

2N7002K

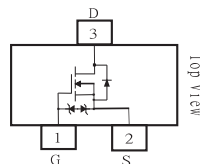
60V N-Channel Enhancement Mode MOSFET - ESD Protected

FEATURES

- $R_{DS(ON)}$, $V_{GS}@10V, I_{DS}@500mA=3\Omega$
- $R_{DS(ON)}$, $V_{GS}@4.5V, I_{DS}@200mA=4\Omega$
- 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 : Relays, Displays, Lamps, Solenoids, Memories, etc.
- ESD Protected 2KV HBM
- Lead free in comply with EU RoHS 2002/95/EC directives.
- Green molding compound as per IEC61249 Std. . (Halogen Free)

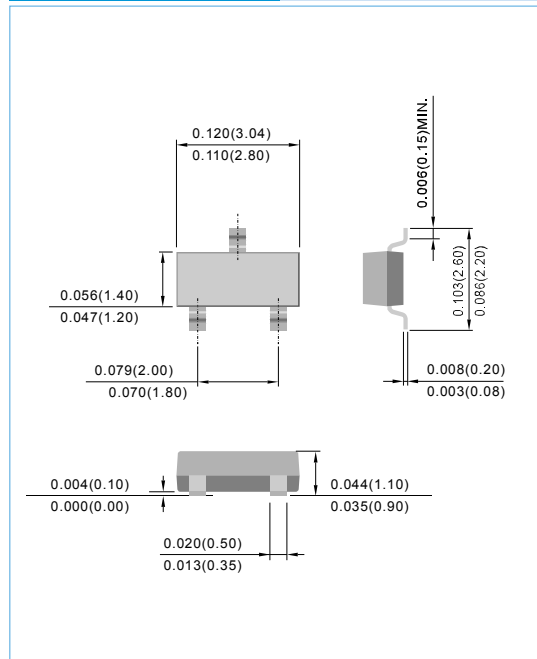
MECHANICAL DATA

- Case: SOT-23 Package
- Terminals : Solderable per MIL-STD-750,Method 2026
- Apporx. Weight: 0.0003 ounces, 0.0084 grams
- Marking : K72



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	V
Continuous Drain Current	I_D	300	mA
Pulsed Drain Current ¹⁾	I_{DM}	2000	mA
Maximum Power Dissipation $T_A=25^\circ\text{C}$ $T_A=75^\circ\text{C}$	P_D	350 210	mW
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to + 150	$^\circ\text{C}$
Junction-to Ambient Thermal Resistance(PCB mounted) ²	$R_{\theta JA}$	357	$^\circ\text{C/W}$

Note: 1. Maximum DC current limited by the package
2. Surface mounted on FR4 board, $t < 5$ sec

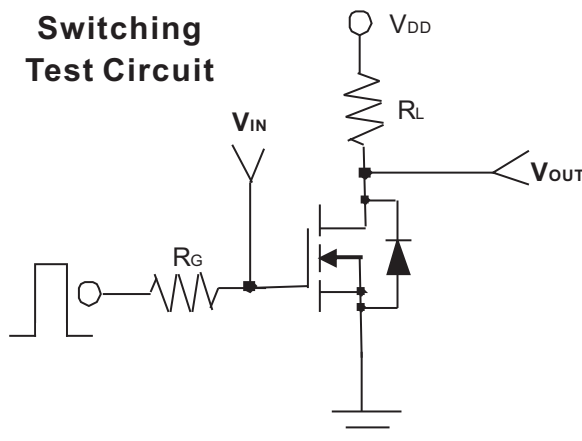
PAN JIT RESERVES THE RIGHT TO IMPROVE PRODUCT DESIGN,FUNCTIONS AND RELIABILITY WITHOUT NOTICE

