30V N-Channel Enhancement Mode MOSFET

Description

The NP3402MR uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and high density cell Design for ultra low on-resistance. 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.)=39mΩ @V_{GS}=4.5V
  $R_{DS(ON)}$(Typ.)=47mΩ @V_{GS}=2.5V
- High power and current handing capability
- Lead free product is acquired
- Surface mount package

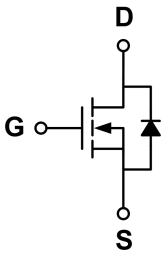
Application

- PWM applications
- Load switch

Package

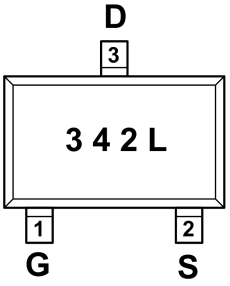
- SOT-23-3L

Schematic diagram



Marking and pin assignment

SOT-23-3L
(TOP VIEW)



342—NP3402MR
L—Package Information

Ordering Information

Part Number	Storage Temperature	Package	Devices Per Reel
NP3402MR-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}	30	V
Gate-source voltage		V_{GS}	±12	V
Continuous Drain Current	T_A=25℃	I_D	4	A
	T_A=70℃		3.2	A
Pulsed Drain Current		I_{DM}	16	A
Maximum power dissipation	T_A=25℃	P_D	1.4	W
	T_A=70℃		0.9	
Operating junction Temperature range		Tj	-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	0.75	1.5	V
	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=3A		39.0	45	mΩ
		V_{GS}=2.5V, I_D=2A		47.0	65.0	
Forward transconductance	g_{fs}	V_{GS}=5V, I_D=3.6A	-	14	-	S
Dynamic Characteristics						
Input capacitance	C_{ISS}	V_{DS}=15V ,V_{GS}=0V f=1.0MHz	-	435	-	pF
Output capacitance	C_{OSS}		-	29	-	
Reverse transfer capacitance	C_{RSS}		-	23	-	
Switching Characteristics						
Turn-on delay time	$t_{D(ON)}$	V_{DS}=15V V_{GS}=10V R_L=2.6 ohm R_{GEN}=3ohm	-	3.5	-	ns
Rise time	tr		-	1.5	-	
Turn-off delay time	$t_{D(OFF)}$		-	17.5	-	
Fall time	tf		-	2.5	-	
Total gate charge	Qg	V_{DS}=15V,I_D=4A V_{GS}=10V	-	5	-	nC
Gate-source charge	Qgs		-	1.2	-	
Gate-drain charge	Qgd		-	1.1	-	
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode forward voltage	V_{SD}	V_{GS}=0V,Is=1A	-	0.82	1.16	V

Thermal Characteristics

Parameter		Symbol	Typ	Max	Unit
Maximum Junction-to-Ambient[A]	≤ 10s	$R_{θJA}$	65	90	℃/W
Maximum Junction-to-Ambient[A]	Steady-State		85	125	
Maximum Junction-to-Lead[B]	Steady-State	$R_{θJC}$	63	80	

A:The value of R qJA is measured with the device mounted on 1in 2 FR-4 board with 2oz. Copper, in a still air environment with T A=25°C. The value in any given application depends on the user's specific board design. The current rating is based on the t ≤ 10s thermal resistance rating.

B: The R qJA is the sum of the thermal impedence from junction to lead R qJL and lead to ambient.

