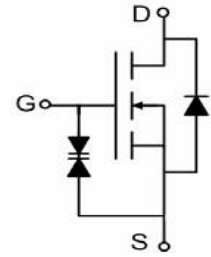


60V N-Channel Enhancement Mode MOSFET

Description

The AP2N7002A uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

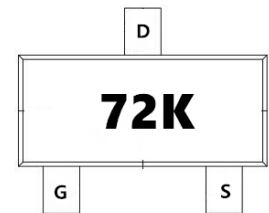


General Features

$V_{DS} = 60V$ $I_D = 0.3A$

$R_{DS(ON)} < 3\Omega$ @ $V_{GS} = 10V$

ESD Rating: HBM $\geq 2000V$



Application

Battery protection

Load switch

Uninterruptible power supply



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP2N7002A	SOT-23		3000

Absolute Maximum Ratings ($T_C = 25^\circ C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_J = 150^\circ C$)	I_D	$T_A = 25^\circ C$	0.3
		$T_A = 100^\circ C$	0.19
Drain Current-Pulsed (Note 1)	I_{DM}	0.8	A
Maximum Power Dissipation	P_D	0.35	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^\circ C$
Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	350	$^\circ C/W$

60V N-Channel Enhancement Mode MOSFET

Electrical Characteristics ($T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	60	68	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=60V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 10V, V_{DS}=0V$	-	± 100	± 500	nA
		$V_{GS}=\pm 20V, V_{DS}=0V$	-	± 4	± 10	μA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.7	1.2	1.9	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=5V, I_D=0.4A$	-	1.3	3	Ω
		$V_{GS}=10V, I_D=0.5A$	-	1	2	Ω
Forward Transconductance	g_{FS}	$V_{DS}=10V, I_D=0.2A$	0.1	-	-	S
Input Capacitance	C_{iss}	$V_{DS}=25V, V_{GS}=0V,$ $F=1.0MHz$	-	21	50	PF
Output Capacitance	C_{oss}		-	11	25	PF
Reverse Transfer Capacitance	C_{rss}		-	4.2	5	PF
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=30V, I_D=0.2A$ $V_{GS}=10V, R_{GEN}=10\Omega$	-	10	-	nS
Turn-on Rise Time	t_r		-	50	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	17	-	nS
Turn-Off Fall Time	t_f		-	10	-	nS
Total Gate Charge	Q_g	$V_{DS}=10V, I_D=0.3A,$ $V_{GS}=4.5V$	-	1.7	3	nC
Diode Forward Voltage ^(Note 3)	V_{SD}	$V_{GS}=0V, I_S=0.2A$	-	-	1.2	V
Diode Forward Current ^(Note 2)	I_S		-	-	0.3	A

