

2N7002KTB89

60V N-Channel Enhancement Mode MOSFET– ESD Protected

Voltage 60 V **Current** 115 mA

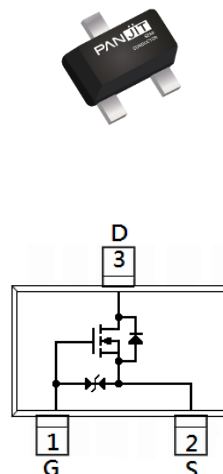
Features

- $R_{DS(ON)}$, $V_{GS}@10V$, $I_D@500mA<3\Omega$
- $R_{DS(ON)}$, $V_{GS}@4.5V$, $I_D@200mA<4\Omega$
- 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
- Lead free in compliance with EU RoHS 2.0
- Green molding compound as per IEC 61249 standard

Mechanical Data

- Case : SC-89 Package
- Terminals : Solderable per MIL-STD-750, Method 2026
- Approx. Weight : 0.0026 grams

SC-89



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	115	mA
Pulsed Drain Current ^(Note 1)		I _{DM}	800	
Power Dissipation	T _A =25°C	P _D	200	mW
	T _A =75°C		150	
Operating Junction and Storage Temperature Range		T _J , T _{STG}	-55~150	°C
Thermal Resistance		R _{θJA}	883	°C/W
- Junction to Ambient ^(Note 3,4)				

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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} =4.5V, I _D =200mA	-	-	4	Ω
		V _{GS} =10V, I _D =500mA	-	-	3	
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	
Dynamic ^(Note 6)						
Total Gate Charge	Q _g	V _{DS} =15V, I _D =200mA, V _{GS} =4.5V	-	-	0.8	nC
Input Capacitance	C _{iss}	V _{DS} =25V, V _{GS} =0V, f=1MHz	-	-	35	pF
Output Capacitance	C _{oss}		-	-	10	
Reverse Transfer Capacitance	C _{rss}		-	-	5	
Turn-On Delay Time	td _(on)	V _{DD} =30V, R _L =150Ω , I _D =200mA, V _{GEN} =10V, R _G =10Ω	-	-	20	ns
Turn-Off Delay Time	td _(off)		-	-	125	
Drain-Source Diode						
Continuous Diode Forward Current	I _S	---	-	-	115	mA
Pulsed Diode Forward Current	I _{SM}	---	-	-	800	
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. Repetitive rating, pulse width limited by junction temperature T_{J(MAX)}=150°C. Ratings are based on low frequency and duty cycles to keep initial T_J = 25°C.
4. R_{θJA} 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.
5. The maximum current rating is package limited.
6. Guaranteed by design, not subject to production testing.

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TYPICAL CHARACTERISTIC CURVES