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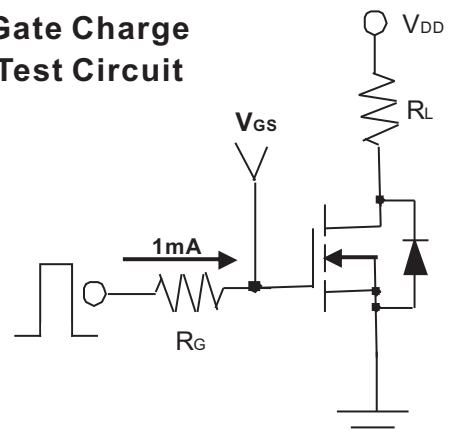
ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Units
Static						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V , I _D =10μA	60	-	-	V
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} =4.5V , I _D =200mA	-	-	4.0	Ω
Drain-Source On-State Resistance	R _{DS(on)}	V _{GS} =10V , I _D =500mA	-	-	3.0	
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =60V , V _{GS} =0V	-	-	1	μA
Gate Body Leakage	I _{GSS}	V _{GS} =±20V , V _{DS} =0V	-	-	±10	μA
Forward Transconductance	g _{fs}	V _{DS} =15V , I _D =250mA	100	-	-	mS
Dynamic						
Total Gate Charge	Q _g	V _{DS} =15V, I _D =200mA V _{GS} =5V	-	-	0.8	nC
Turn-On Time	t _{on}	V _{DD} =30V , R _L =150Ω I _D =200mA , V _{GEN} =10V R _G =10Ω	-	-	20	ns
Turn-Off Time	t _{off}		-	-	40	
Input Capacitance	C _{iss}	V _{DS} =25V , V _{GS} =0V f=1.0MHz _Z	-	-	35	pF
Output Capacitance	C _{oss}		-	-	10	
Reverse Transfer Capacitance	C _{rss}		-	-	5	
Source-Drain Diode						
Diode Forward Voltage	V _{SD}	I _S =200mA , V _{GS} =0V	-	0.82	1.3	V
Continuous Diode Forward Current	I _S	-	-	-	300	mA
Pulse Diode Forward Current	I _{SM}	-	-	-	2000	mA

