2N7002K

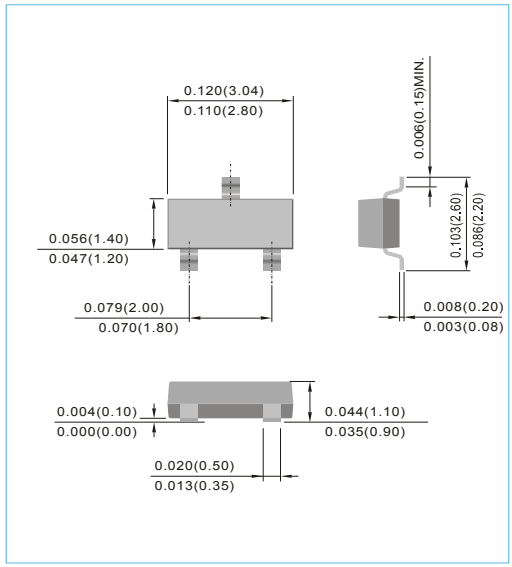
60V N-Channel Enhancement Mode MOSFET - ESD Protected

FEATURES

- $R_{DS(ON)}$, V_{GS}@10V,I_{DS}@500mA=3Ω
- $R_{DS(ON)}$, V_{GS}@4.5V,I_{DS}@200mA=4Ω

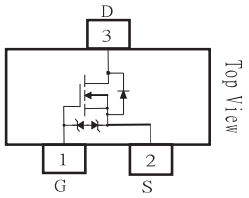
- Advanced Trench Process Technology
- High Density Cell Design For Ultra Low On-Resistance
- Very Low Leakage Current In Off Condition
- Specially Designed for Battery Operated Systems, Solid-State Relays Drivers : Relays, Displays, Lamps, Solenoids, Memories, etc.
- ESD Protected 2KV HBM
- Lead free in compliance with EU RoHS 2.0
- Green molding compound as per IEC 61249 standard

SOT-23 Unit : inch(mm)



MECHANICAL DATA

- Case: SOT-23 Package
- Terminals: Solderable per MIL-STD-750,Method 2026
- Marking: K72
- Approx. Weight: 0.0003 ounce, 0.0084 gram



Maximum RATINGS and Thermal Characteristics (T_A=25°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°C T_A=75°C	P_D	350 210	mW
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 to + 150	°C
Junction-to Ambient Thermal Resistance(PCB mounted)[2]	$R_{\theta JA}$	357	°C/W

Note:1.Maximum DC current limited by the package
2.Surface mounted on FR4 board, t≤10 sec
3.Pulse width≤300us, Duty cycle≤2%

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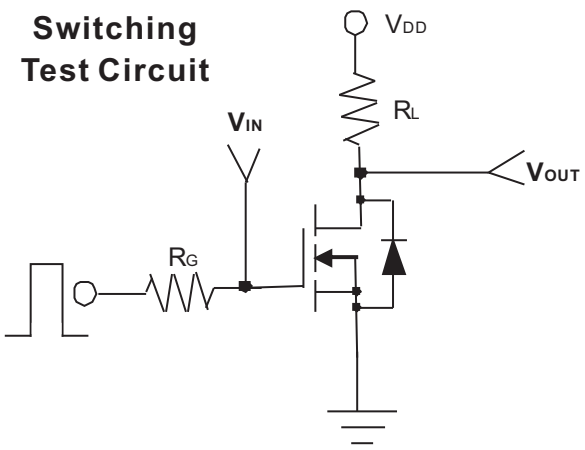
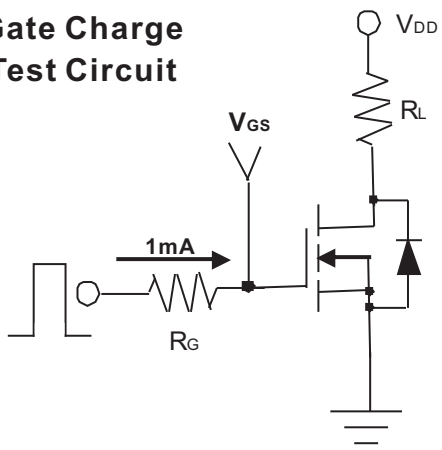
ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Units
Static						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V , I_D=10uA	60	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS} , I_D=250uA	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	uA
Gate Body Leakage	I_{GSS}	V_{GS}=±20V , V_{DS}=0V	-	-	±10	uA
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	-	-	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°C, unless otherwise noted)