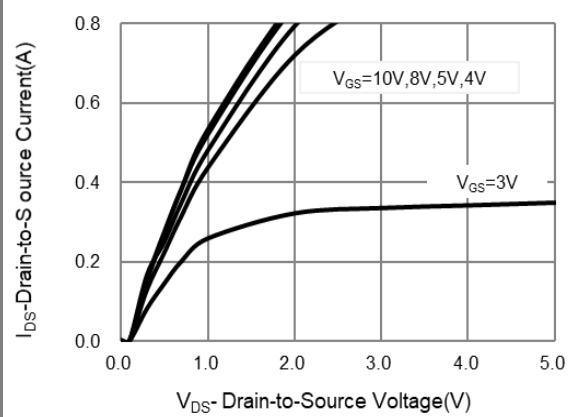


Fig.1 On-Region Characteristics

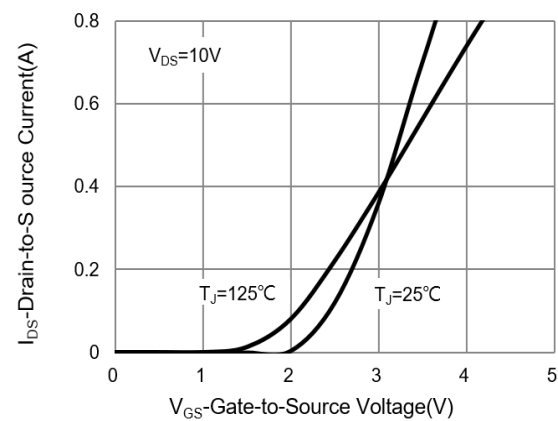


Fig.2 Transfer Characteristics

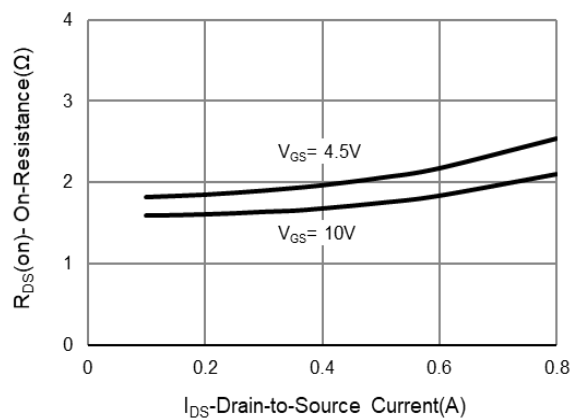


Fig.3 On-Resistance vs. Drain Current

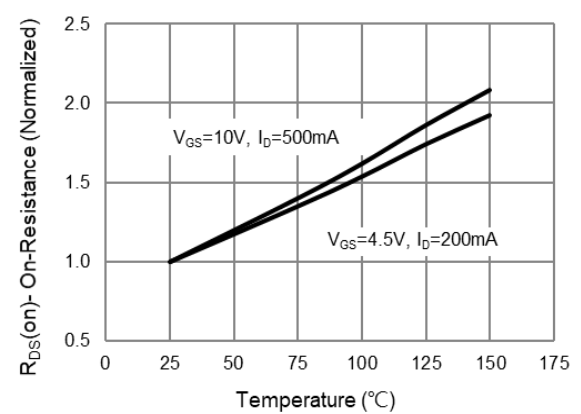


Fig.4 On-Resistance vs. Junction temperature

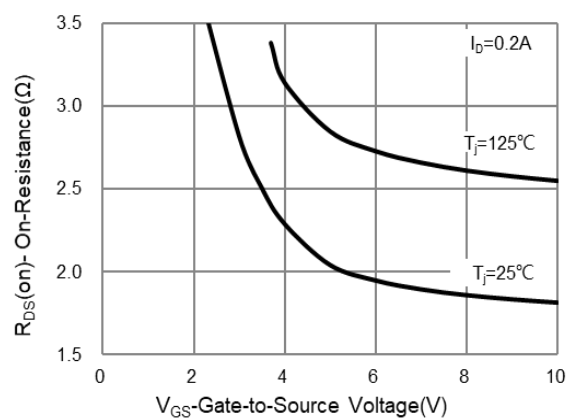


Fig.5 On-Resistance Variation with V_{GS}

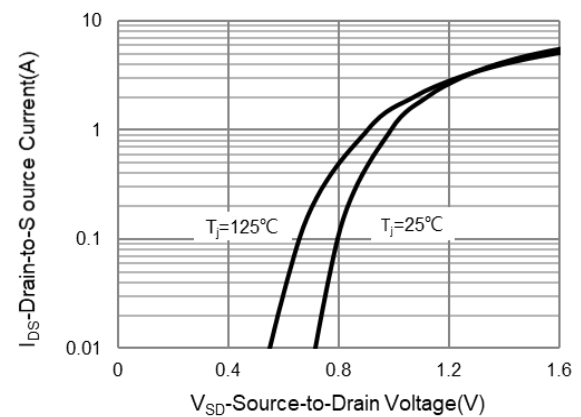


Fig.6 Body Diode Characteristics

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TYPICAL CHARACTERISTIC CURVES

