

## 2N7002M

### 60V N-Channel MOSFET

0.34A 60V;  $R_{DS(ON)typ}=0.85\Omega@10V$ ,  $R_{DS(ON)typ}=0.95\Omega@4.5V$

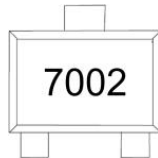
#### FEATURE

- Trench Technology Power MOSFET
- Low  $R_{DS(ON)}$
- Low Gate Charge

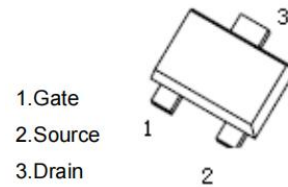
#### Application

- Load Switch
- DC/DC Converter

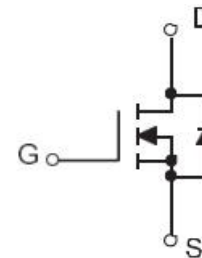
#### MARKING:



SOT-723



Schematic diagram



#### ABSOLUTE MAXIMUM RATINGS ( $T_a=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain - Source Voltage	$V_{DS}$	60	V
Gate - Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current <sup>1,5</sup>	$I_D$	0.34	A
Pulsed Drain Current <sup>2</sup>	$I_{DM}$	1.0	A
Power Dissipation <sup>4,5</sup>	$P_D$	0.2	W
Thermal Resistance from Junction to Ambient <sup>5</sup>	$R_{\theta JA}$	625	$^\circ\text{C/W}$
Junction Temperature	$T_J$	150	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-55~ +150	$^\circ\text{C}$

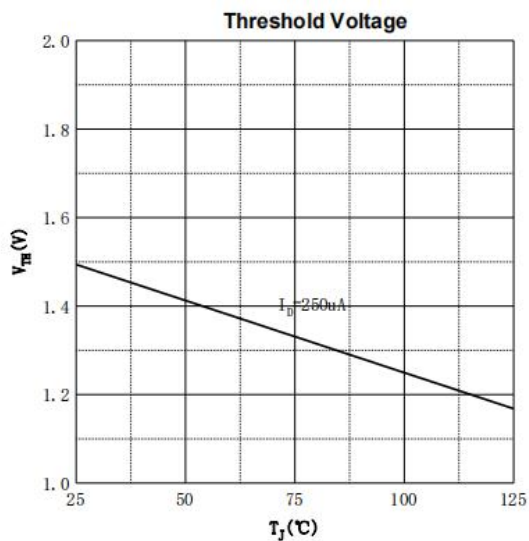
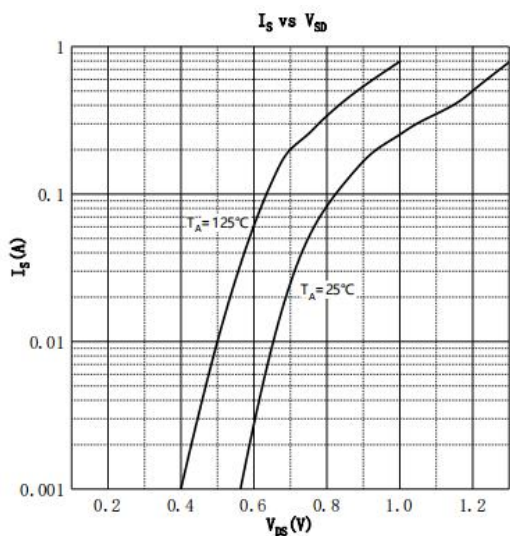
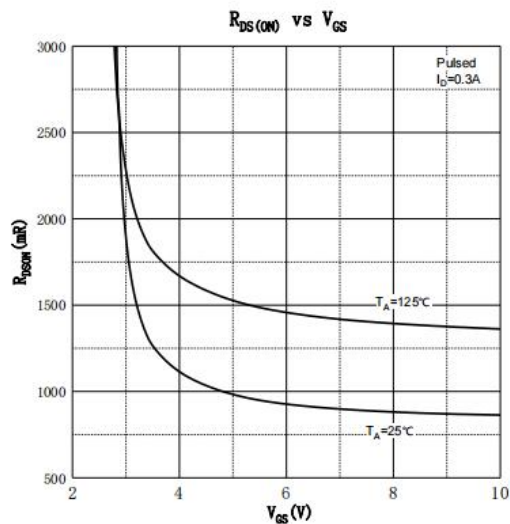
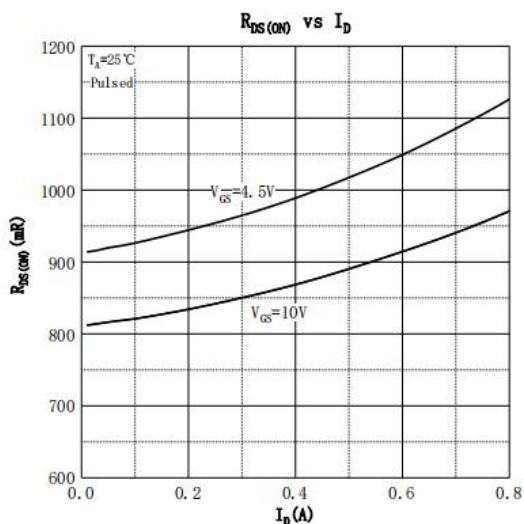
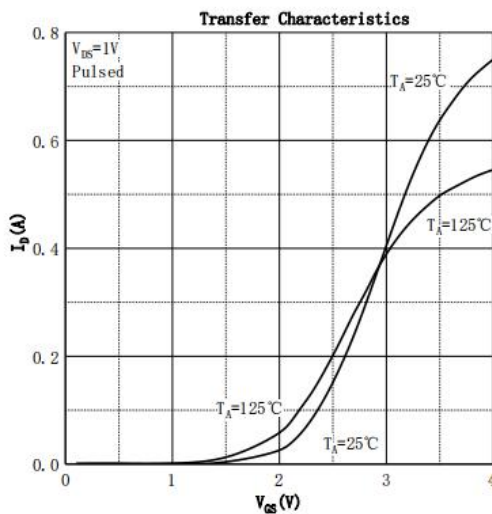
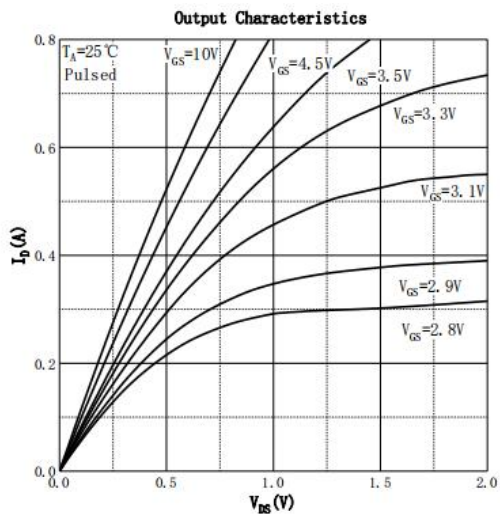
**MOSFET ELECTRICAL CHARACTERISTICS(T<sub>a</sub>=25°C unless otherwise noted)**