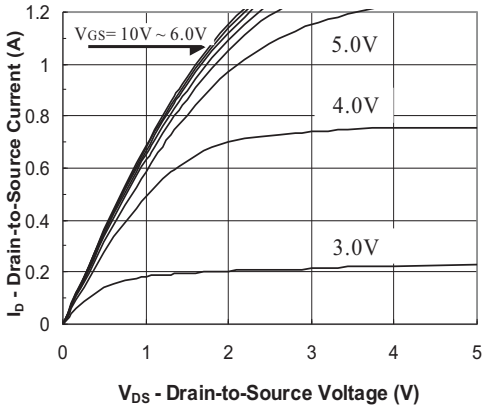

FIG.1- Output Characteristic

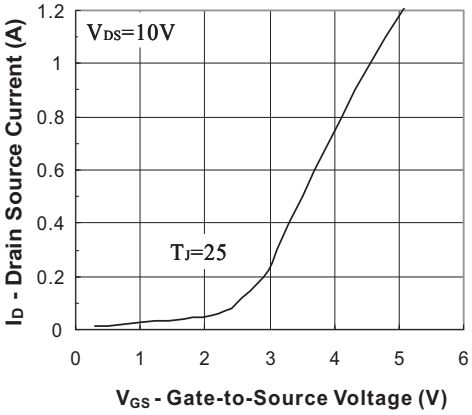

FIG.2- Transfer Characteristic

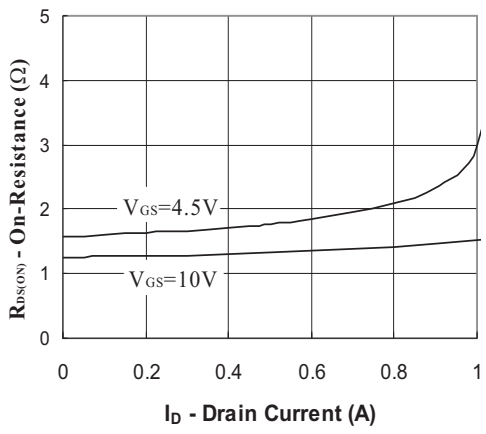

FIG.3- On Resistance vs Drain Current

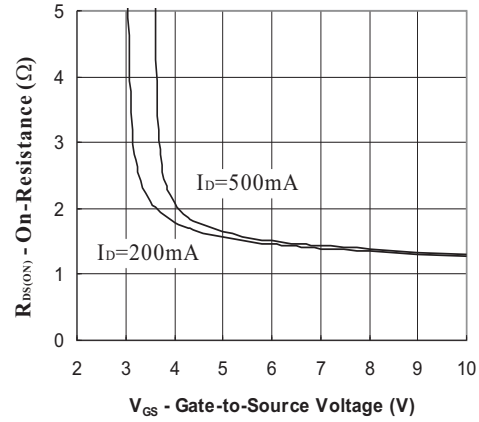

FIG.4- On Resistance vs Gate to Source Voltage

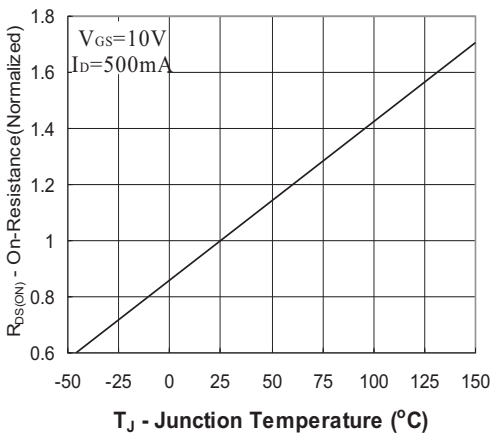

FIG.5- On Resistance vs Junction Temperature

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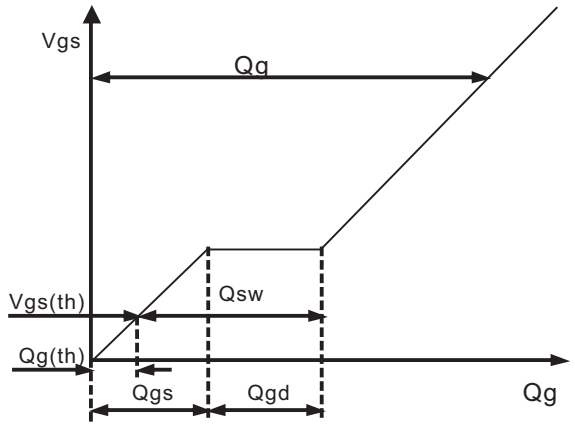

