30V P-Channel Enhancement Mode MOSFET

Description

The NP3401VR uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with low gate voltages. This device is suitable for use as a load switch or in PWM applications.

General Features

- V_{DS} =-30V，I_D =-4A
  $R_{DS(ON)}$(Typ.)=42mΩ @V_{GS}=-4.5V
  $R_{DS(ON)}$(Typ.)=58mΩ @V_{GS}=-2.5V
- High power and current handing capability
- Lead free product is acquired
- Surface mount package

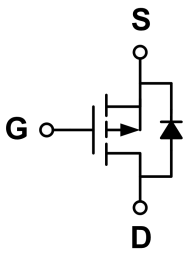
Application

- PWM applications
- Load switch

Package

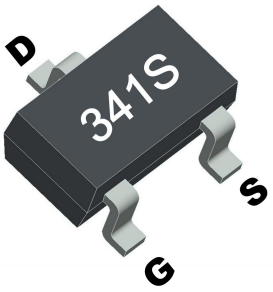
- SOT-23

Schematic diagram



Marking and pin assignment

SOT-23
(TOP VIEW)



Ordering Information

Part Number	Storage Temperature	Package	Devices Per Reel
NP3401VR-G	-55°C to +150°C	SOT-23	3000

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

parameter		symbol	limit	unit
Drain-source voltage		V_{DS}	-30	V
Gate-source voltage		V_{GS}	±12	V
Continuous Drain Current	T_C=25°C	I_D	-4	A
	T_C=70°C		-3	
Pulsed Drain Current		I_{DM}	-12	
Avalanche energy(V_{DD}=15V,V_G=10V,L=0.5mH,Rg=25Ω)		E_{AS}	33.7	mJ
Maximum power dissipation	T_C=25°C	P_D	1.7	W
	T_C=70°C		0.7	
Operating Junction and Storage Temperature Range		T_J,T_{STG}	-55—150	℃

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	-30	-	-	V
Zero gate voltage drain current	I_{DSS}	V_{DS}=-30V, V_{GS}=0V	-	-	-1	μA
Gate-body leakage	I_{GSS}	V_{DS}=0V, V_{GS}=±12V	-	-	±100	nA
ON Characteristics						
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-250μA	-0.5	-0.9	-1.5	V
Drain-source on-state resistance	$R_{DS(ON)}$	V_{GS}=-4.5V, I_D=-1A	-	42	55	mΩ
		V_{GS}=-2.5V, I_D=-1A	-	58	75	
Forward transconductance	gfs	V_{DS}=-5V, I_D=-4A	-	11	-	S
Dynamic Characteristics						
Gate Resistance	R_G	V_{GS}=0V, V_{DS}=0V,f=1MHz	-	16	-	Ω
Input capacitance	C_{ISS}	V_{DS}=-15V ,V_{GS}=0V f=1.0MHz	-	709	-	pF
Output capacitance	C_{OSS}		-	67	-	
Reverse transfer capacitance	C_{RSS}		-	57	-	
Switching Characteristics						
Turn-on delay time	$t_{D(ON)}$	V_{DS}=-15V I_D=-1A V_{GEN}=-5V R_L=3.6Ω R_{GEN}=6Ω	-	7	-	ns
Rise time	tr		-	3	-	
Turn-off delay time	$t_{D(OFF)}$		-	31	-	
Fall time	tf		-	12	-	
Total gate charge	Qg	V_{DS}=-15V,I_D=-1A V_{GS}=-5V	-	8.4	-	nC
Gate-source charge	Qgs		-	2.1	-	
Gate-drain charge	Qgd		-	1.6	-	
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode forward voltage	V_{SD}	V_{GS}=0V,Is=-1A	-	-0.74	-1.4	V