**Switching
Test Circuit**



**Gate Charge
Test Circuit**



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

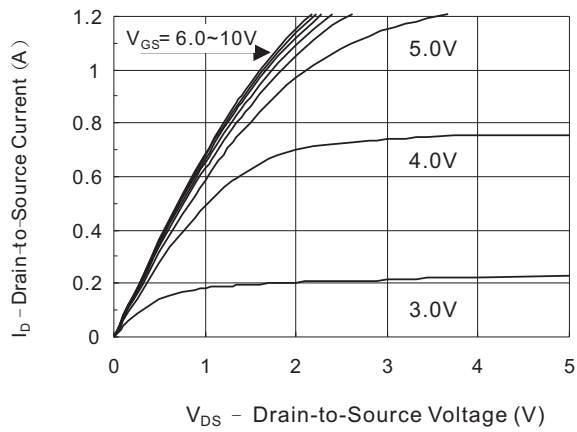


FIG.1- Output Characteristic

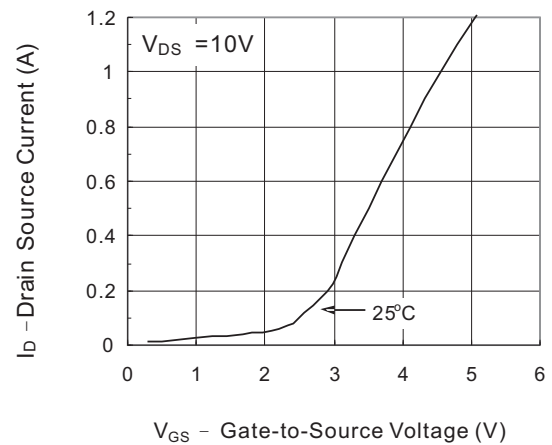


FIG.2- Transfer Characteristic

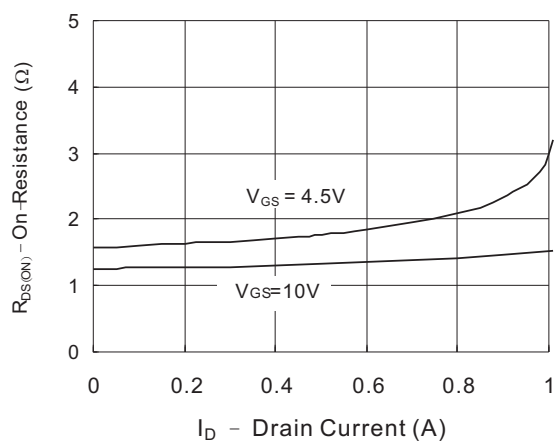


FIG.3- On Resistance vs Drain Current

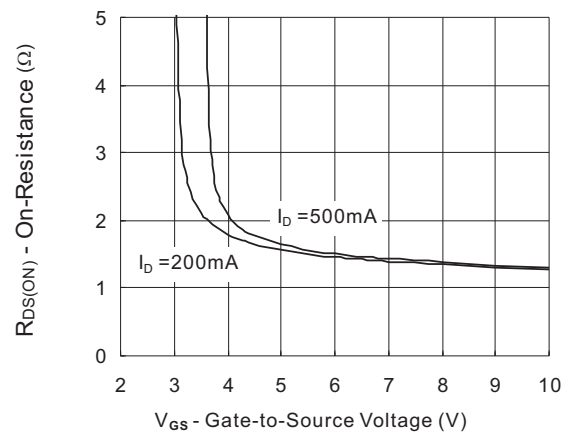


FIG.4- On Resistance vs Gate to Source Voltage

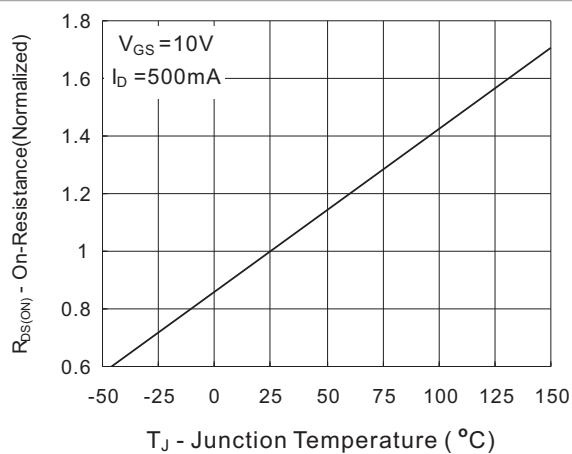


FIG.5- On Resistance vs Junction Temperature

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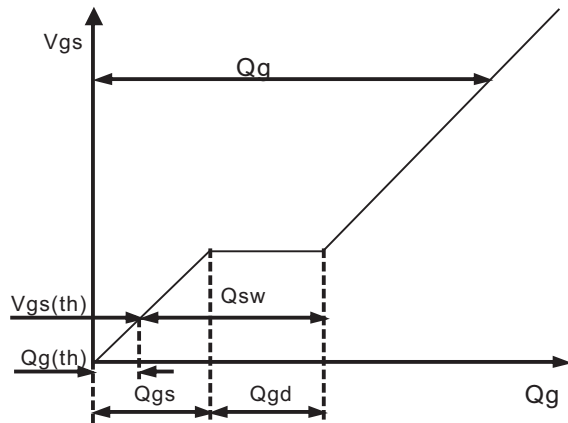


