

2N7002

60V N-Channel Enhancement Mode MOSFET - ESD Protected

FEATURES

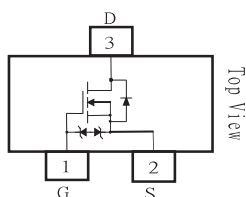
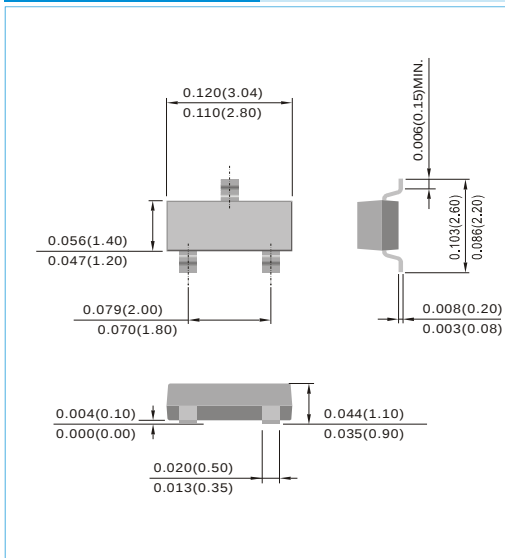
- $R_{DS(ON)}$ V_{GS} @10V, I_{DS} @500mA=3Ω
- $R_{DS(ON)}$ V_{GS} @4.5V, I_{DS} @200mA=4Ω
- Advanced Trench Process Technology
- High Density Cell Design For Ultra Low On-Resistance
- Very Low Leakage Current In Off Condition
- Specially Designed for Battery Operated Systems, Solid-State Relays Drivers : Relays, Displays, Lamps, Solenoids, Memories, etc.
- ESD Protected 2KV HBM
- Lead free in compliance with EU RoHS 2011/65/EU directive
- Green molding compound as per IEC61249 Std. . (Halogen Free)

MECHANICAL DATA

- Case: SOT-23 Package
- Terminals: Solderable per MIL-STD-750, Method 2026
- Marking: S72
- Approx. Weight: 0.0003 ounce, 0.0084 gram

SOT-23

Unit : inch(mm)



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	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