Typical Performance Characteristics

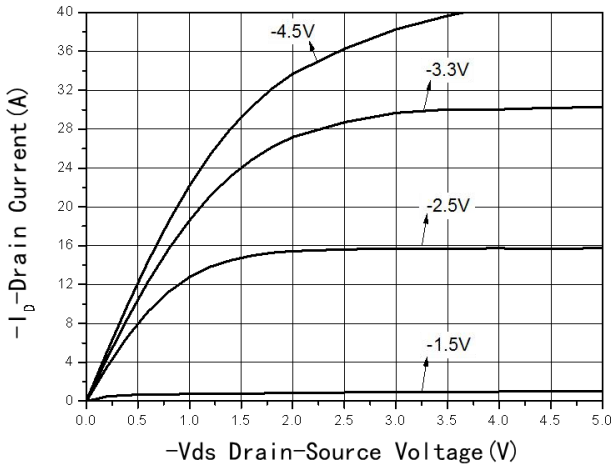


Fig1 Output Characteristics

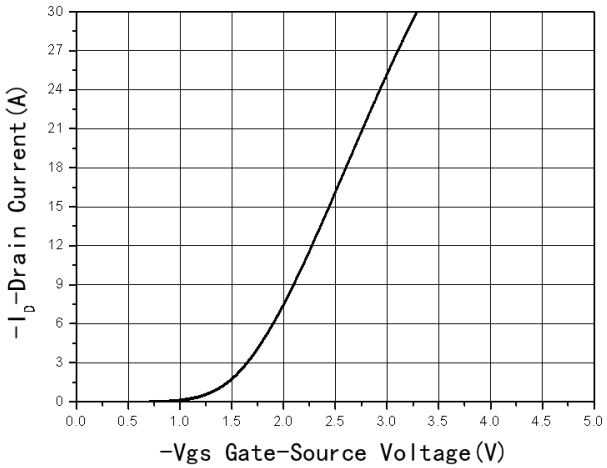


Fig2 Transfer Characteristics

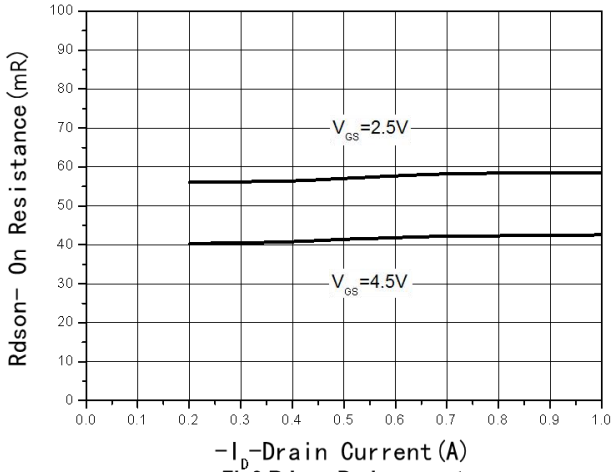


Fig3 Rdson-Drain current

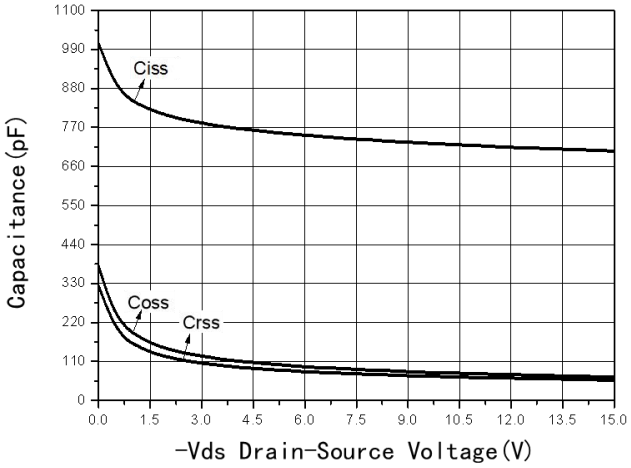


Fig4 Capacitance vs Vds

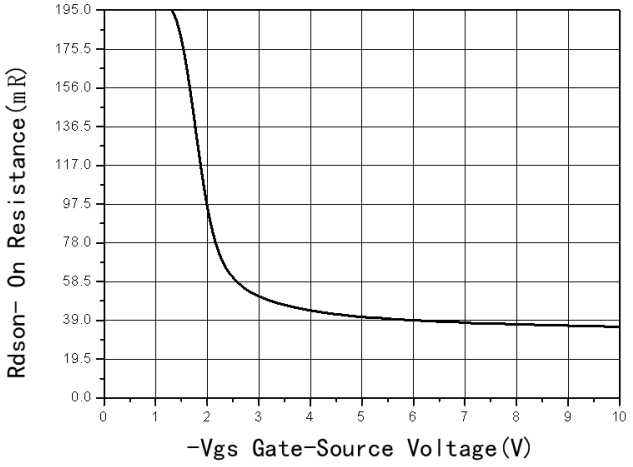


Fig5 Rdson-Gate Drain voltage

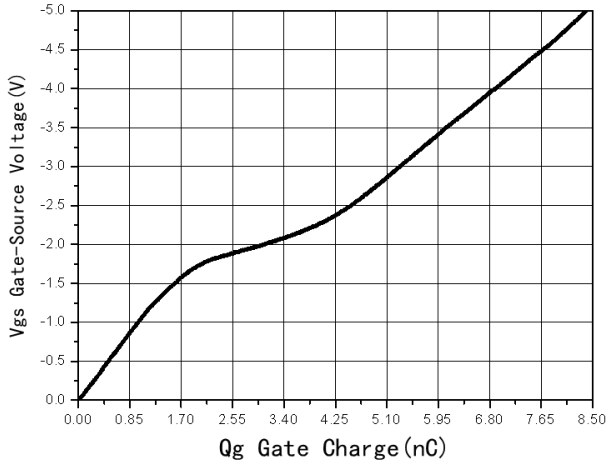


Fig6 Gate Charge