Fig.6 - Gate Charge Waveform

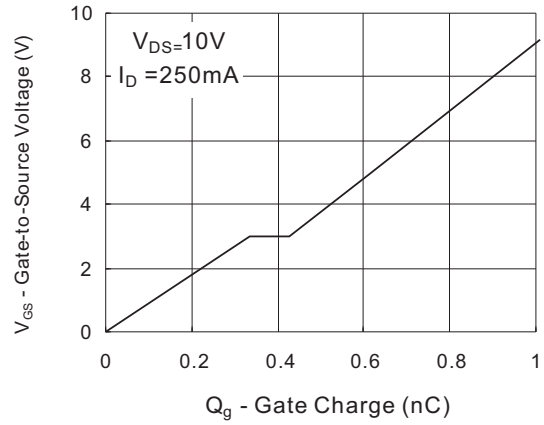

Fig.7 - Gate Charge

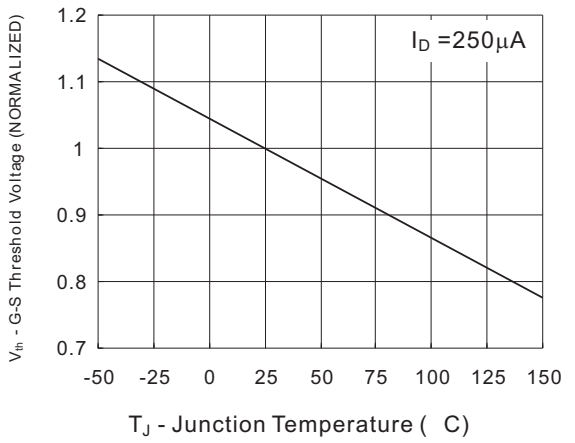

Fig.8 - Threshold Voltage vs Temperature

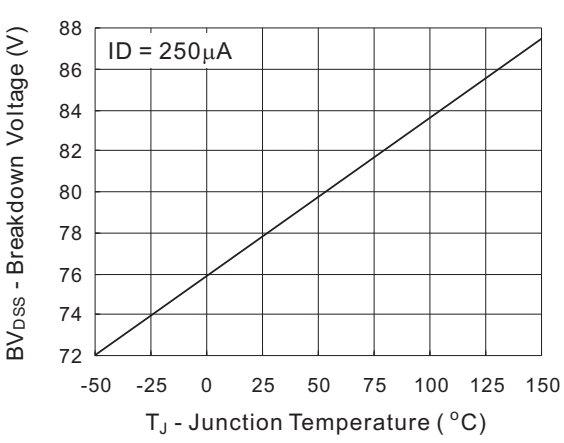

Fig.9 - Breakdown Voltage vs Junction Temperature

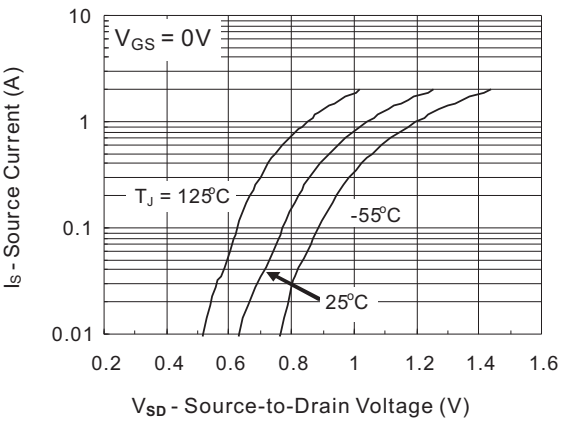

Fig.10 - Source-Drain Diode Forward Voltage

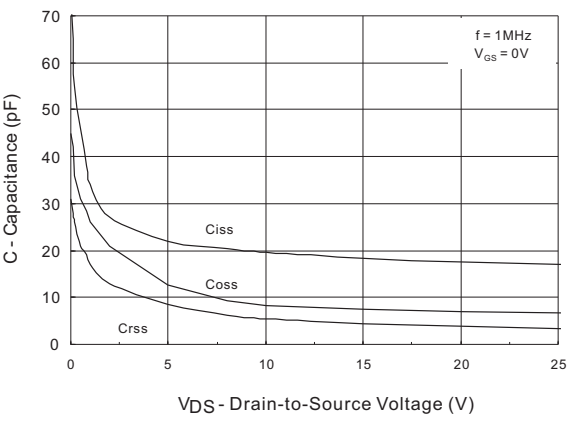

Fig.11 - Capacitance vs Drain to Source Voltage

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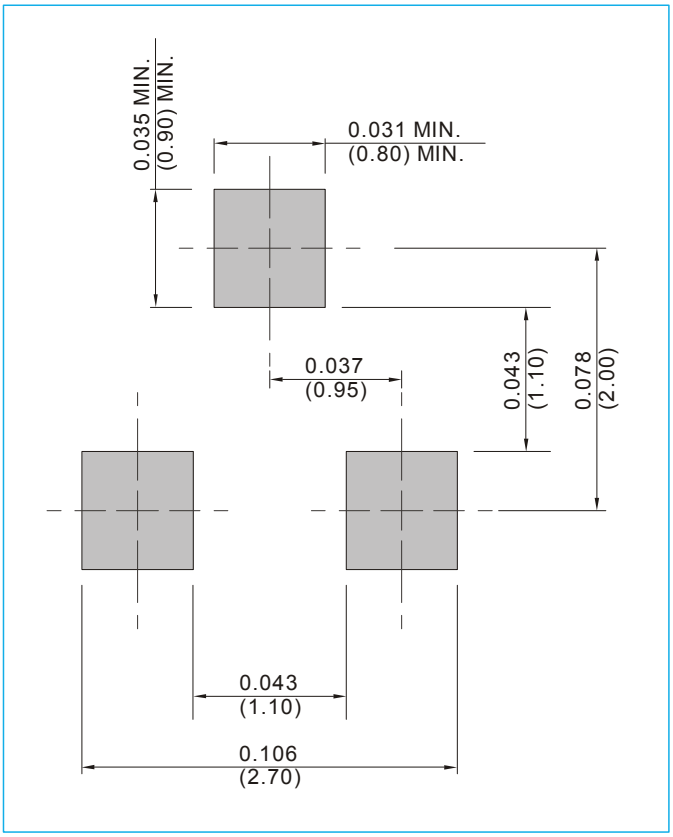
MOUNTING PAD LAYOUT

SOT-23 Unit : inch(mm)



ORDER INFORMATION

- Packing information

  T/R - 12K per 13" plastic Reel

  T/R - 3K per 7" plastic Reel

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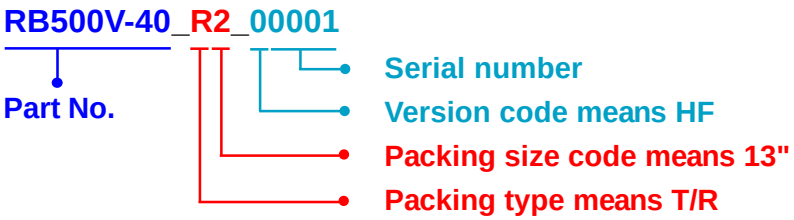
Part No_packing code_Version

2N7002K_R1_00001

2N7002K_R2_00001

For example :



Packing Code XX				Version Code XXXXX		
Packing type	1st Code	Packing size code	2nd Code	HF or RoHS	1st Code	2nd~5th 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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