

60V N-Channel Enhancement Mode MOSFET

Description

The AP2N7002EI 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

$V_{DS}=60V$ $I_D=0.5A$

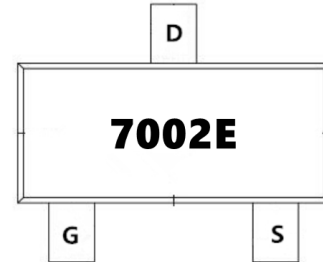
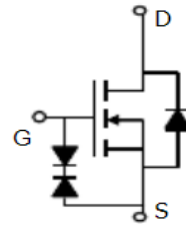
$R_{DS(ON)} < 1600m\Omega$ @ $V_{GS}=10V$ (Type: 1100m Ω)

ESD Rating: HBM $\geq$ 2200V

Application

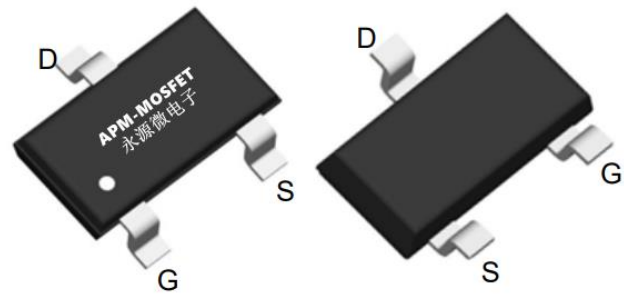
Load switch

Uninterruptible power supply



Top View

Bottom View



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP2N7002EI	SOT23L	7002E	3000

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_C=25^{\circ}C$	Continuous Drain Current, V_{GS} @ 10V ¹	0.5	A
$I_D@T_C=100^{\circ}C$	Continuous Drain Current, V_{GS} @ 10V ¹	0.13	A
I_{DM}	Pulsed Drain Current ²	1.5	A
EAS	Single Pulse Avalanche Energy ³	1	mJ
$P_D@T_C=25^{\circ}C$	Total Power Dissipation ⁴	350	mW
T_{STG}	Storage Temperature Range	-55 to 150	$^{\circ}C$
T_J	Operating Junction Temperature Range	-55 to 150	$^{\circ}C$
$R_{\theta JA}$	Thermal Resistance Junction-ambient ¹	128	$^{\circ}C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	15	$^{\circ}C/W$



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Electrical Characteristics (T_A=25°C unless otherwise noted)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
V(BR)DSS	Drain-Source Breakdown Voltage	VGS= 0V, ID= 250μA	60	72	-	V
IGSS	Gate leakage Current	VGS= ±20V, VDS= 0V	-	-	±10	μA
IDSS	Drain Cut-off Current	VDS= 60V, VGS= 0V	-	-	1	μA
VGS(th)	Gate Threshold Voltage	VDS= VGS, ID= 250μA	1.0	1.3	2.0	V
RDS(on)	Drain-Source On-state Resistance ³	VGS= 10V, ID= 0.3A	-	1100	1600	mΩ
		VGS= 4.5V, ID= 0.2A	-	1300	2000	mΩ
Ciss	Input Capacitance	V DS = 30V, V GS = 0V, f = 1MHz		25		pF
Coss	Output Capacitance			5.6		pF
Crss	Reverse Transfer Capacitance			2.2		pF
Qg	Total Gate Charge	VGS = 4.5V, VDS = 30V, ID = 0.3A	-	0.61	-	nC
Qgs	Gate-Source Charge		-	0.27	-	nC
Qgd	Gate-Drain Charge		-	0.23	-	nC
td(on)	Turn-on Delay Time	VGS = 10V, VDD = 30V, ID = 0.3A, RG= 3Ω	-	4.3	-	ns
tr	Turn-on Rise Time		-	2.4	-	ns
td(off)	Turn-off Delay Time		-	21	-	ns
tf	Turn- off Fall Time		-	14.5	-	ns
VSD	Diode Forward Voltage ³	IS= 0.3A ,VGS=0V,	-	-	1.5	V
IS	Continuous Source Current	-	-	-	0.5	A

Note :

- 1、The data tested by surface mounted on a 1 inch 2 FR-4 board with 2OZ copper.
- 2、The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- 3、The power dissipation is limited by 150°C junction temperature
- 4、The data is theoretically the same as I D and I DM , in real applications , should be limited by total power dissipation.

