60V N-Channel Enhancement Mode MOSFET

Description

The NP2N7002VR uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 1.8V. This device is suitable for use as a load switch or in PWM applications.

General Features

- V_{DS} =60V，I_D =340mA
  $R_{DS(ON)}$(Typ.)=1.15Ω @V_{GS}=10V
  $R_{DS(ON)}$(Typ.)=1.25Ω @V_{GS}=4.5V
- High power and current handing capability
- Lead free product is acquired
- Surface mount package
- ESD Rating: 2000V HBM

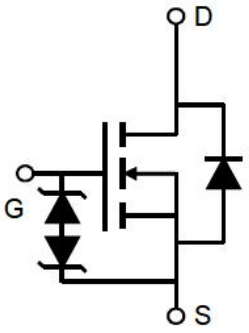
Application

- PWM applications
- Load switch

Package

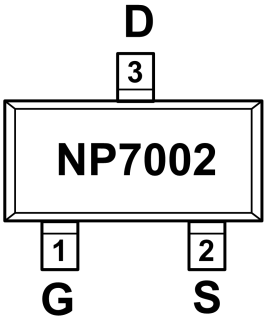
- SOT-23-3L

Schematic diagram



Marking and pin assignment

SOT-23-3L
(TOP VIEW)



Ordering Information

Part Number	Storage Temperature	Package	Devices Per Reel
NP2N7002VR-G	-55°C to +150°C	SOT-23-3L	3000

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

parameter		symbol	limit	unit
Drain-source voltage		V_{DS}	60	V
Gate-source voltage		V_{GS}	±20	V
Drain current-continuous[a]@Tj=125℃		I_D	0.34	A
-pulse [b]		I_{DM}	0.3	A
Maximum power dissipation	T_A=25℃	P_D	0.15	W
Operating junction Temperature range		Tj	-55—150	℃

Notes:

a. surface mounted on FR4 board,t≤10sec

b. pulse test: pulse width≤300μs,duty≤2%

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	I_{GSS}	V_{DS}=0V, V_{GS}=±20V	-	-	±10	μA
ON Characteristics						
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	1	1.4	2.5	V
Drain-source on-state resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=200mA	-	1.15	2.5	Ω
		V_{GS}=4.5V, I_D=200mA	-	1.25	3.5	
Recovered charge	Q_r	V_{GS}=0V I_S=300mA V_R=25V dI_S/d_t=-100A/uS	-	30	-	nC
Dynamic Characteristics						
Input capacitance	C_{ISS}	V_{DS}=30V ,V_{GS}=0V f=1.0MHz	-	14.8	-	pF
Output capacitance	C_{OSS}		-	3.6	-	
Reverse transfer capacitance	C_{RSS}		-	2.1	-	
Switching Characteristics						
Turn-on delay time	$t_{D(ON)}$	V_{DD}=5V V_{GS}=10V R_L=250ohm R_{GEN}=50ohm	-	-	10	ns
Rise time	tr		-	30	-	
Turn-off delay time	$t_{D(OFF)}$		-	-	15	
Total gate charge	Qg	V_{DS}=30V,I_D=200mA V_{GS}=10V	-	1.3	-	nC
Gate-source charge	Qgs		-	0.4	-	
Gate-drain charge	Qgd		-	0.1	-	
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode forward voltage	V_{SD}	V_{GS}=0V,Is=300mA	-	-	1.5	V

Thermal Characteristics

Parameter	Symbol	Typ	max	Unit
Thermal Resistance-Junction to Case	Rθjc	1.7	-	℃/W
Thermal Resistance junction-to ambient	RθJa	62.5	-	