Typical Performance Characteristics

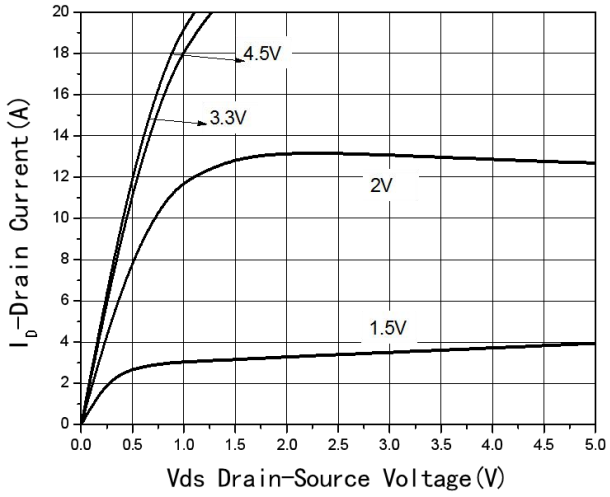


Fig1 Output Characteristics

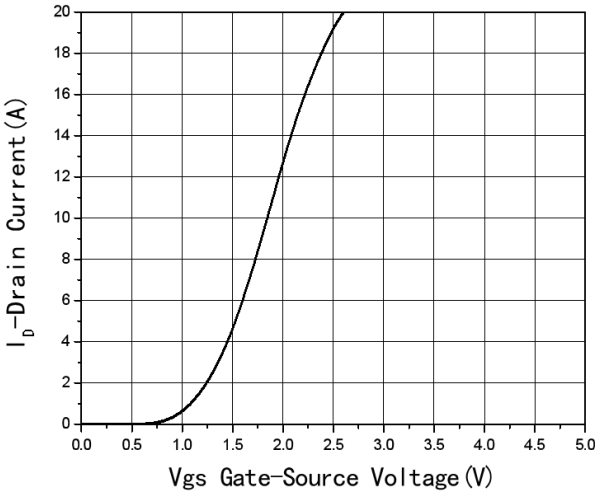


Fig2 Transfer Characteristics

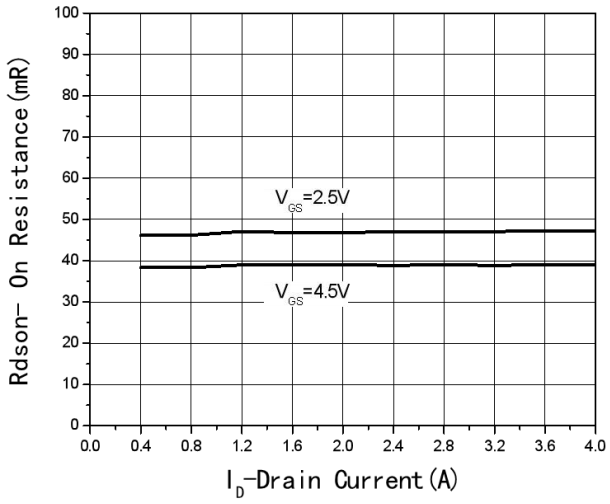


Fig3 Rdson-Drain current

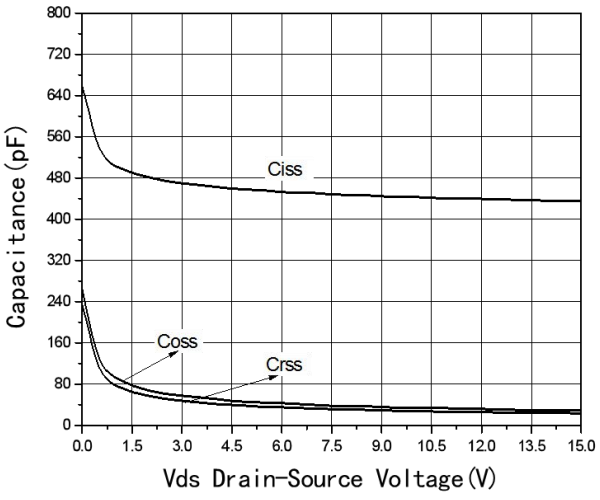


Fig4 Capacitance vs Vds

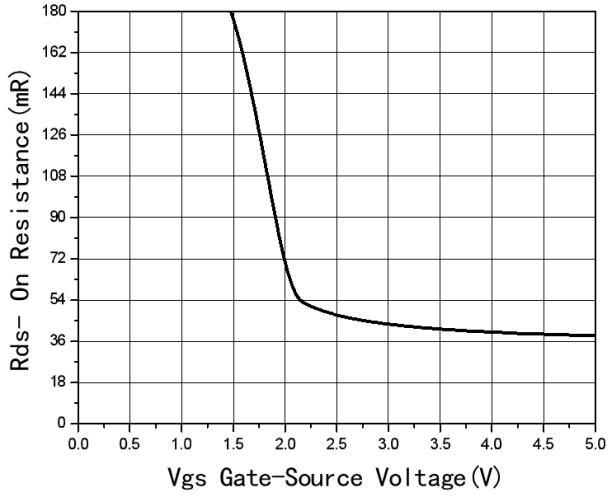