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production

60V N-Channel Enhancement Mode MOSFET

Typical Electrical And Thermal Characteristics

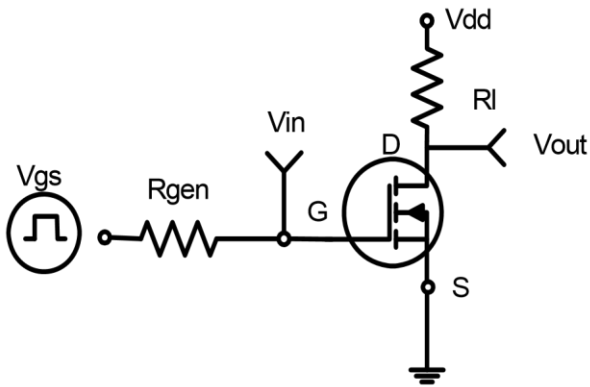


Figure 1: Switching Test Circuit

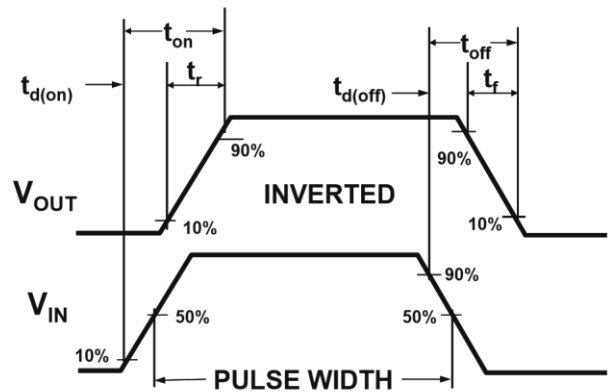


Figure 2: Switching Waveforms

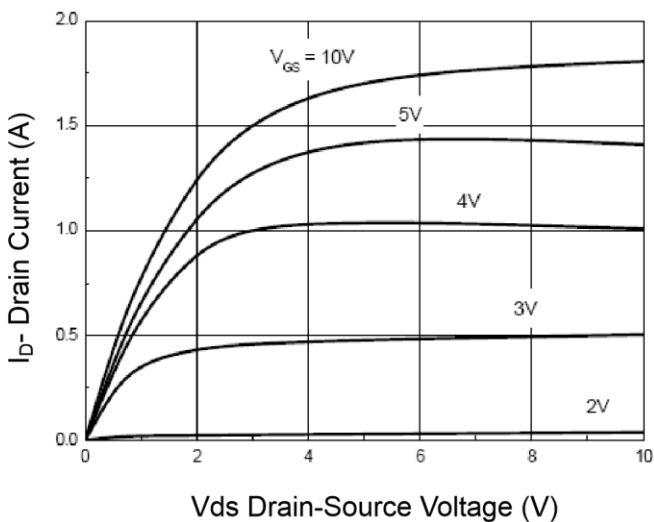


