

2N7002

60V N-Channel MOSFET

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

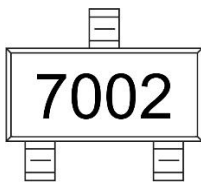
FEATURE

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

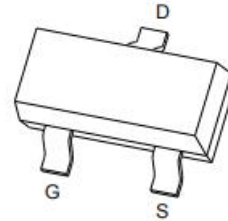
Application

- Load Switch
- DC/DC Converter

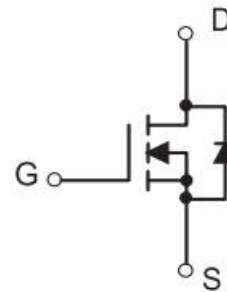
MARKING:



SOT-23



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}	± 20	V
Continuous Drain Current ^{1,5}	I_D	0.34	A
Pulsed Drain Current ²	I_{DM}	1.0	A
Power Dissipation ^{4,5}	P_D	0.35	W
Thermal Resistance from Junction to Ambient ⁵	$R_{\theta JA}$	357	$^\circ\text{C/W}$
Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55~ +150	$^\circ\text{C}$

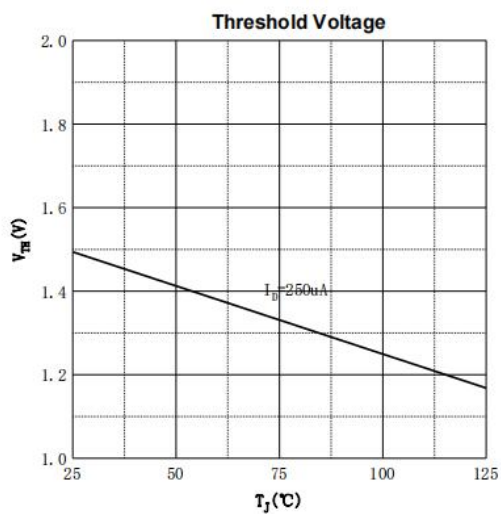
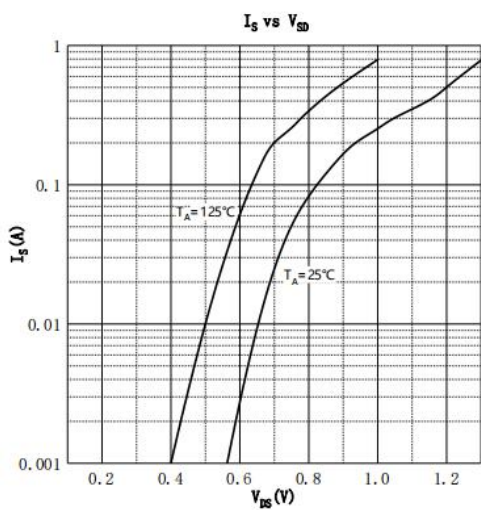
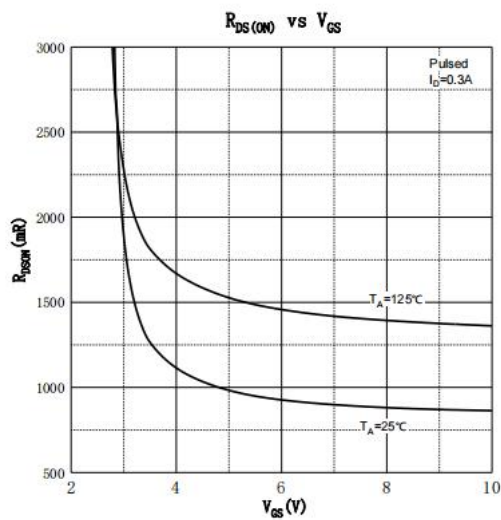
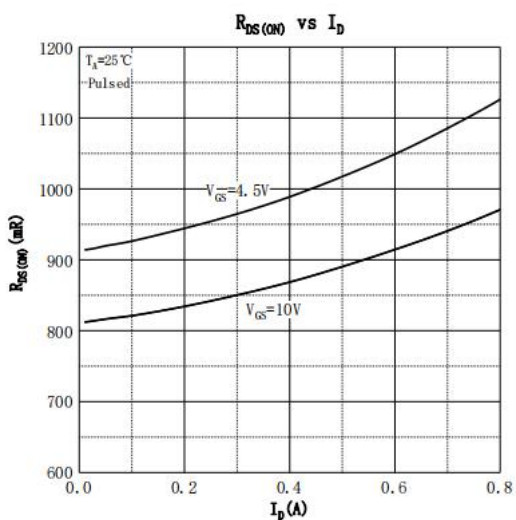
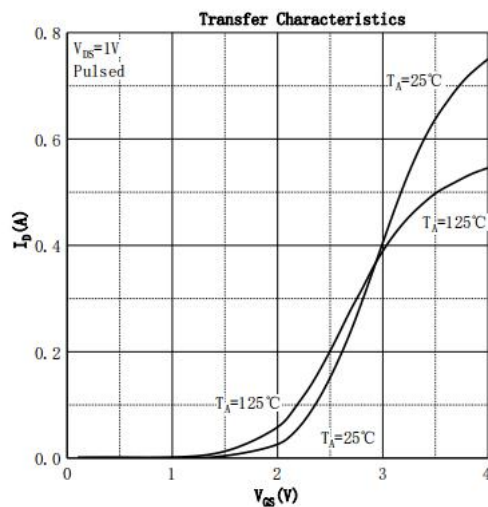
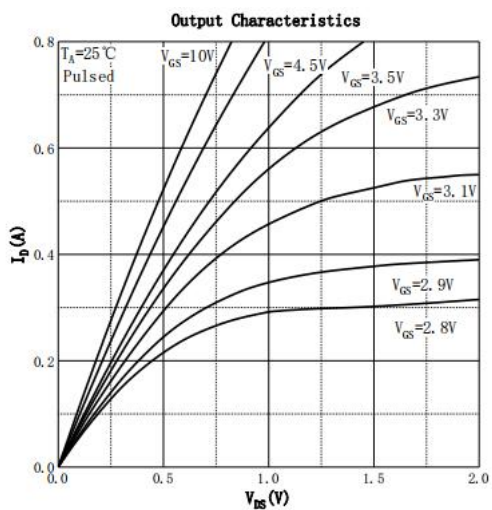
MOSFET ELECTRICAL CHARACTERISTICS(T_a=25°C unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Off CHARACTERISTICS						
Drain - Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D = 250μA	60			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 48V, V _{GS} = 0V			1	μA
Gate - Body Leakage Current	I _{GSS}	V _{GS} = ±20V, V _{DS} = 0V			±95	nA
ON CHARACTERISTICS³						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	1	1.5	2.5	V