Typical Performance Characteristics

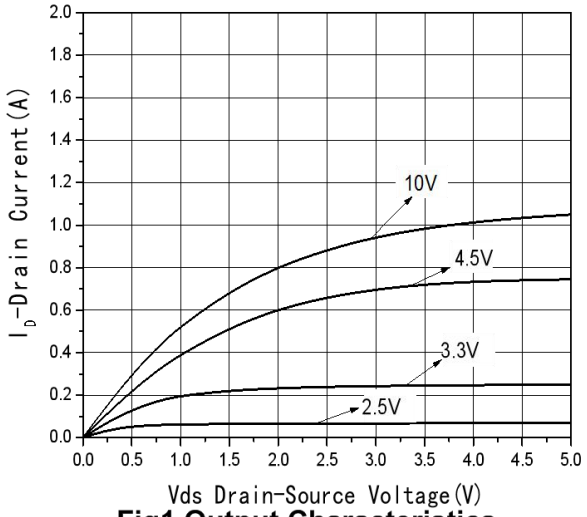


Fig1 Output Characteristics

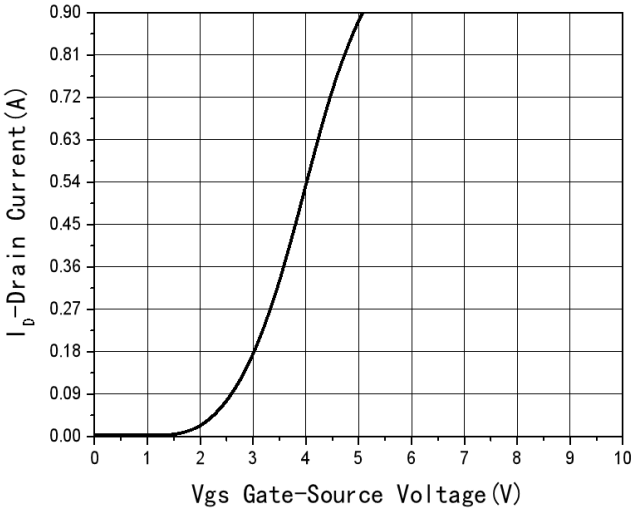


Fig2 Transfer Characteristics

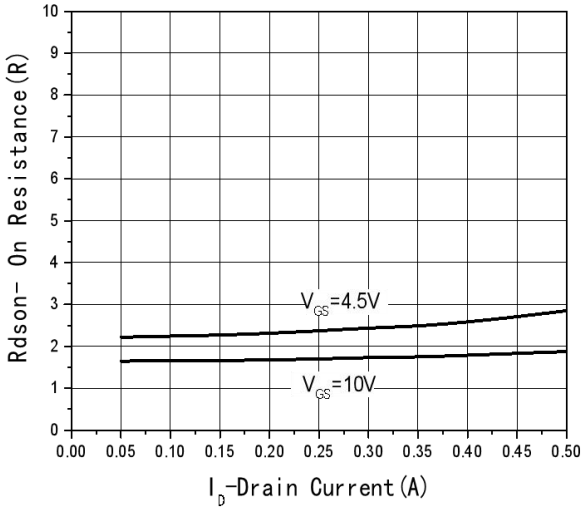


Fig3 Rdson-Drain current

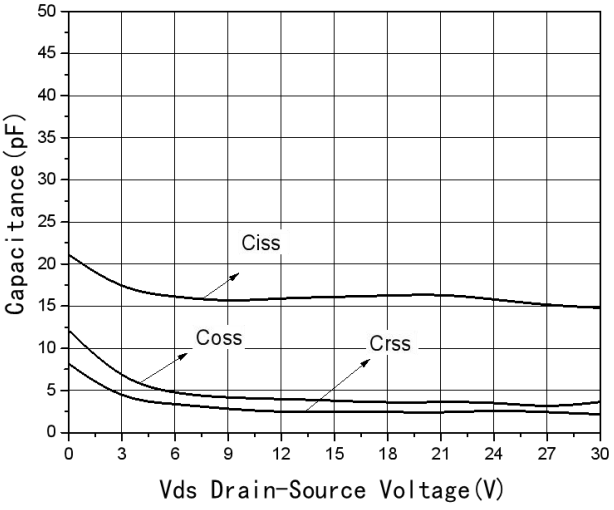


Fig4 Capacitance vs Vds

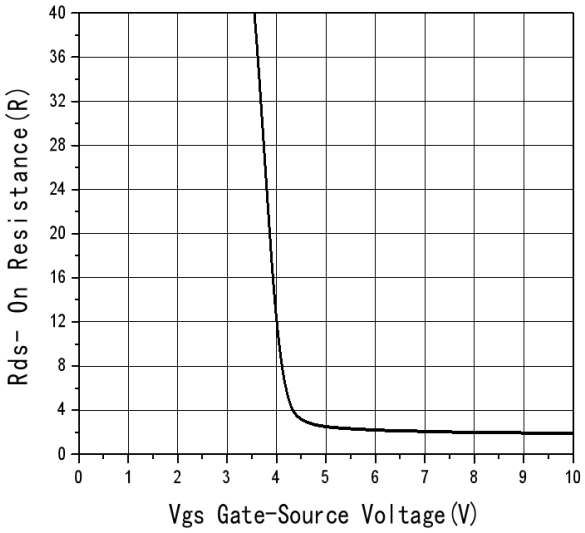


Fig5 Rdson-Gate Drain voltage