Figure 3 Output Characteristics

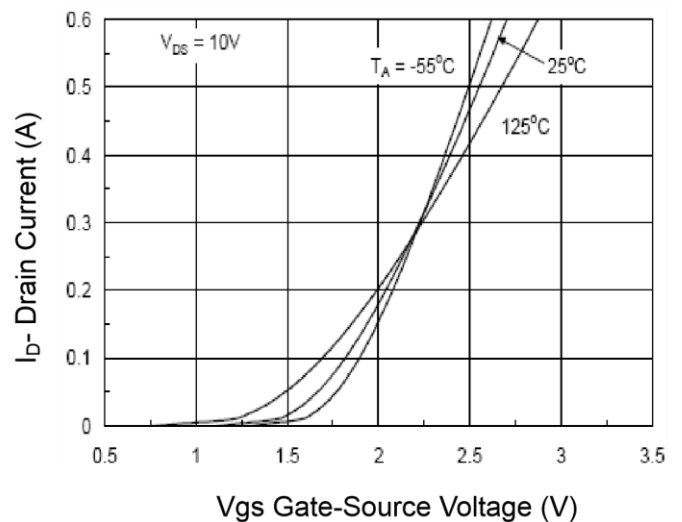


Figure 4 Transfer Characteristics

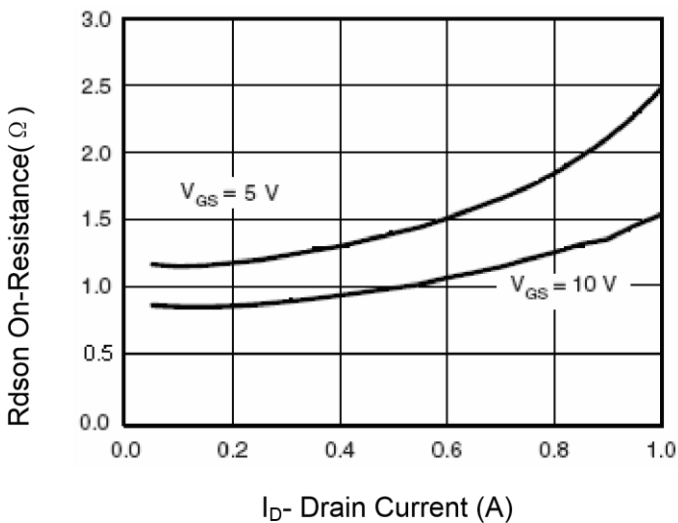


Figure 5 Drain-Source On-Resistance

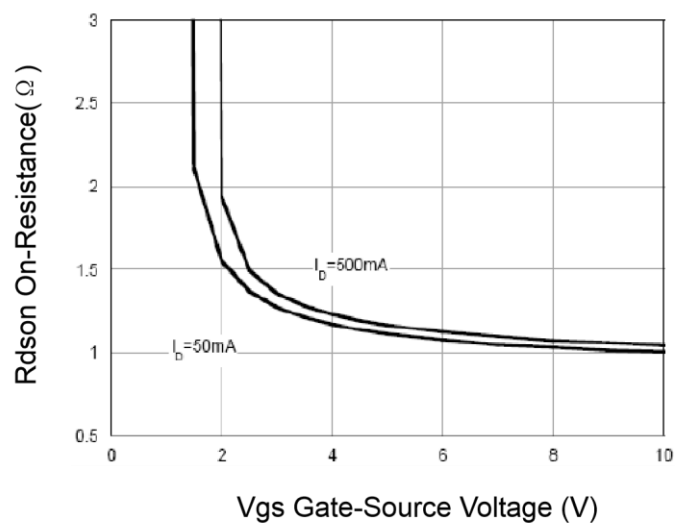


Figure 6 Rdson vs Vgs

60V N-Channel Enhancement Mode MOSFET

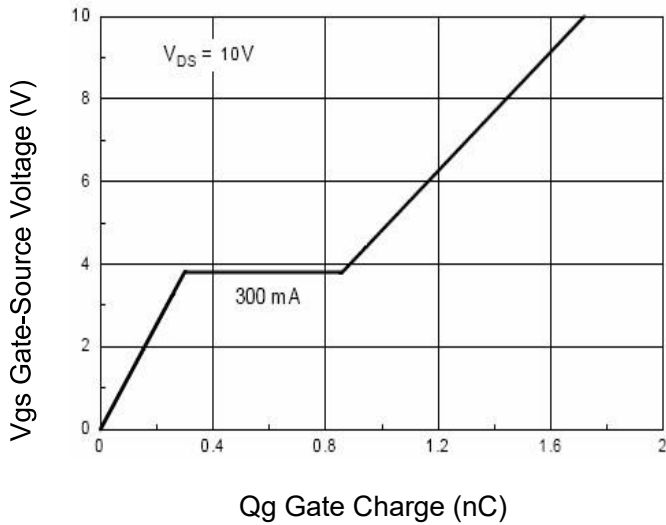


Figure 7 Gate Charge

