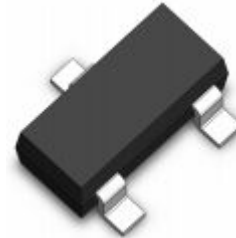


### Description

- Trench Power MV MOSFET technology
- Voltage controlled small signal switch
- Low input Capacitance
- Fast Switching Speed
- Low Input / Output Leakage

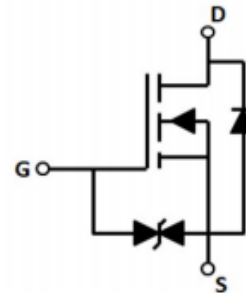
### Dimensions SOT-23



### General Features

- $V_{DS}$  60V
- $I_D$  300mA
- $R_{DS(ON)}$  ( at  $V_{GS}=10V$ ) <2.5ohm
- $R_{DS(ON)}$  ( at  $V_{GS}=4.5V$ ) <3.0ohm
- ESD Protected Up to 2.0KV (HBM)

### Pin Configuration



### Application

- Battery operated systems
- Solid-state relays
- Direct logic-level interface: TTL/CMOS

### Package Marking and Ordering Information

Device	Device Marking	Device Package	Reel Size	Tape width	Quantity
2N7002BK	72KC	SOT-23	Ø180mm	8 mm	3000 units

### Absolute Maximum Ratings (TC=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-source Voltage	$V_{DS}$	60	V
Gate-source Voltage	$V_{GS}$	±20	V
Drain Current	$T_A=25^\circ\text{C}$ @ Steady State	300	mA
	$T_A=70^\circ\text{C}$ @ Steady State	240	
Pulsed Drain Current <sup>A</sup>	$I_{DM}$	1.5	A
Total Power Dissipation @ $T_A=25^\circ\text{C}$	$P_D$	300	mW
Thermal Resistance Junction-to-Ambient @ Steady State <sup>B</sup>	$R_{\theta JA}$	416	°C/W
Junction and Storage Temperature Range	$T_J, T_{STG}$	-55~+150	°C

## Electrical Characteristics (T<sub>J</sub>=25°C, unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
<b>Static Parameter</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> =250μA	60			V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =60V, V <sub>GS</sub> =0V			1	μA
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±20V, V <sub>DS</sub> =0V			±10	μA
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =250μA	1	1.5	2.5	V
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> =300mA		1.9	2.5	Ω
		V <sub>GS</sub> = 4.5V, I <sub>D</sub> =200mA		2.0	3.0	
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =300mA, V <sub>GS</sub> =0V			1.2	V
Maximum Body-Diode Continuous Current	I <sub>S</sub>				300	mA
<b>Dynamic Parameters</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V, f=1MHZ		27		pF
Output Capacitance	C <sub>oss</sub>			3		
Reverse Transfer Capacitance	C <sub>rss</sub>			2		
<b>Switching Parameters</b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>GS</sub> =10V, V <sub>DS</sub> =30V, I <sub>D</sub> =0.3A		1.65	2.4	nC
Turn-on Delay Time	t <sub>D(on)</sub>	V <sub>GS</sub> =10V, V <sub>DD</sub> =30V, I <sub>D</sub> =300mA, R <sub>GEN</sub> =6Ω		6.5		ns
Turn-off Delay Time	t <sub>D(off)</sub>			9.6		
Reverse recovery Time	t <sub>rr</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =300mA, V <sub>R</sub> =25V, di/dt=-100A/μs		24		ns

A. Pulse Test: Pulse Width ≤ 300us, Duty cycle ≤ 2%.

B. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch.

