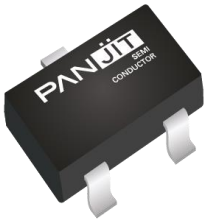
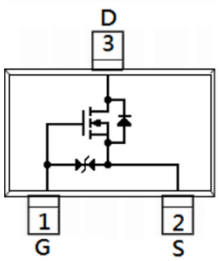
2N7002K

60V N-Channel Enhancement Mode MOSFET – ESD Protected

Voltage	60 V	Current	300mA

SOT-23





Features

- $R_{DS(ON)}$, V_{GS}@10V, I_D@500mA<3Ω
- $R_{DS(ON)}$, V_{GS}@4.5V, I_D@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: Relay, Displays, Memories, etc
- ESD Protected 2KV HBM
- 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 : 0.0084 grams

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	
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 - Junction to Ambient(Note 3,4)		$R_{\theta JA}$	250	°C/W

PANJIT SEMI CONDUCTOR

2N7002K

Electrical Characteristics (T_A=25°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	Ciss	V_{DS}=25V, V_{GS}=0V, f=1MHZ	-	35	-	pF
Output Capacitance	Coss		-	13	-	
Reverse Transfer Capacitance	Crss		-	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:

1. Pulse width≤300us, Duty cycle≤2%.
2. Essentially independent of operating temperature typical characteristics.
3. $R_{\Theta JA}$ 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.
4. The maximum current rating is package limited.
5. Guaranteed by design, not subject to production testing.