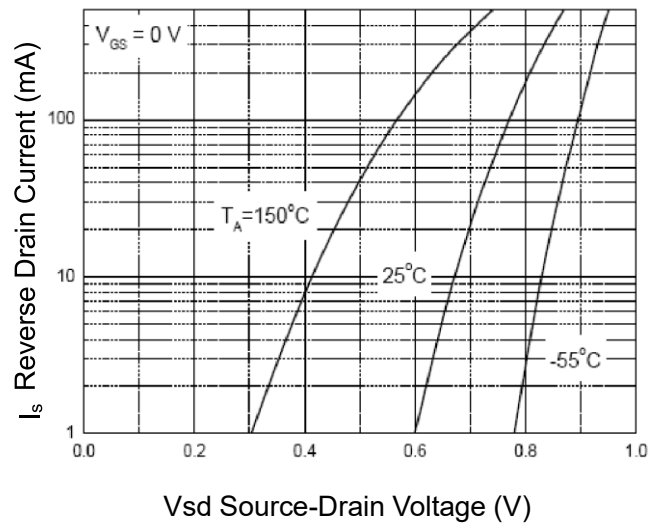


Figure 8 Source-Drain Diode Forward

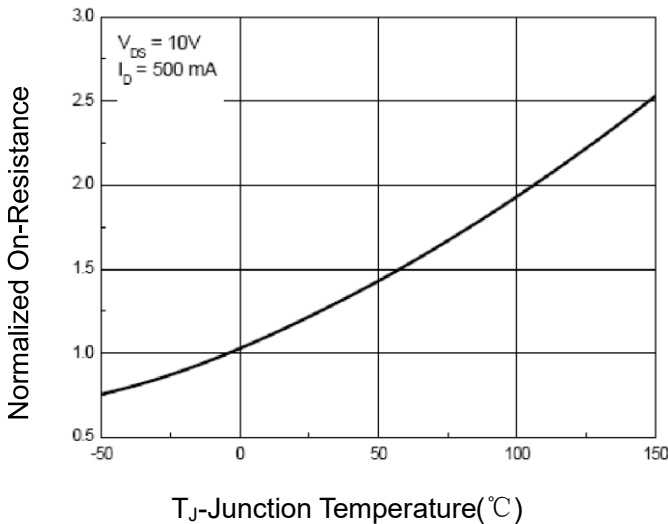


Figure 9 Drain-Source On-Resistance

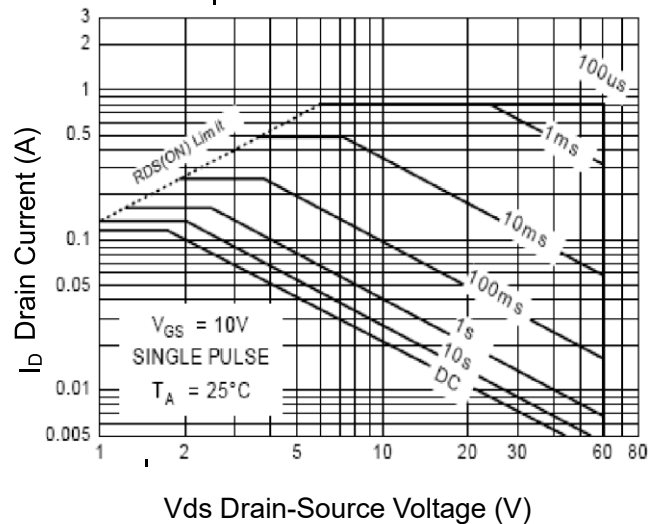


Figure 10 Safe Operation Area

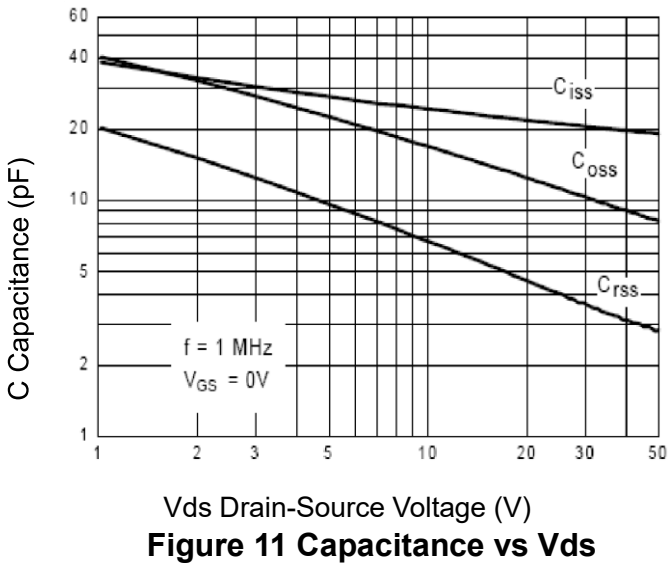


Figure 11 Capacitance vs Vds

60V N-Channel Enhancement Mode MOSFET