Fig.6 - Gate Charge Waveform

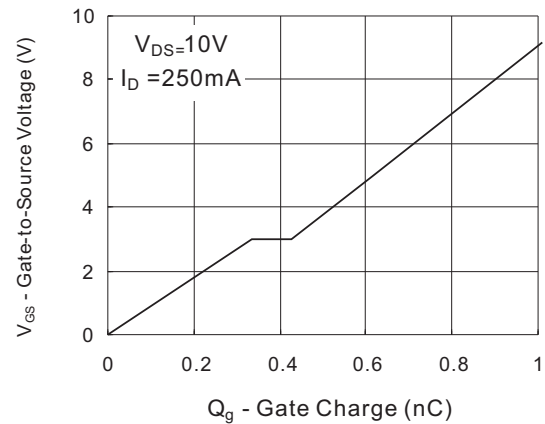


Fig.7 - Gate Charge

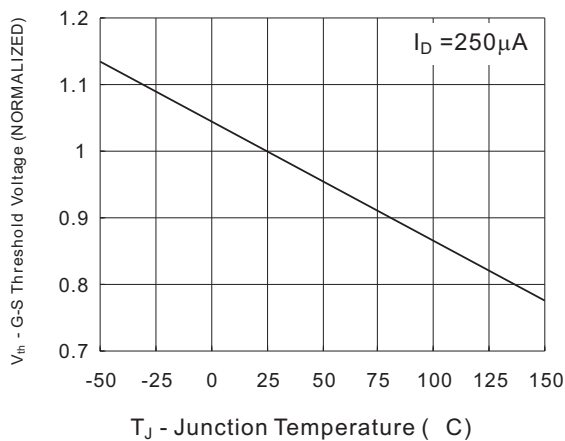


Fig.8 - Threshold Voltage vs Temperature

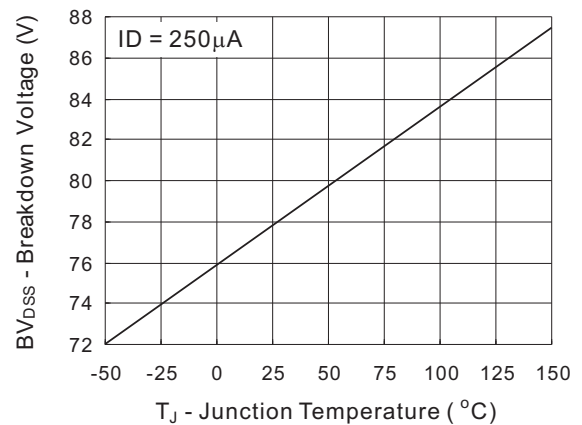


Fig.9 - Breakdown Voltage vs Junction Temperature

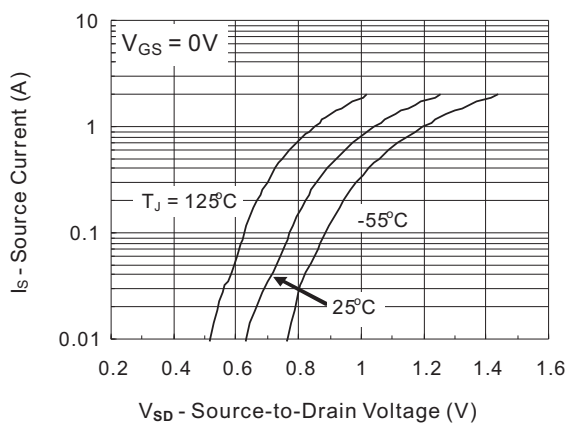


Fig.10 - Source-Drain Diode Forward Voltage

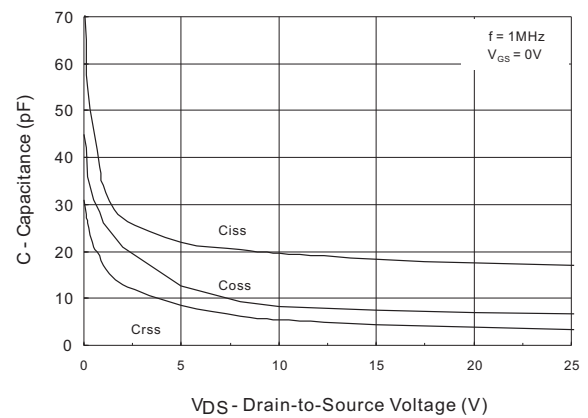
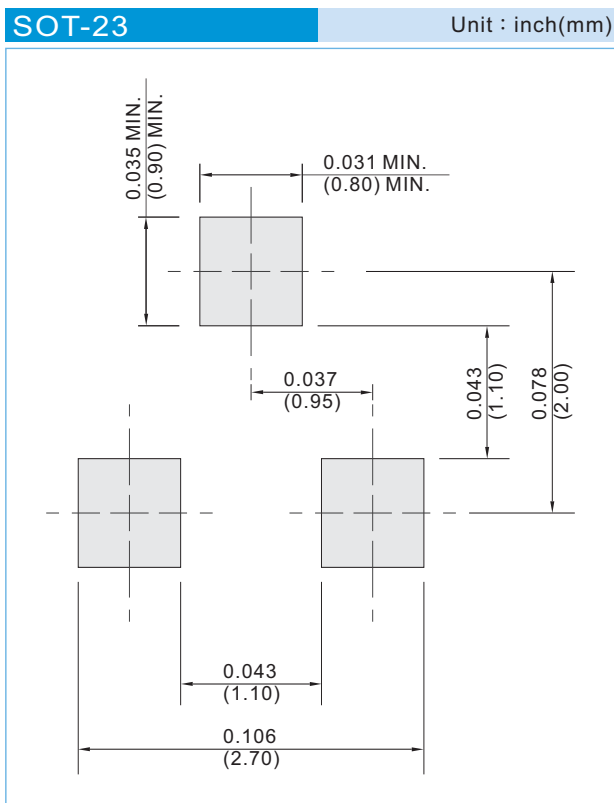


Fig.11 - Capacitance vs Drain to Source Voltage

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MOUNTING PAD LAYOUT



ORDER INFORMATION

- Packing information
 - T/R - 12K per 13" plastic Reel
 - T/R - 3K per 7" plastic Reel

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Part No_packing code_Version

2N7002K_R1_00001

2N7002K_R2_00001

For example :

RB500V-40_R2_00001

Part No.

Serial number

Version code means HF

Packing size code means 13"

Packing type means T/R

Packing Code XX				Version Code XXXXX		
Packing type	1 st Code	Packing size code	2 nd Code	HF or RoHS	1 st Code	2 nd ~5 th Code
Tape and Ammunition Box (T/B)	A	N/A	0	HF	0	serial number
Tape and Reel (T/R)	R	7"	1	RoHS	1	serial number
Bulk Packing (B/P)	B	13"	2			
Tube Packing (T/P)	T	26mm	X			
Tape and Reel (Right Oriented) (TRR)	S	52mm	Y			
Tape and Reel (Left Oriented) (TRL)	L	PANASERT T/B CATHODE UP (PBCU)	U			
FORMING	F	PANASERT T/B CATHODE DOWN (PBCD)	D			



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