Description

The 2N7002 uses advanced technology to provide excellent RDS(ON), low gate charge and low gate voltages during operation. This device is suitable for use as a load switch or in PWM applications.

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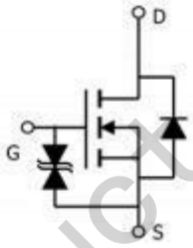
General Features

- V_{DS} = 60V, I_D = 500mA

  $R_{DS(ON)}$ < 3Ω @V_{GS}= 10V

  $R_{DS(ON)}$ < 4Ω @V_{GS}=4.5V

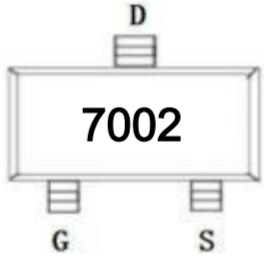
- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package
- ESD Rating:>2000V HBM



Schematic diagram

Application

- PWM applications
- Load switch
- Power management



Marking and pin assignment

Absolute Maximum Ratings (TA=25℃ unless otherwise noted)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	0.5	A
Pulsed Drain Current(Note 1)	I_{DM}	1.2	A
Maximum Power Dissipation	P_D	0.35	W
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

Thermal Characteristic

Thermal Resistance, Junction-to-Ambient(Note 2)	$R_{\theta JA}$	357	℃/W

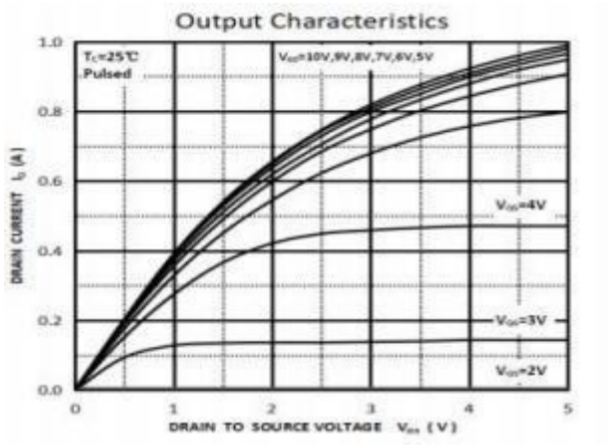
Electrical Characteristics (TA=25℃ unless otherwise noted)

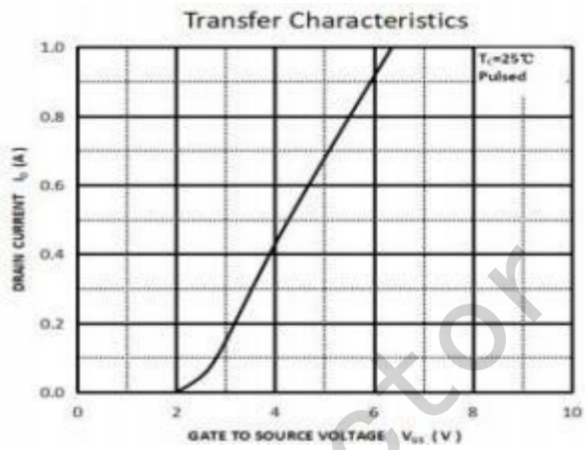
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V,I_D=250μA	60	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=48V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±10	μA
On Characteristics(Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D= 1mA	0.8	1.5	2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}= 10V,I_D=0.5A	-	1.9	3	Ω
		V_{GS}=4.5V,I_D=0.2A	-	2.4	4	Ω
Dynamic Characteristics(Note 4)						
Input Capacitance	C_{iss}	V_{DS}= 10V,V_{GS}=0V, F=1.0MHz	-	-	40	pF
Output Capacitance	C_{oss}		-	-	30	pF
Reverse Transfer Capacitance	C_{rss}		-	-	10	pF
Switching Characteristics(Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=50V,R_G=50Ω, V_{GS}= 10V,R_{GS}=50Ω R_L=250Ω	-	-	10	nS
Turn-Off Delay Time	$t_{d(off)}$		-	-	15	nS
Reverse Charge Capacity	Q_r	I_S=0.3A,V_R=25V, V_{GS}=0V, dIs/dt=-100A/uS	-	30	-	nC
Reverse Recovery Time	t_{rr}		-	30	-	nS
Drain-Source Diode Characteristics						
Diode Forward Voltage(Note 3)	V_{SD}	V_{GS}=0V,I_S=0.3A	-	-	1.5	V
Gate Source Zener Breakdown Voltage	BV_{GSO}	I_{GS}=±1mA (Open Drain)	±21.5	-	±30	V

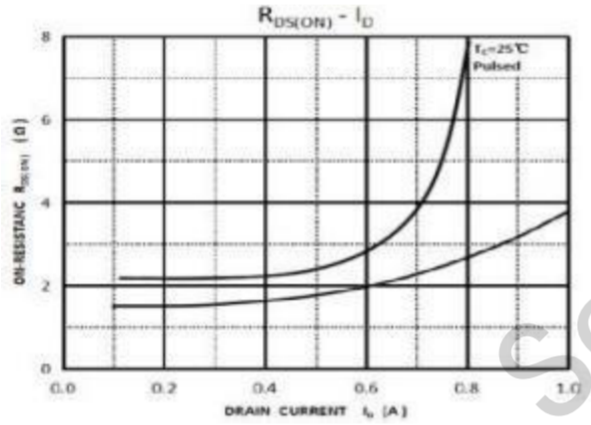
Notes:

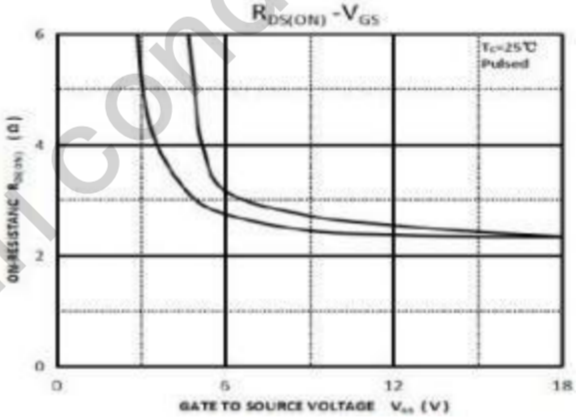
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to product.

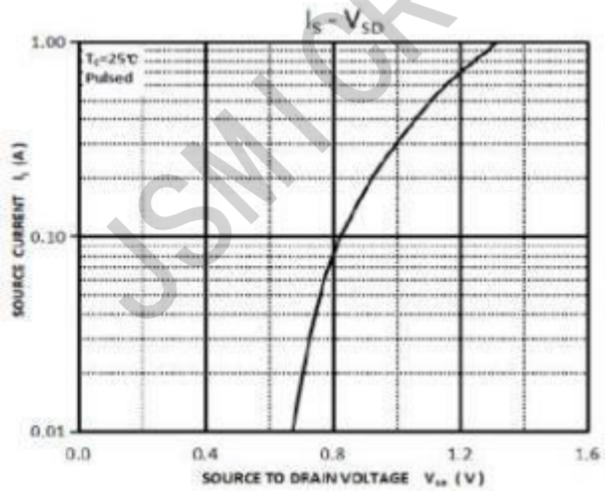
Typical Electrical and Thermal Characteristics











Package Information

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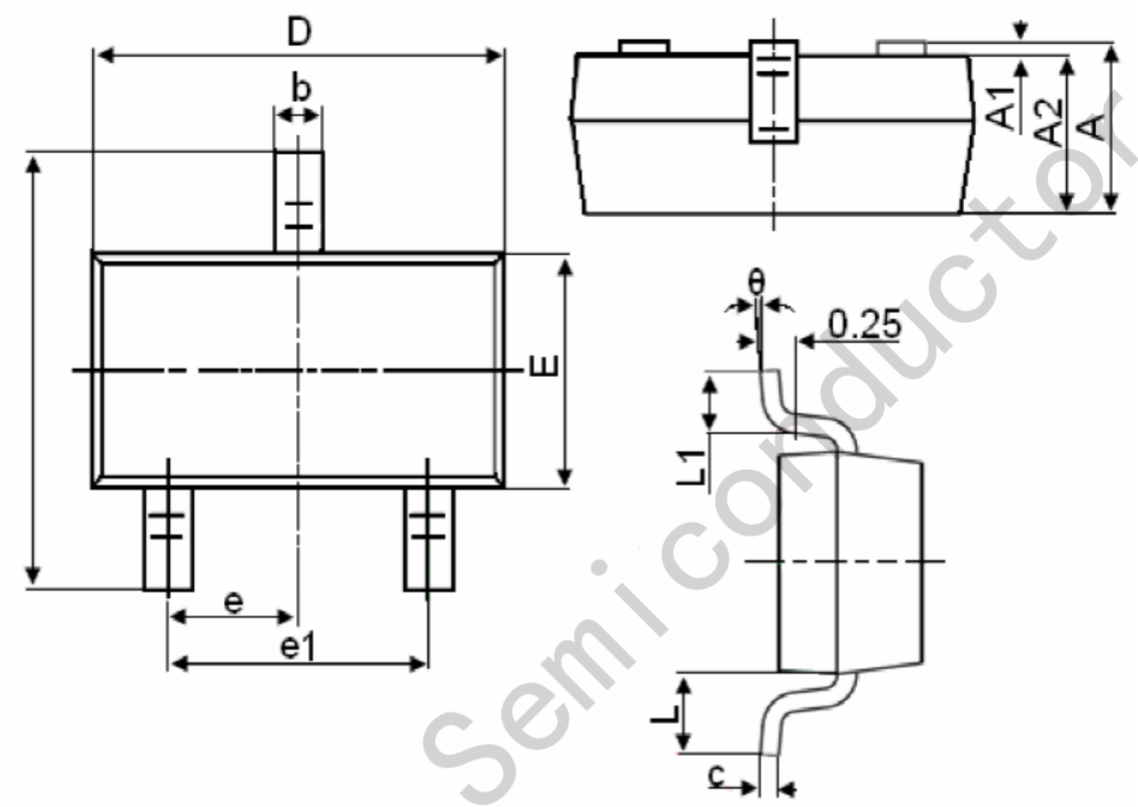

Symbol	Dimensions in Millimeters(mm)		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950TYP		0.037TYP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