Drain-source On-resistance	R _{DS(on)}	V _{GS} = 10V, I _D = 0.3A		0.85	2.5	Ω
		V _{GS} = 4.5V, I _D = 0.2A		0.95	3	
DYNAMIC CHARACTERISTICS						
Input Capacitance	C _{iss}	V _{DS} = 30V, V _{GS} = 0V, f = 1MHz		34.8		pF
Output Capacitance	C _{oss}			6.4		
Reverse Transfer Capacitance	C _{rss}			3.5		
Gate Resistance	R _g	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz		40		Ω
SWITCHING CHARACTERISTICS						
Total Gate Charge	Q _g	V _{DS} = 30V, V _{GS} = 10V, I _D = 0.3A		0.32		nC
Gate-source Charge	Q _{gs}			0.25		
Gate-drain Charge	Q _{gd}			0.17		
Turn-on Delay Time	t _{d(on)}	V _{DD} = 30V, V _{GS} = 10V, R _L = 100Ω, R _G = 3Ω		3.8		ns
Turn-on Rise Time	t _r			2.9		
Turn-off Delay Time	t _{d(off)}			14		
Turn-off Fall Time	t _f			8		
SOURCE-DRAIN DIODE CHARACTERISTICS						
Diode Forward Voltage ³	V _{SD}	V _{GS} = 0V, I _S = 0.3A			1.2	V

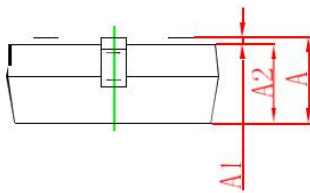
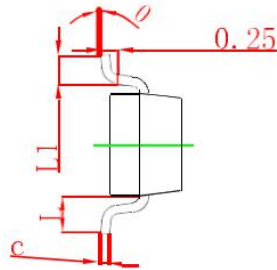
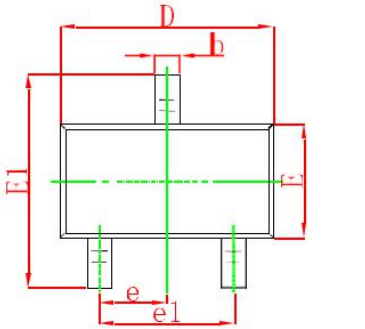
Notes:

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_J(MAX) = 150°C.
5. Device mounted on 1in2 FR-4 board with 2oz. Copper, in a still air environment with T_A = 25°C.

Typical Electrical and Thermal Characteristics



SOT-23 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF		0.022 REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°