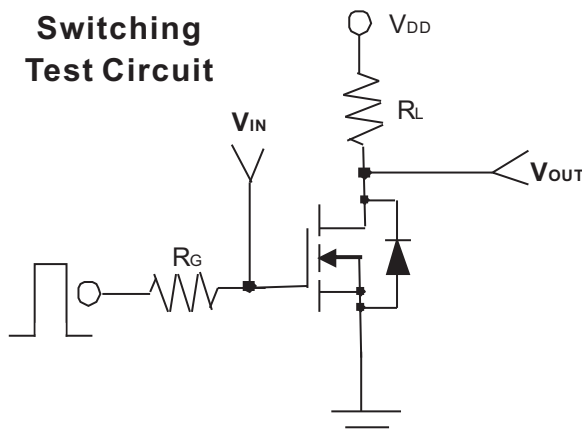
3.Pulse width≤300us, Duty cycle≤2%

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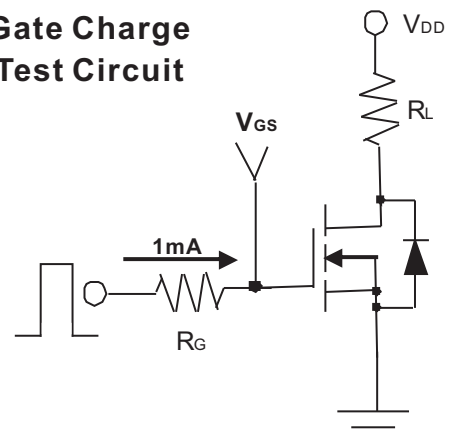
ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Units
Static						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V$, $I_D=10\mu A$	60	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$, $I_D=250\mu A$	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}	$V_{GS}=\pm 20V$, $V_{DS}=0V$	-	-	± 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}	$V_{DD}=30V$, $R_L=150\Omega$ $I_D=200mA$, $V_{GEN}=10V$ $R_G=10\Omega$	-	21	-	ns
Turn-Off Time	t_{off}		-	30	-	
Input Capacitance	C_{iss}	$V_{DS}=25V$, $V_{GS}=0V$ $f=1.0MHz$	-	24	-	pF
Output Capacitance	C_{oss}		-	13	-	
Reverse Transfer Capacitance	C_{rss}		-	8	-	
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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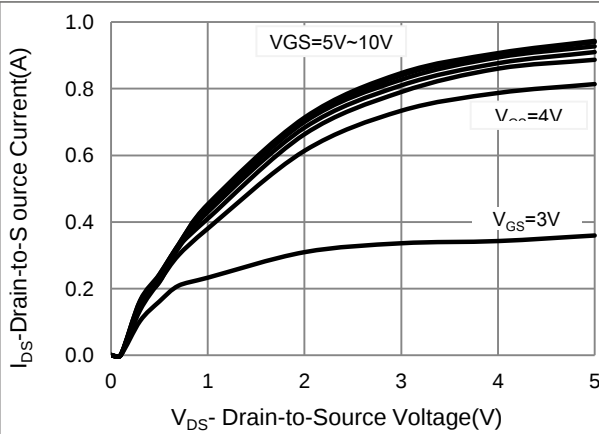