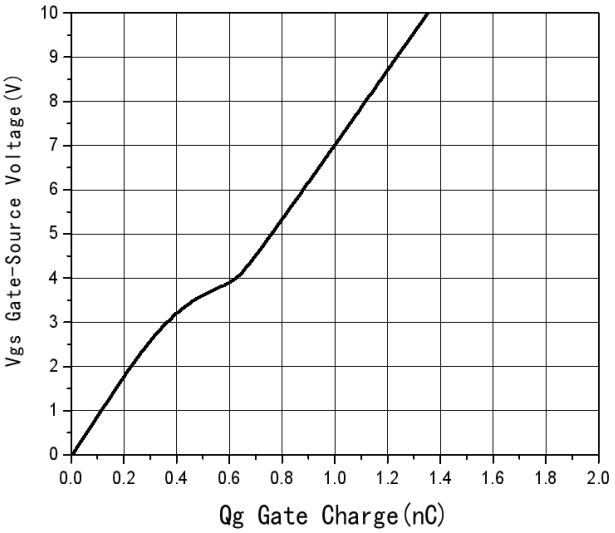


Fig6 Gate Charge

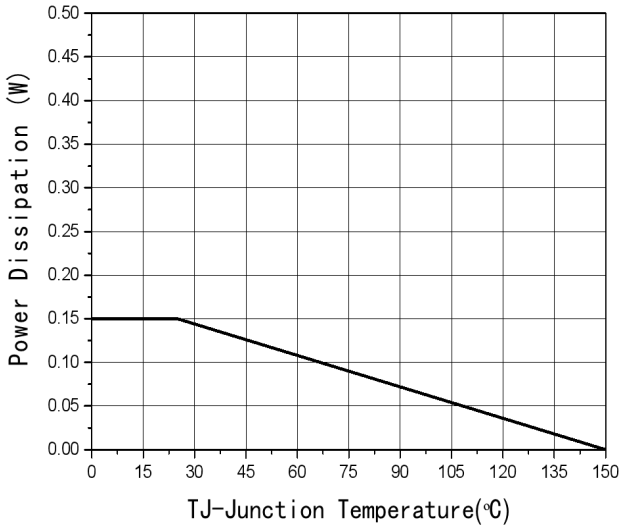


Fig7 Power De-rating

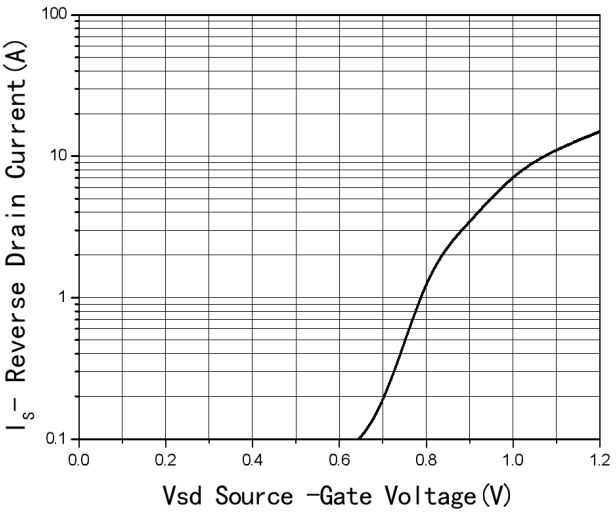
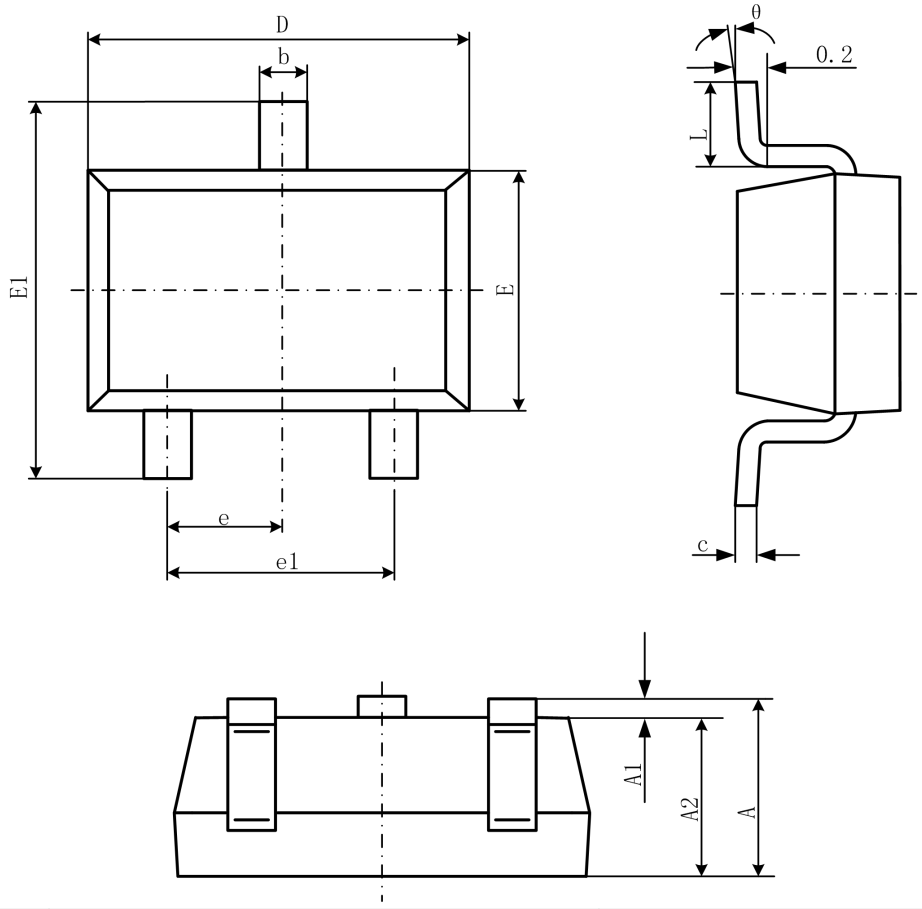


Fig8 Source-Drain Diode Forward

Package Information

- **SOT-23-3L**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

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