Typical Characteristics

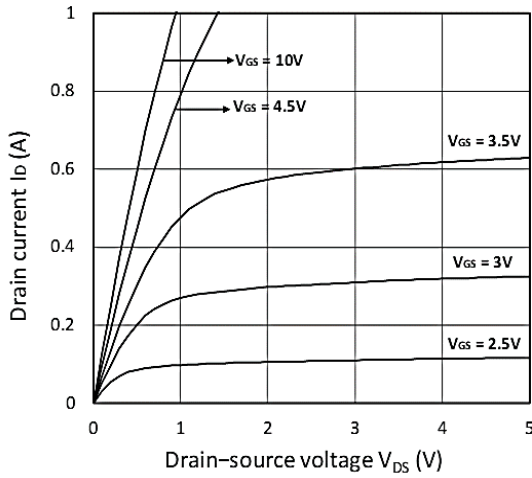


Figure 1. Output Characteristics

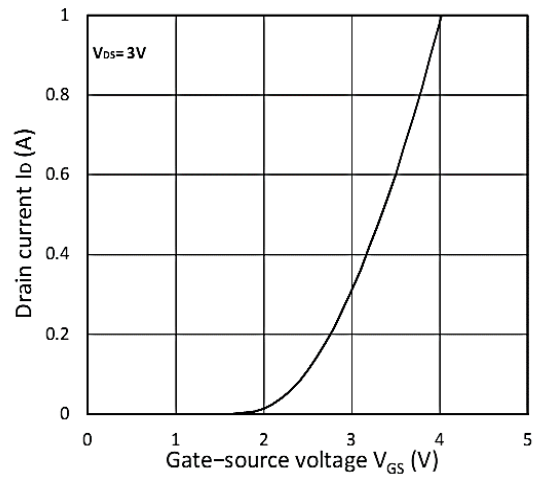


Figure 2. Transfer Characteristics

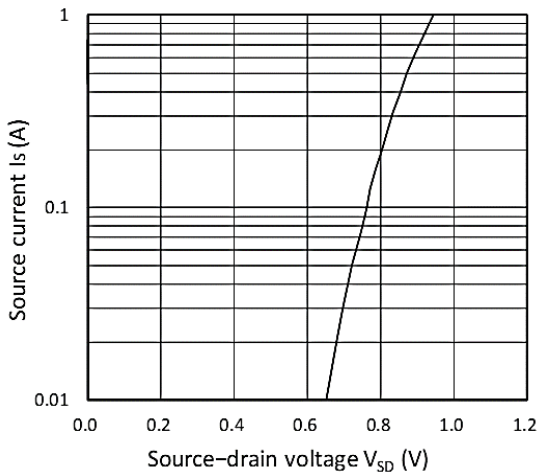


Figure 3. Forward Characteristics of Reverse

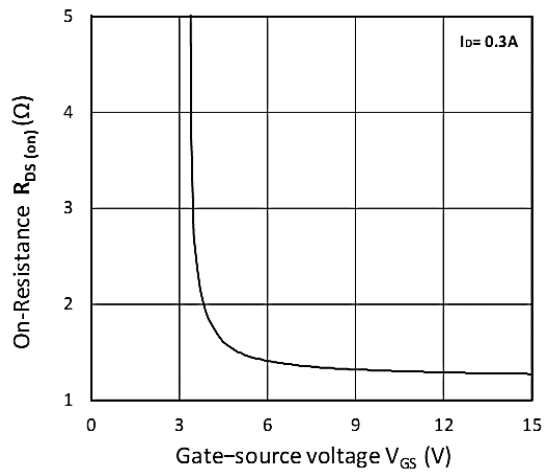