Fig.1 On-Region Characteristics

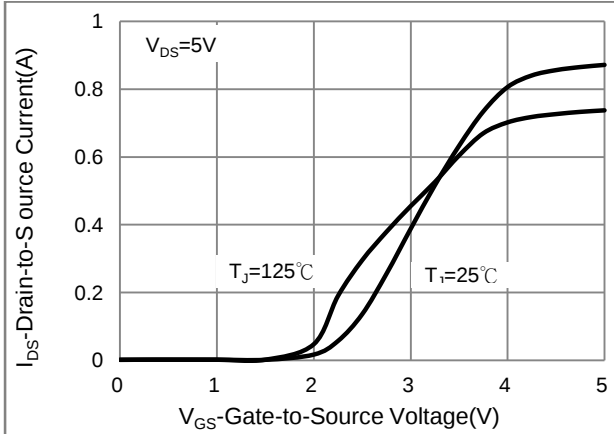


Fig.2 Transfer Characteristics

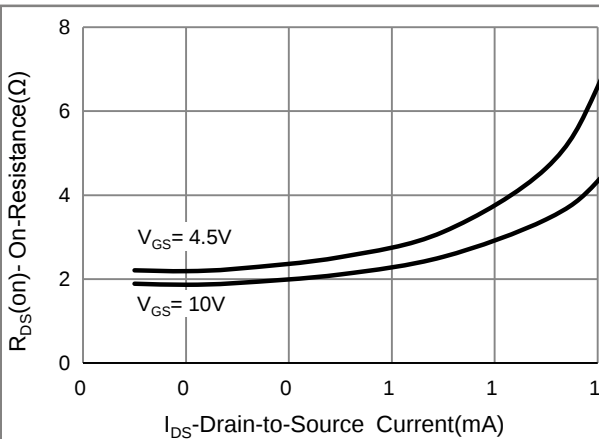


Fig.3 On-Resistance vs. Drain current

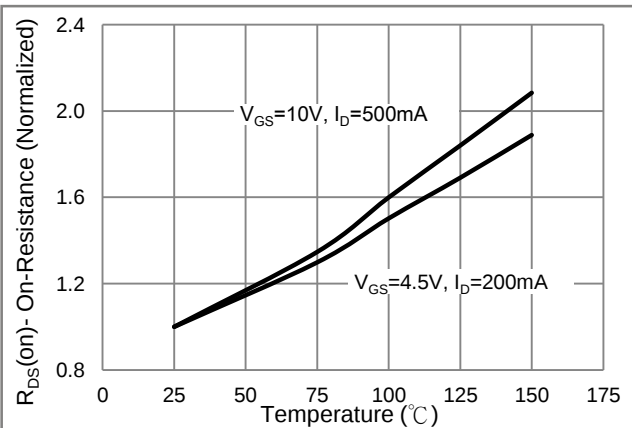


Fig.4 On-Resistance vs. Junction

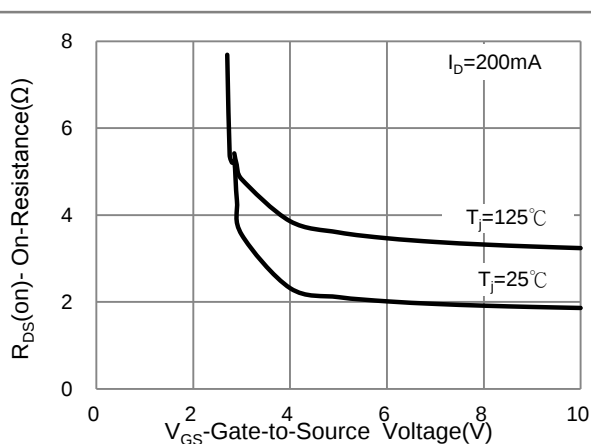


Fig.5 On-Resistance Variation with VGS.

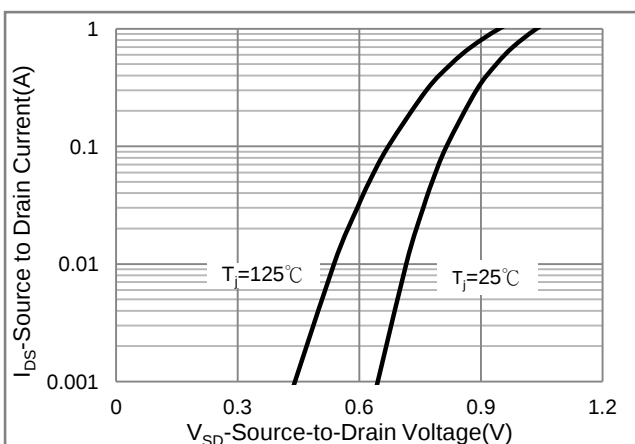


Fig.6 Body Diode Characteristics

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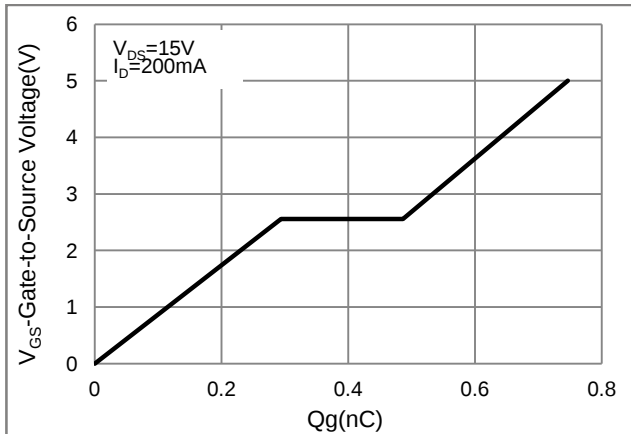


