NP3407MR

30V P-Channel Enhancement Mode MOSFET

Description

The NP3407MR uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. 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.)=61mΩ @V_{GS}=-4.5V
$R_{DS(ON)}$(Typ.)=48mΩ @V_{GS}=-10V

◆ High power and current handing capability
◆ Lead free product is acquired
◆ Surface mount package
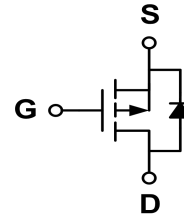
Application

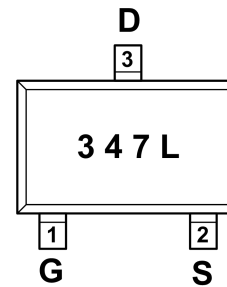◆ PWM applications
◆ Load switch

Package

◆ SOT-23-3L

Schematic diagram

Marking and pin assignment

SOT-23-3L
(TOP VIEW)

347—NP3407

L—Package Information

Ordering Information

Part Number	Storage Temperature	Package	Devices Per Reel
NP3407MR-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}	±20	V
Continuous Drain Current	TC=25°C	I_D	-4	A
	TC=70°C		-3.0	
Pulsed Drain Current [C]		I_{DP}	-16	A
power dissipation [B]	TC=25°C	P_D	1.4	W
	TC=70°C		0.9	
Junction and Storage Temperature Range		T_J, T_{SGT}	-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}=±20V	-	-	±100	nA
ON Characteristics						
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-250µA	-0.9	-1.3	-2	V
Drain-source on-state resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-4A	-	48	60	mΩ
		V_{GS}=-4.5V, I_D=-3A	-	61	85	
Forward transconductance	G_{FS}	V_{DS}=-5V, I_D=-4A	-	5	-	S
Dynamic Characteristics						
Input capacitance	C_{ISS}	V_{DS}=-15V ,V_{GS}=0V f=1.0MHz	-	600	-	pF
Output capacitance	C_{OSS}		-	85	-	
Reverse transfer capacitance	C_{RSS}		-	65	-	
Gate resistance	Rg	V_{DS}=15mV，f=1.0MHz		10		Ω
Switching Characteristics						
Turn-on delay time	$t_{D(ON)}$	V_{DS}=-15V I_D=-4A V_{GEN}=-10V R_L=10ohm R_{GEN}=6ohm	-	3.0	3.5	ns
Rise time	tr		-	31	35	
Turn-off delay time	$t_{D(OFF)}$		-	33	40	
Fall time	tf		-	8	12	
Total gate charge	Qg	V_{DS}=-15V,I_D=-4A V_{GS}=-4.5V	-	6.2	-	nC
Gate-source charge	Qgs		-	1.7	-	
Gate-drain charge	Qgd		-	2.5	-	
Body Diode Reverse Recovery Time	trr	IF=-4A, dI/dt=100A/ms		24		nS
Body Diode Reverse Recovery Charge	Qrr	IF=-4A, dI/dt=100A/ms		1.8		nC
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode forward voltage	V_{SD}	V_{GS}=0V,Is=-4.2A	-	-0.81	-1.2	V

Thermal Characteristics

Parameter	Symbol		Typ.	Max.	Unit
Maximum Junction-to-Ambient [A]	$R_{θJA}$	t≤ 10s	70	90	℃/W
Maximum Junction-to-Ambient [A D]		Steady-State	100	125	
Maximum Junction-to-Lead	$R_{θJL}$	Steady-State	62	80	

A. The value of $R_{θJA}$ 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.

B. The power dissipation PD is based on $T_{J(MAX)}$=150°C, using ≤ 10s junction-to-ambient thermal resistance.

C. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C. Ratings are based on low frequency and duty

cycles to keep initialT_J=25°C.