Figure 4. R_DS(ON) vs. V_GS

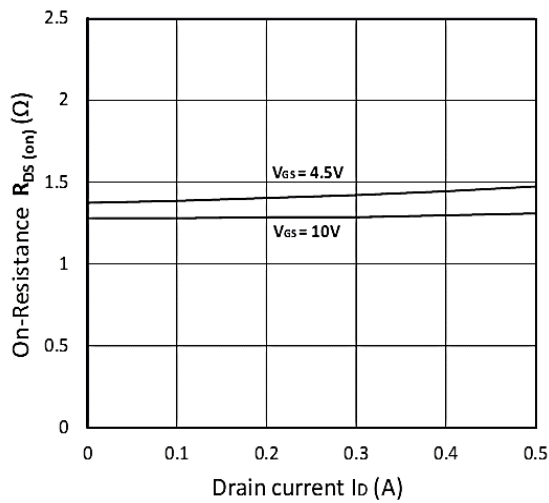


Figure 5. R_DS(ON) vs. I_D

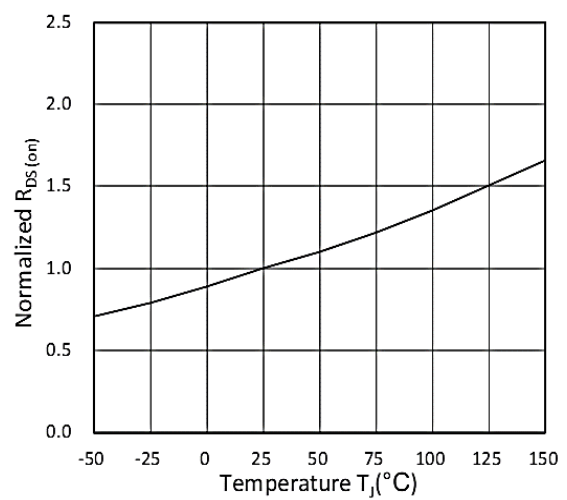


Figure 6. Normalized R_DS(on) vs. Temperature

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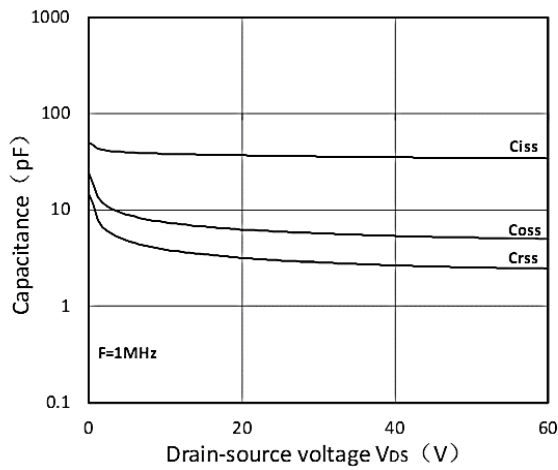


