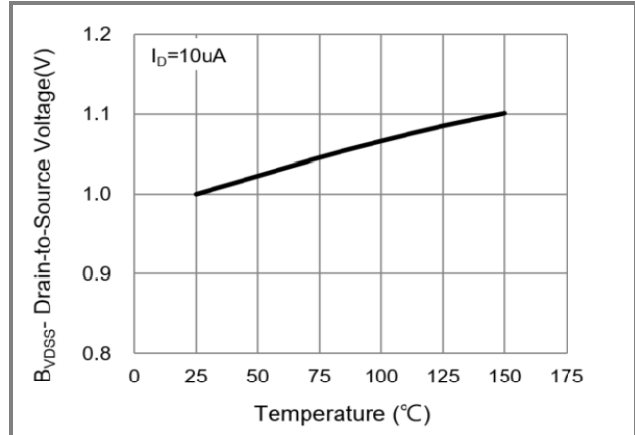


Fig.8 Breakdown Voltage Variation vs. Temperature

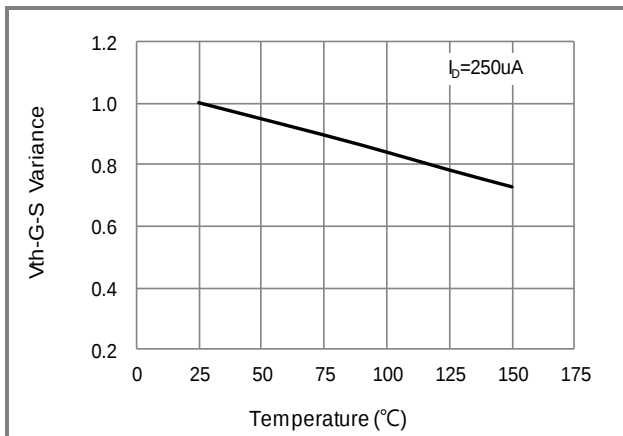


Fig.9 Threshold Voltage Variation with Temperature

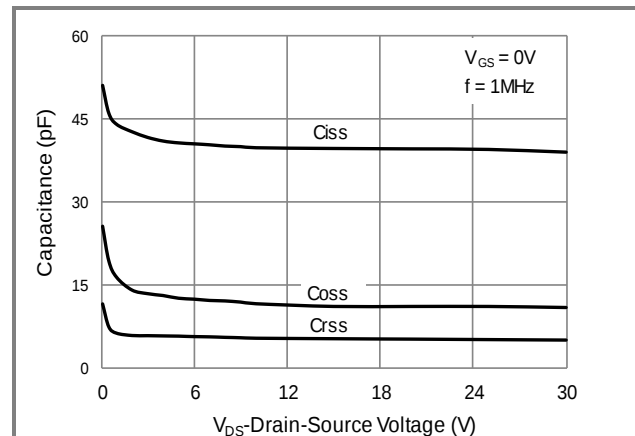


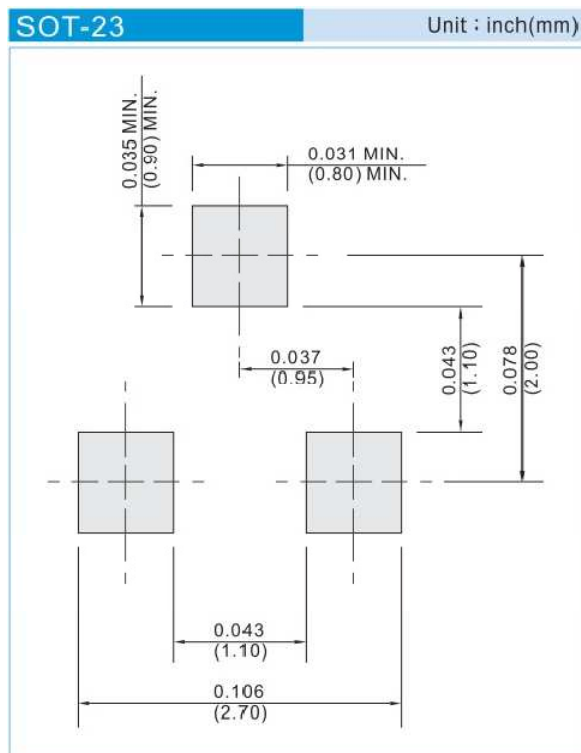
Fig.10 Capacitance vs. Drain-Source Voltage

2N7002K-AU

Part No. Packing Code Version

Part No. Packing Code	Package Type	Packing Type	Marking	Version
2N7002K-AU_R1_000A2	SOT-23	3K pcs / 7" reel	K72	Halogen free

Mounting Pad Layout





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