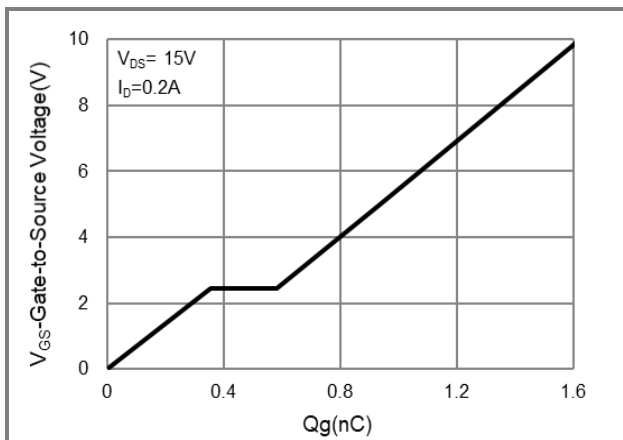


Fig.7 Gate-Charge Characteristics

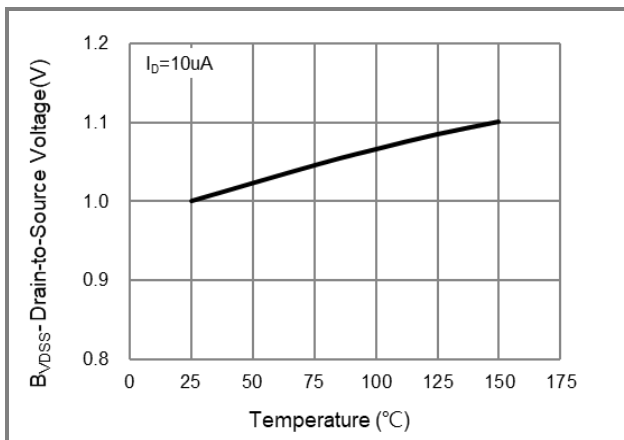


Fig.8 Breakdown Voltage Variation vs. Temperature

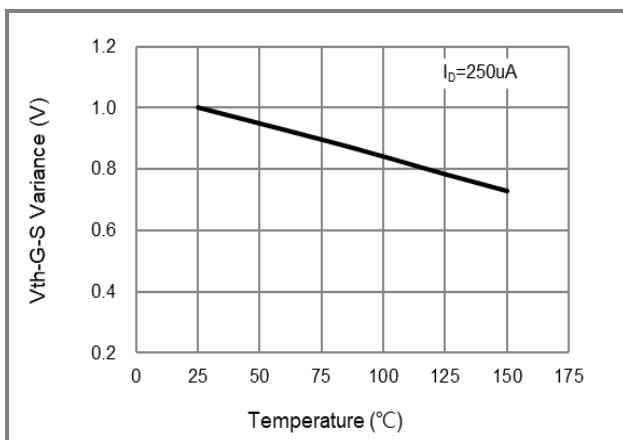


Fig.9 Threshold Voltage Variation with Temperature

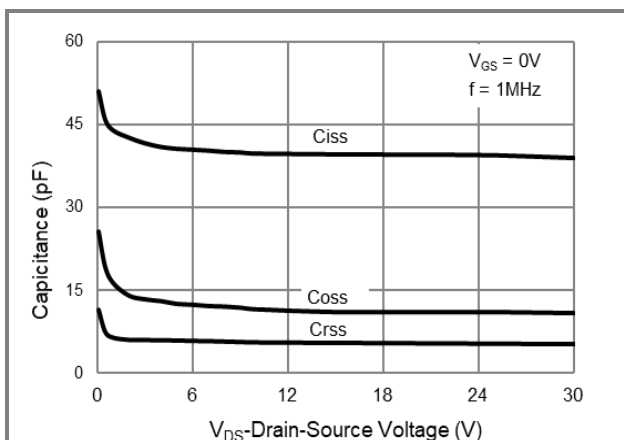


Fig.10 Capacitance vs. Drain-Source Voltage

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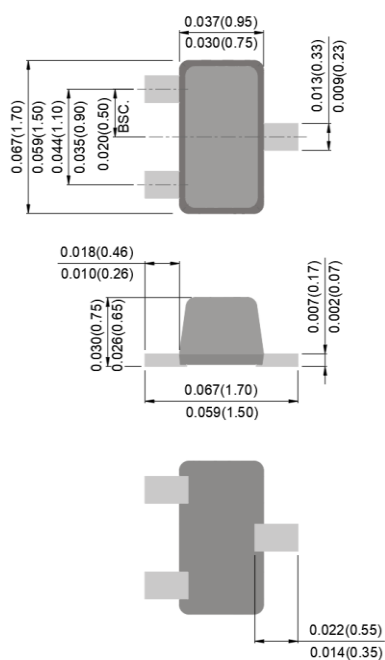
Product and Packing Information

Part No.	Package Type	Packing Type	Marking
2N7002KTB89	SC-89	4K pcs / 7" reel	27

Packaging Information & Mounting Pad Layout

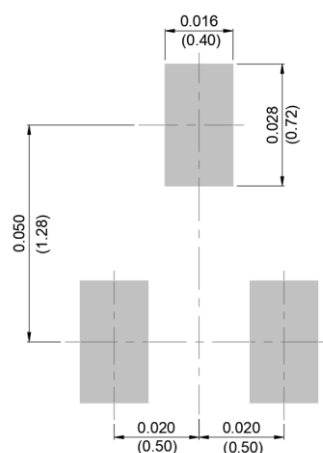
SC-89 Dimension

Unit: inch(mm)



SC-89 Pad Layout

Unit: inch(mm)



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