Figure 7. Capacitance Characteristics

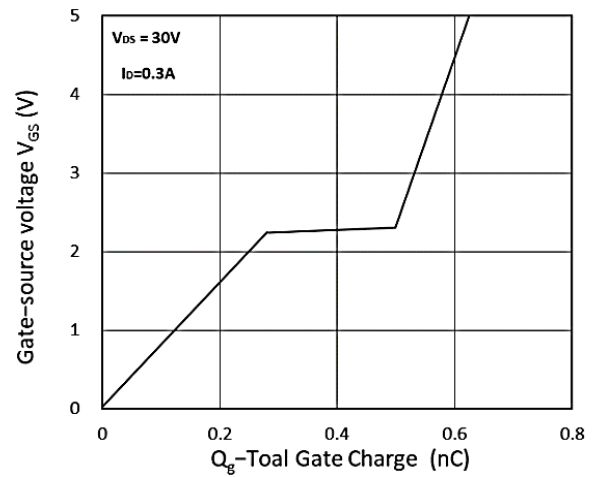


Figure 8. Gate Charge Characteristics

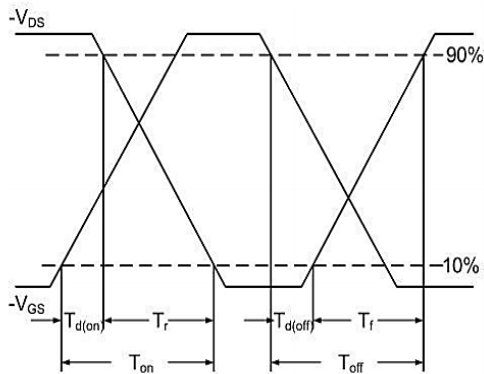


Figure.9 Switching Time Waveform

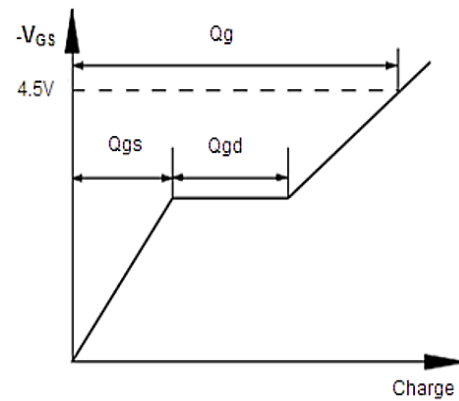
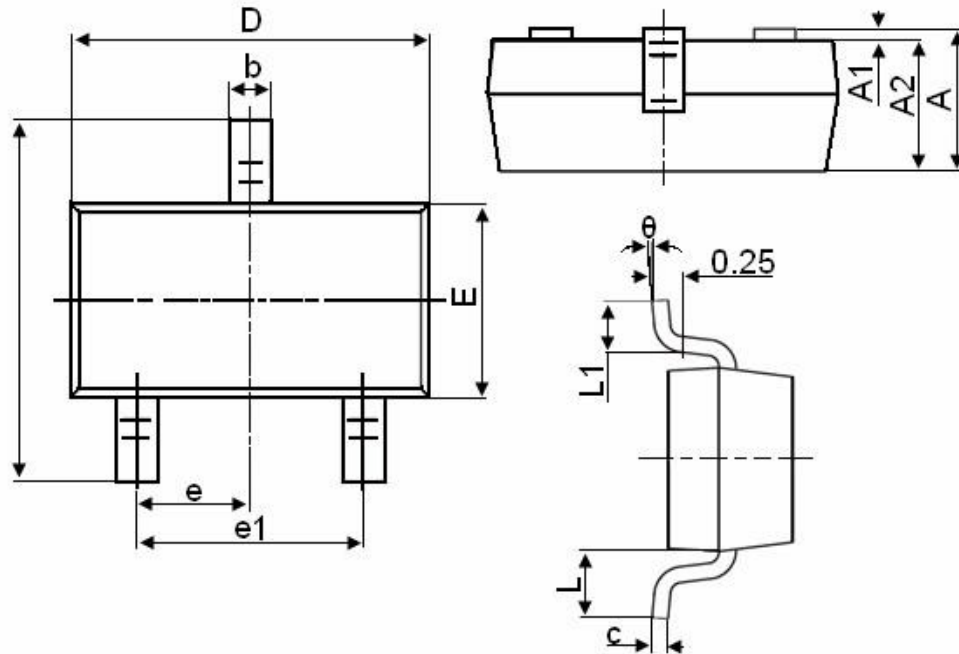


Figure.10 Gate Charge Waveform

Package Mechanical Data-SOT23-XC-Single



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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AP2N7002EI

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Edition	Date	Change
REV1.0	2023/3/8	Initial release

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