Typical Characteristics

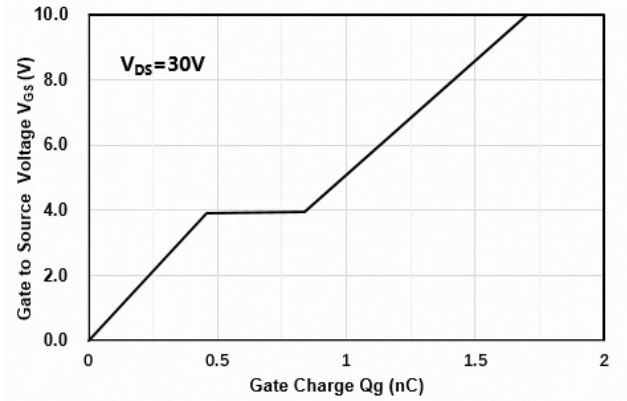
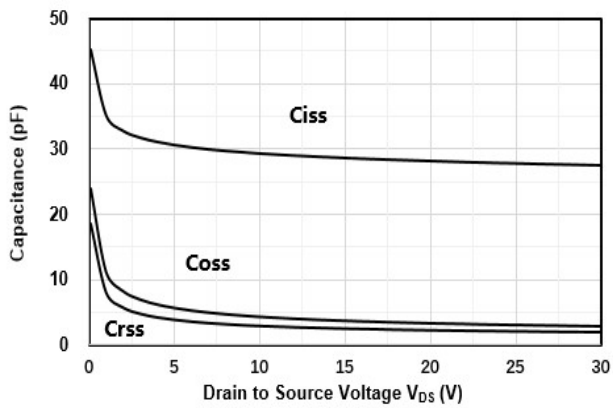
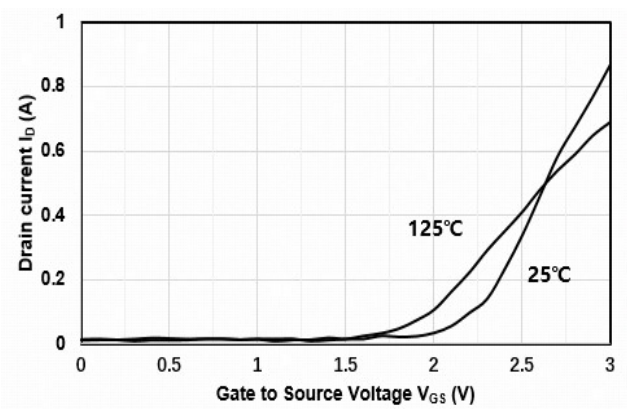
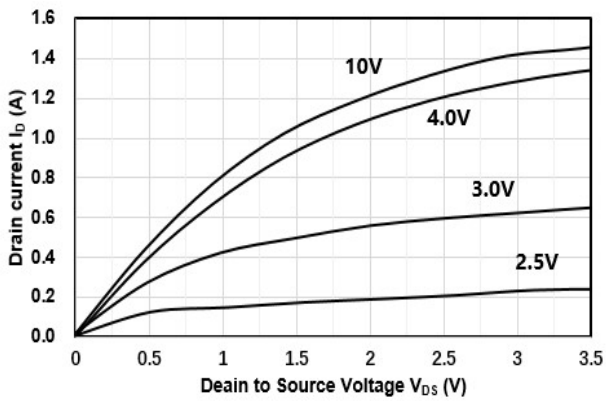