Fig5 Rdson-Gate Drain voltage

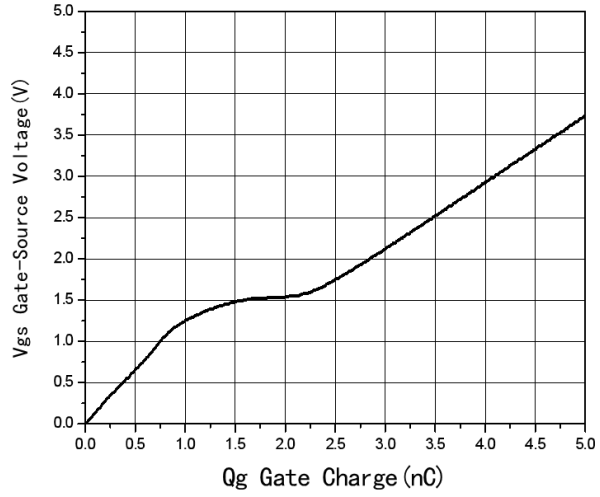


Fig6 Gate Charge

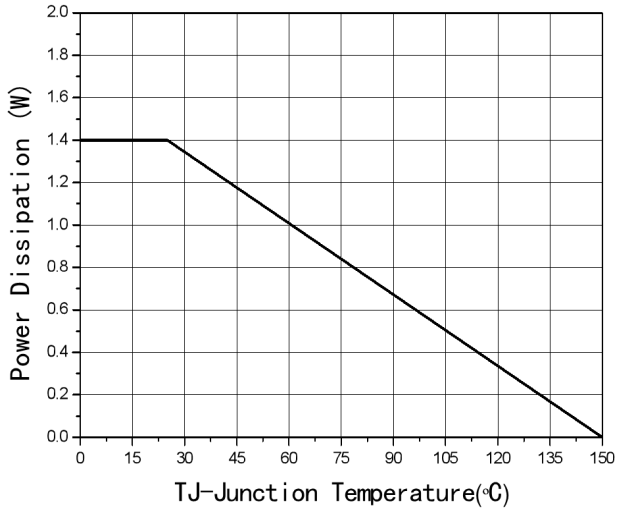


Fig7 Power De-rating

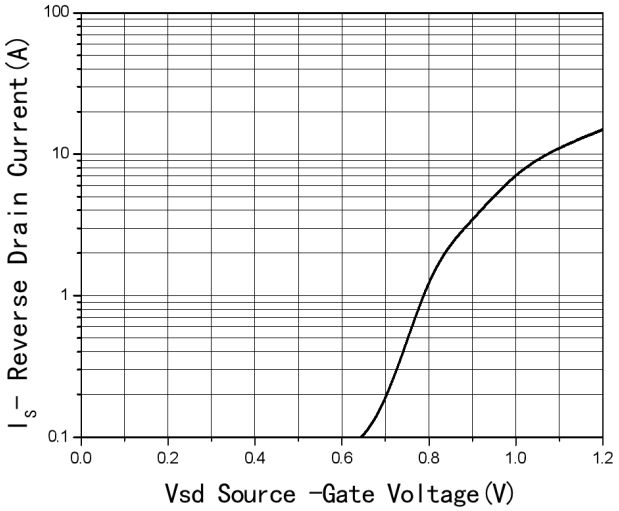
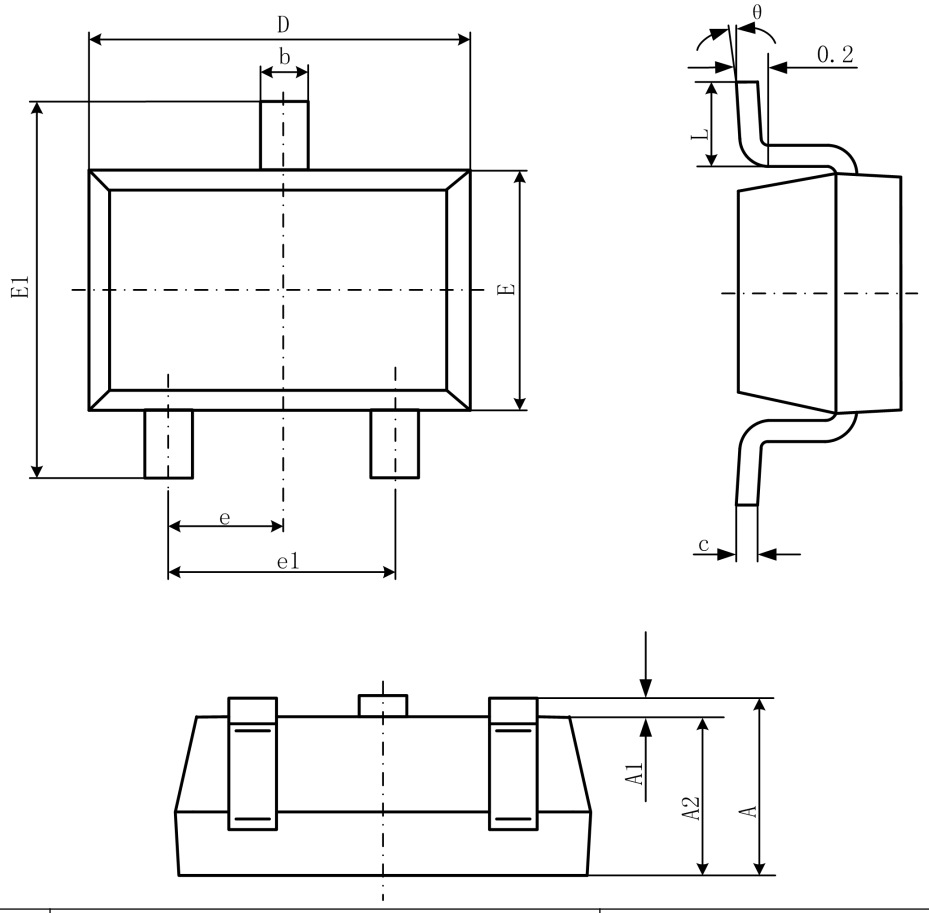


Fig8 Source-Drain Diode Forward

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°