2N7002K

TYPICAL CHARACTERISTIC CURVES

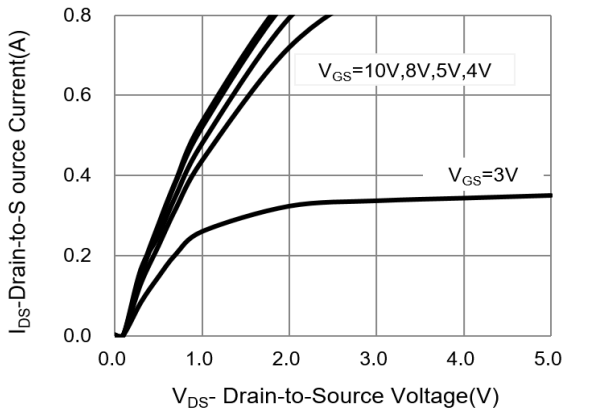


Fig.1 On-Region Characteristics

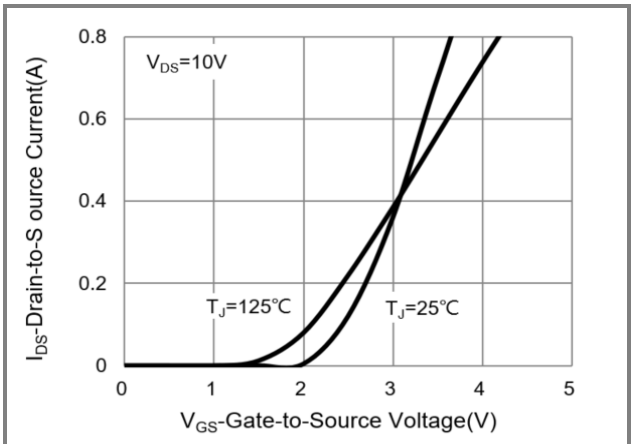


Fig.2 Transfer Characteristics

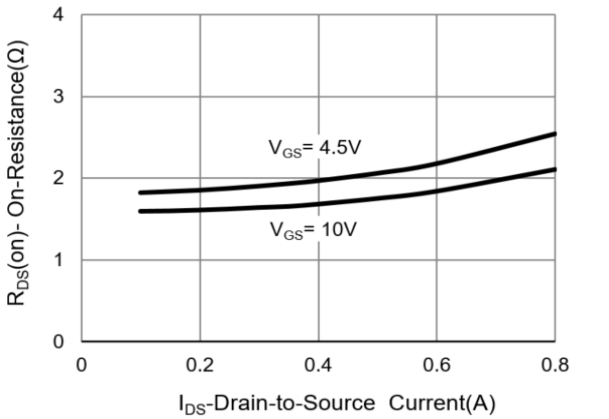


Fig.3 On-Resistance vs. Drain Current

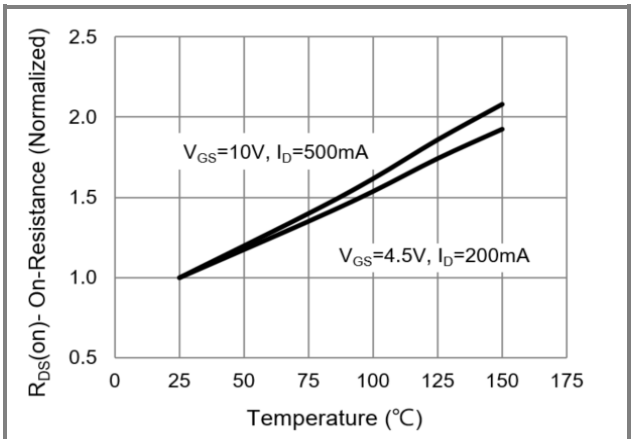


Fig.4 On-Resistance vs. Junction temperature

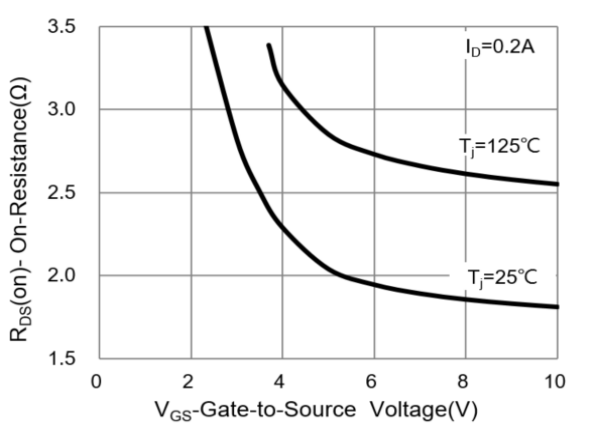


Fig.5 On-Resistance Variation with V_{GS}

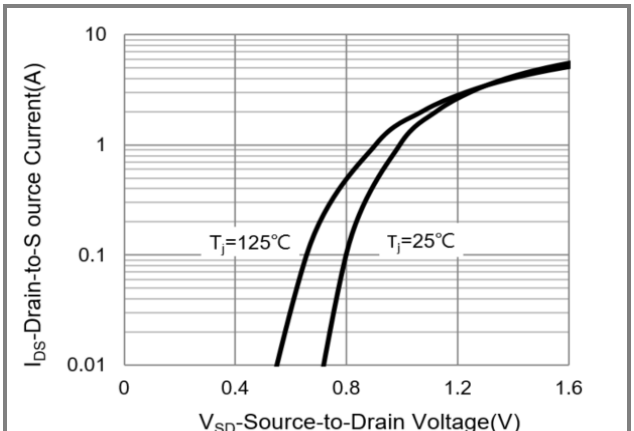


Fig.6 Body Diode Characteristics

2N7002K

TYPICAL CHARACTERISTIC CURVES

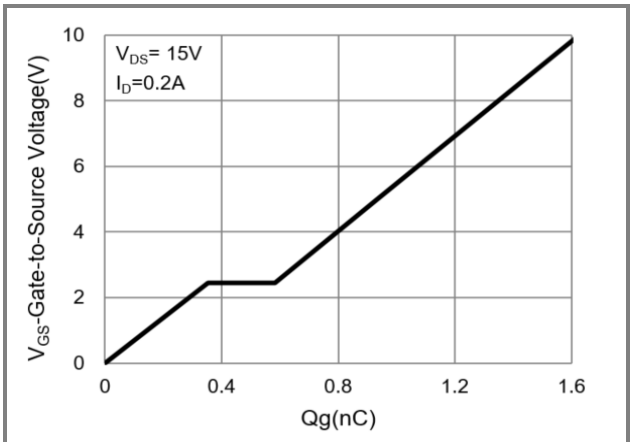


Fig.7 Gate-Charge Characteristics

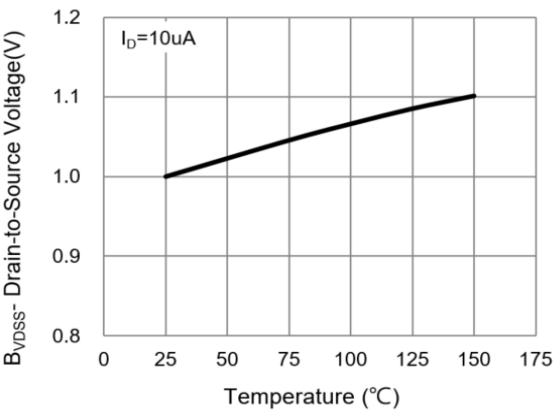


Fig.8 Breakdown Voltage Variation vs. Temperature

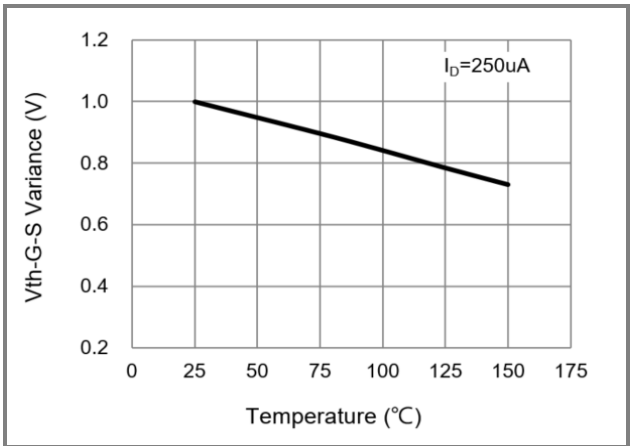


Fig.9 Threshold Voltage Variation with Temperature

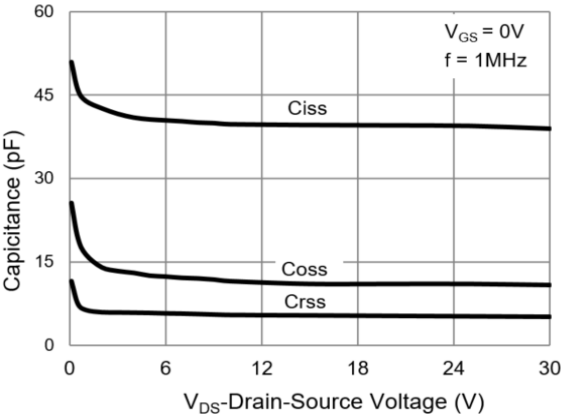


Fig.10 Capacitance vs. Drain-Source Voltage

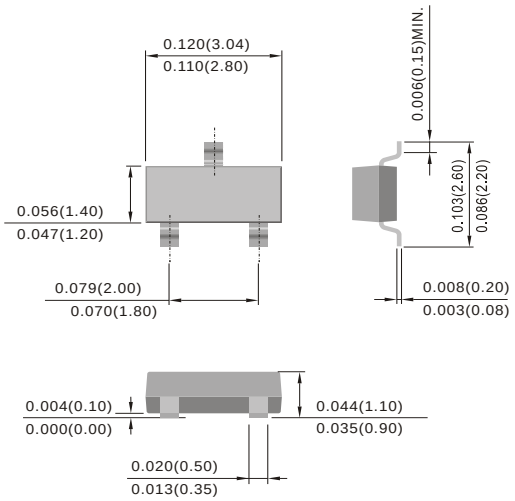
2N7002K

Product and Packing Information

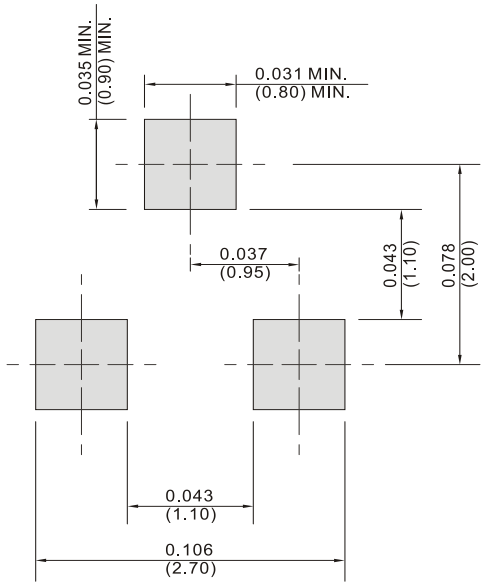
Part No.	Package Type	Packing Type	Marking
2N7002K	SOT-23	3K pcs / 7” reel	K72

Packaging Information & Mounting Pad Layout

SOT-23 Dimension — Unit: inch(mm)



SOT-23 Pad Layout — Unit:1inch(mm)



Disclaimer

- Reproducing and modifying information of the document is prohibited without permission from Panjit International Inc..
- Panjit International Inc. reserves the rights to make changes of the content herein the document anytime without notification. Please refer to our website for the latest document.
- Panjit International Inc. disclaims any and all liability arising out of the application or use of any product including damages incidentally and consequentially occurred.
- Panjit International Inc. does not assume any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.
- Applications shown on the herein document are examples of standard use and operation. Customers are responsible in comprehending the suitable use in particular applications. Panjit International Inc. makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.
- The products shown herein are not designed and authorized for equipments requiring high level of reliability or relating to human life and for any applications concerning life-saving or life-sustaining, such as medical instruments, transportation equipment, aerospace machinery et cetera. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Panjit International Inc. for any damages resulting from such improper use or sale.
- Since Panjit uses lot number as the tracking base, please provide the lot number for tracking when complaining.