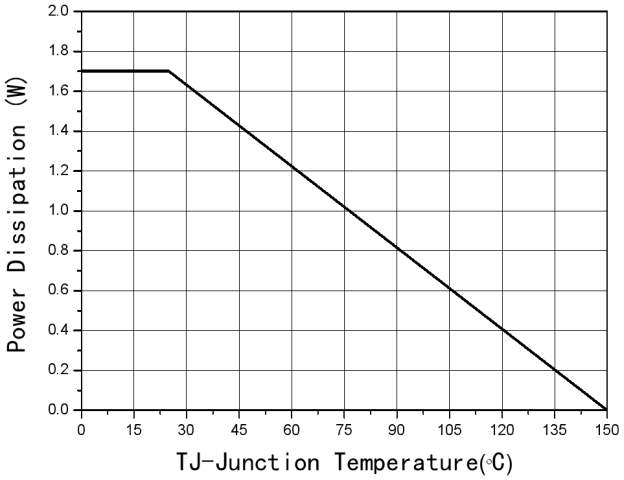


Fig7 Power De-rating

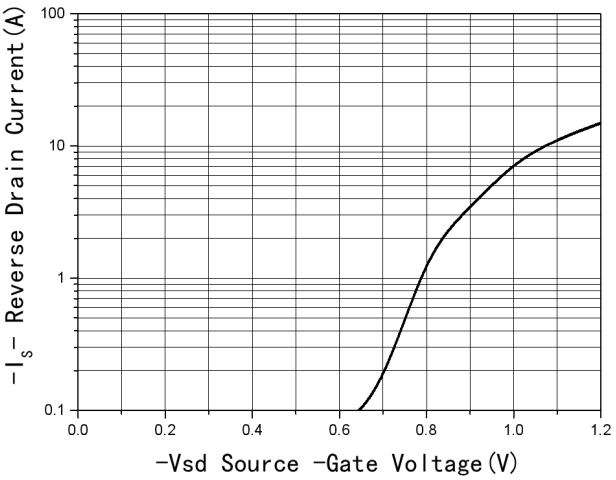
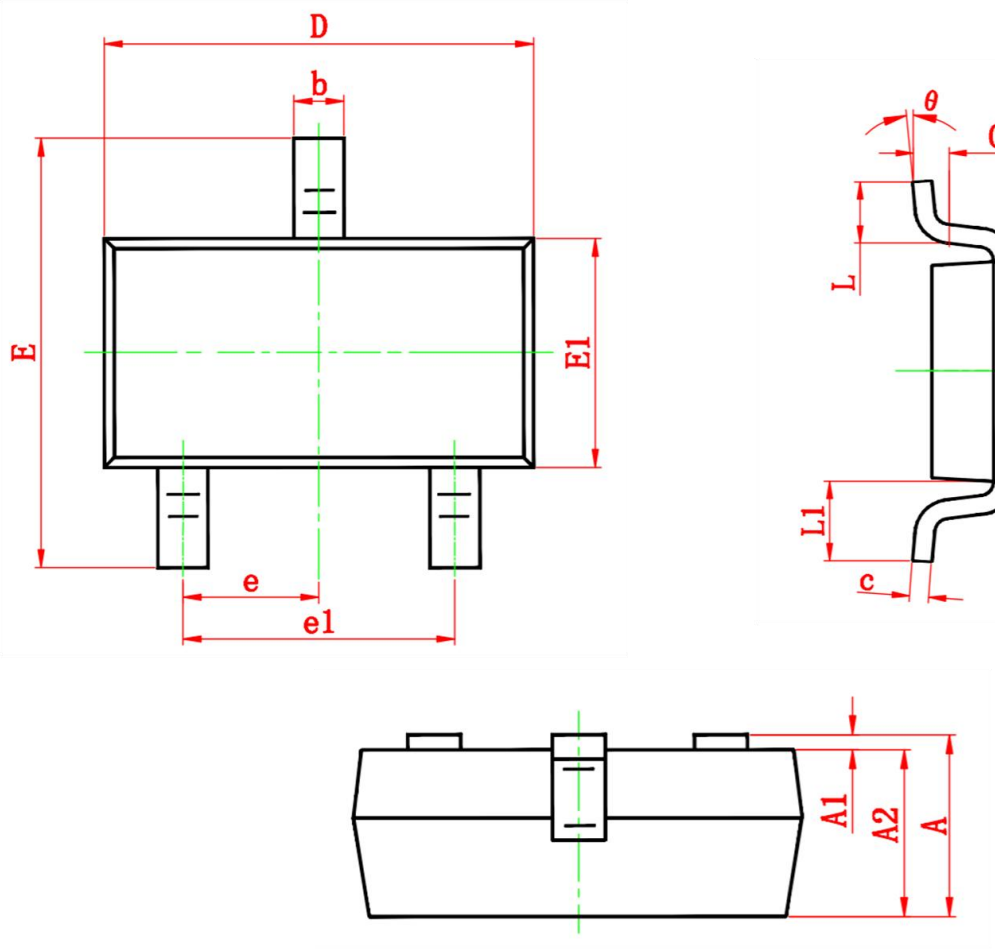


Fig8 Source-Drain Diode Forward

Package Information

- **SOT-23**



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	2.250	2.550	0.089	0.100
E1	1.200	1.400	0.047	0.055
e	0.950 TYP.		0.037 TYP.	
e1	1.800	2.000	0.071	0.079
L	0.300	0.500	0.012	0.020
L1	0.550 REF.		0.022 REF.	
θ	0°	8°	0°	8°