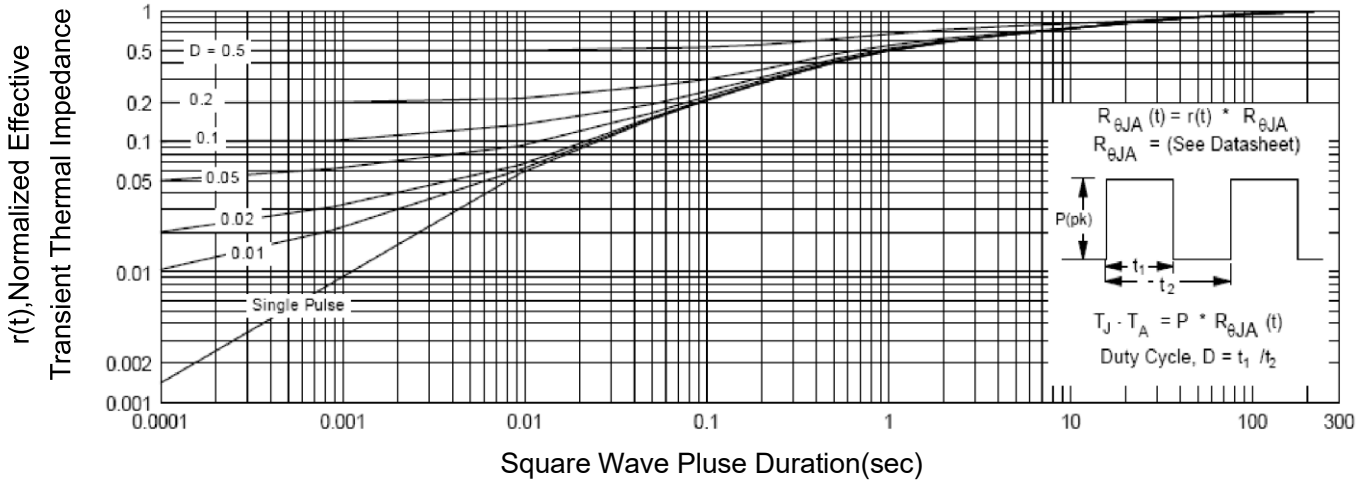
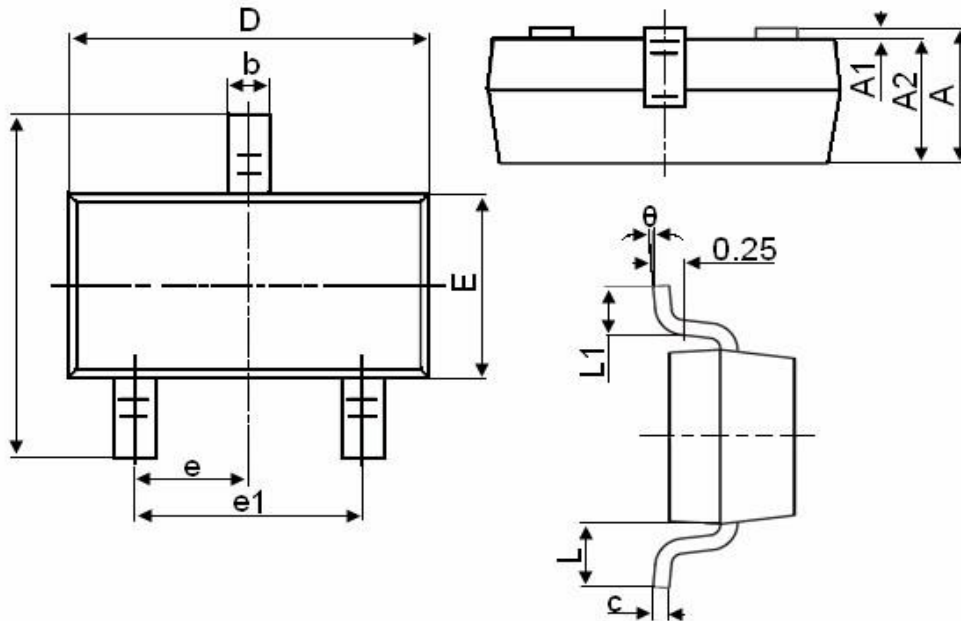


Figure 12 Normalized Maximum Transient Thermal Impedance

SOT-23 Package Information



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
θ	0°	8°

60V N-Channel Enhancement Mode MOSFET**Attention**

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