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
<b>Off CHARACTERISTICS</b>						
Drain - Source Breakdown Voltage	V <sub>(BR)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> = 48V, 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			±95	nA
<b>ON CHARACTERISTICS<sup>3</sup></b>						
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
Drain-source On-resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 0.3A		0.85	2.5	Ω
		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 0.2A		0.95	3	
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V, f = 1MHz		34.8		pF
Output Capacitance	C <sub>oss</sub>			6.4		
Reverse Transfer Capacitance	C <sub>rss</sub>			3.5		
Gate Resistance	R <sub>g</sub>	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz		40		Ω
<b>SWITCHING CHARACTERISTICS</b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = 30V, V <sub>GS</sub> = 10V, I <sub>D</sub> = 0.3A		0.32		nC
Gate-source Charge	Q <sub>gs</sub>			0.25		
Gate-drain Charge	Q <sub>gd</sub>			0.17		
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = 30V, V <sub>GS</sub> = 10V, R <sub>L</sub> = 100Ω, R <sub>G</sub> = 3Ω		3.8		ns
Turn-on Rise Time	t <sub>r</sub>			2.9		
Turn-off Delay Time	t <sub>d(off)</sub>			14		
Turn-off Fall Time	t <sub>f</sub>			8		
<b>SOURCE-DRAIN DIODE CHARACTERISTICS</b>						
Diode Forward Voltage <sup>3</sup>	V <sub>SD</sub>	V <sub>GS</sub> = 0V, I <sub>S</sub> = 0.3A			1.2	V

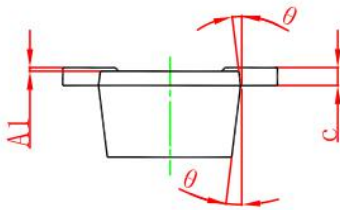
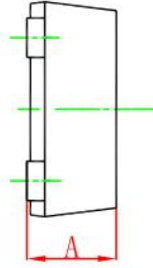
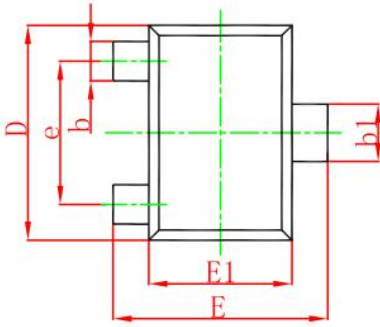
**Notes:**

1. The maximum current rating is limited by package.
2. Pulse Test : Pulse Width ≤ 10μs, duty cycle ≤ 1%.
3. Pulse Test : Pulse Width ≤ 300μs, duty cycle ≤ 2%.
4. The power dissipation PD is limited by T<sub>J</sub>(MAX) = 150°C.
5. Device mounted on 1in2 FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub> = 25°C.

**Typical Electrical and Thermal Characteristics**



**SOT-723 Package Information**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.430	0.500	0.017	0.020
A1	0.000	0.050	0.000	0.002
b	0.170	0.270	0.007	0.011
b1	0.270	0.370	0.011	0.015
c	0.080	0.150	0.003	0.006
D	1.150	1.250	0.045	0.049
E	1.150	1.250	0.045	0.049
E1	0.750	0.850	0.030	0.033
e	0.800TYP.		0.031TYP.	
$\theta$	7° REF.		7° REF.	