Fig.7 Gate-Charge Characteristics

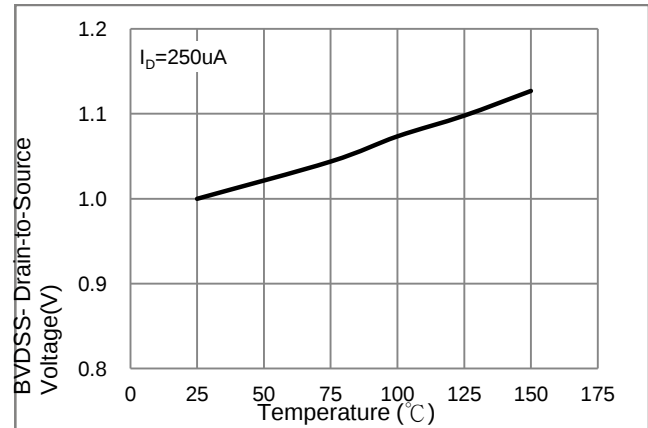


Fig.8 Breakdown Voltage Variation vs. Temperature

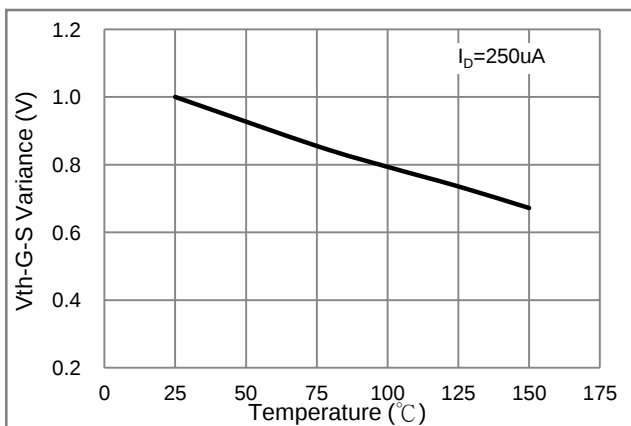


Fig.9 Threshold Voltage Variation with

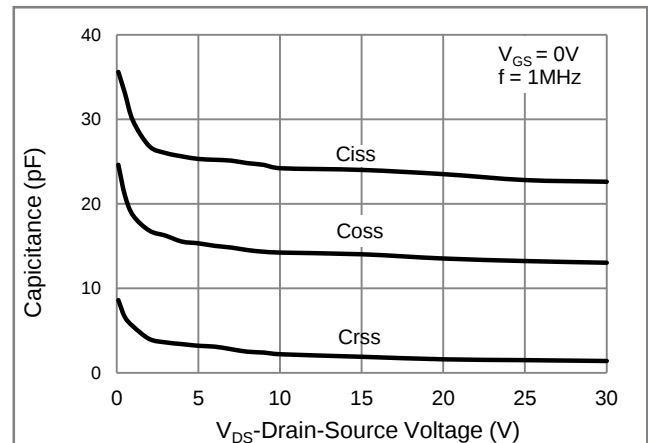


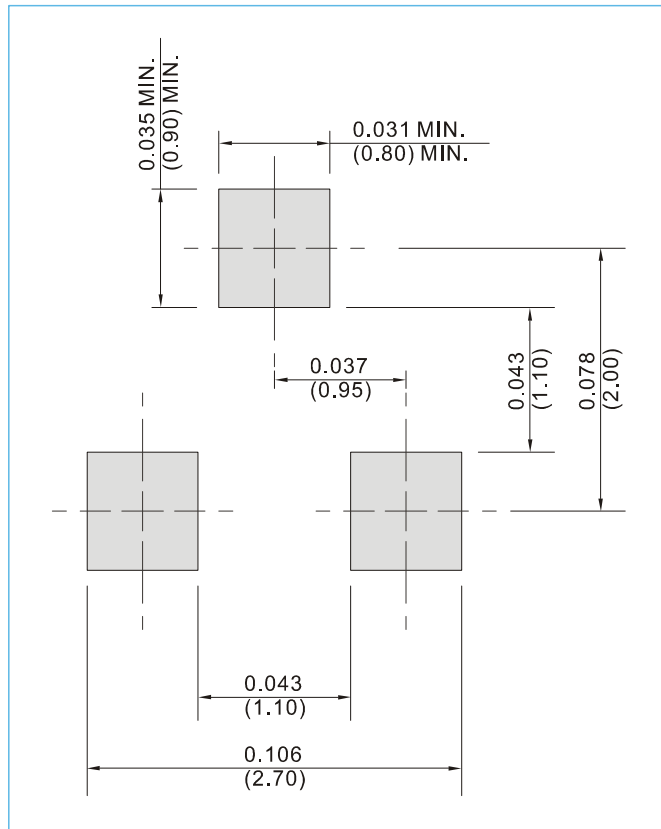
Fig.10 Capacitance vs. Drain-Source Voltage

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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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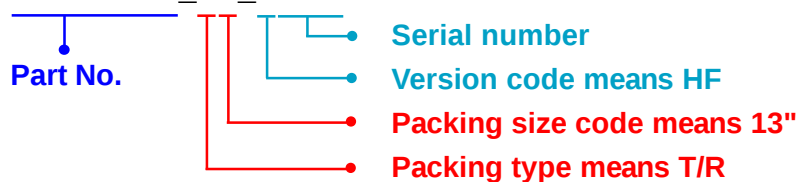
Part No_packing code_Version

2N7002_R1_00001

2N7002_R2_00001

For example :

RB500V-40_R2_00001



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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