Figure3. Capacitance Characteristics

Figure4. Gate Charge

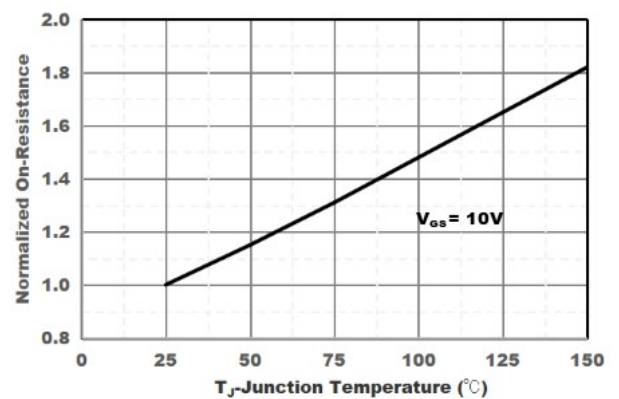
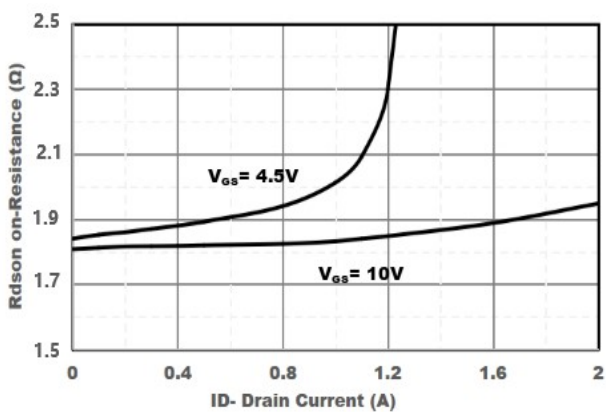
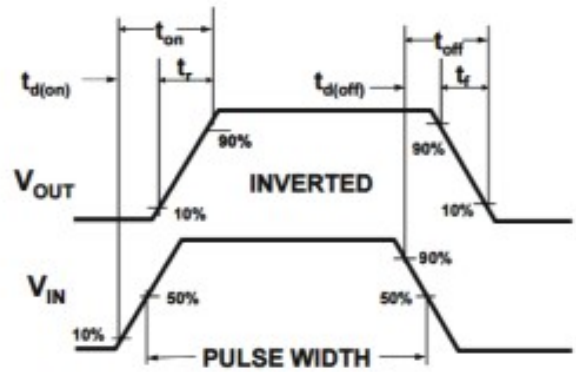
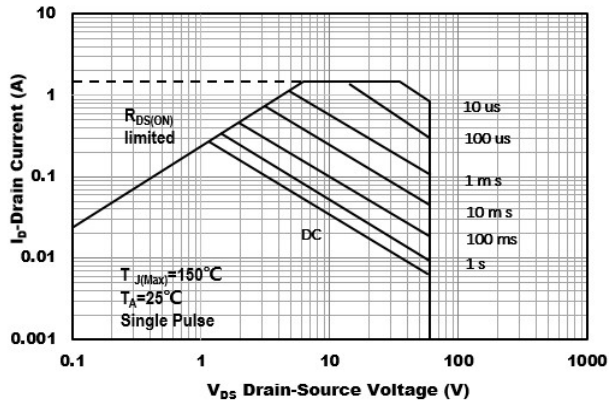
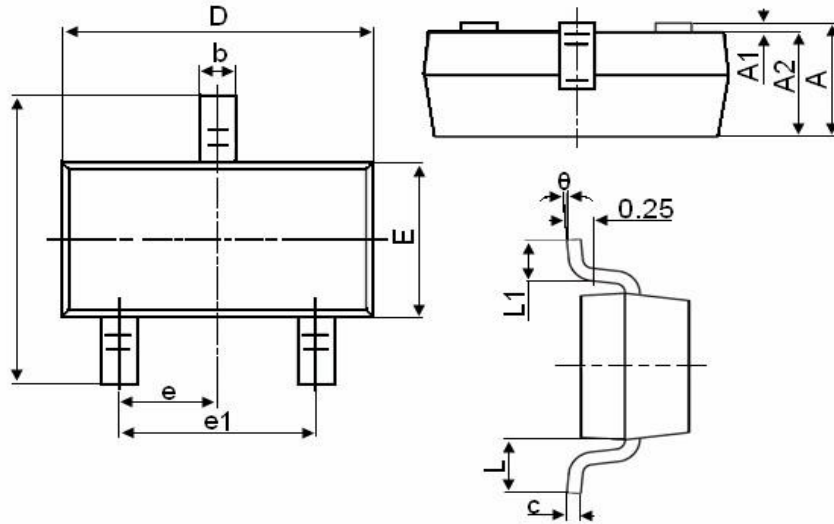


Figure5. Drain-Source on Resistance

Figure6. Drain-Source on Resistance



Package Mechanical Data:SOT-23



Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.500
theta	0°	8°