D. The $R_{\theta JA}$ is the sum of the thermal impedence from junction to lead $R_{\theta JL}$ and lead to ambient.

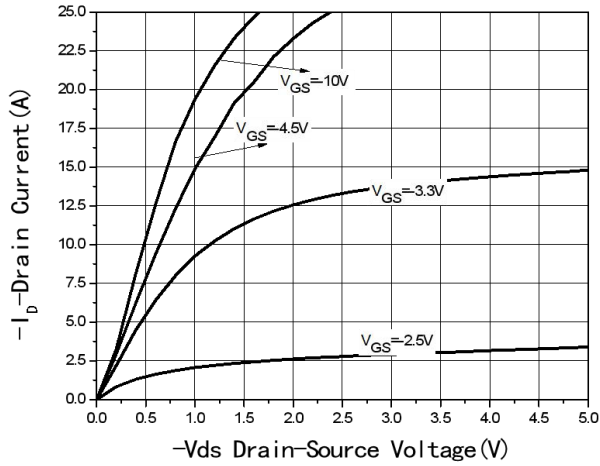## Typical Performance Characteristics
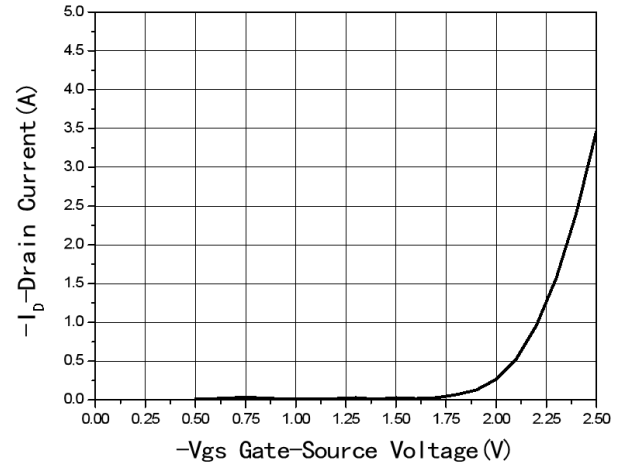

Fig1 Output Characteristics
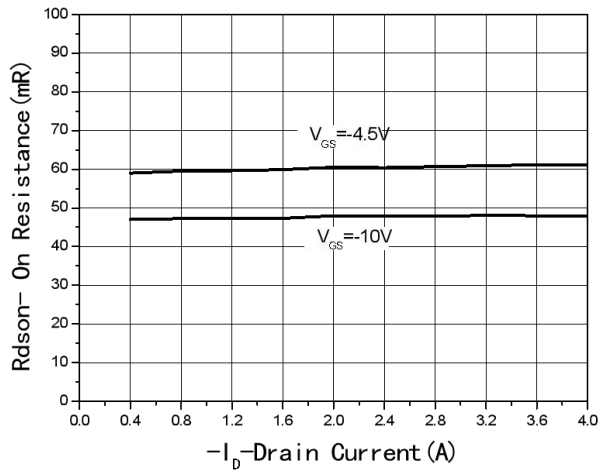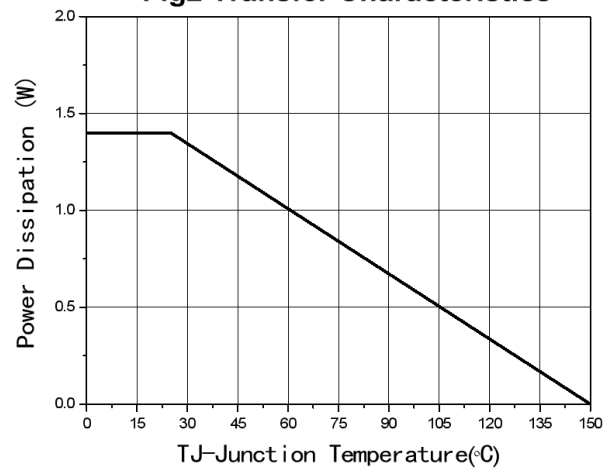

Fig2 Transfer Characteristics

Fig3 Rdson-Drain current
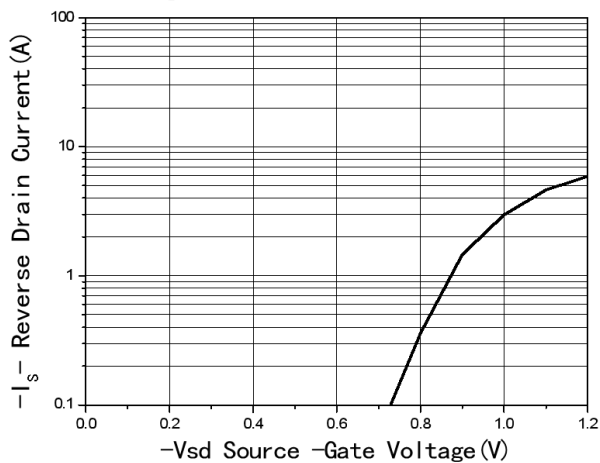

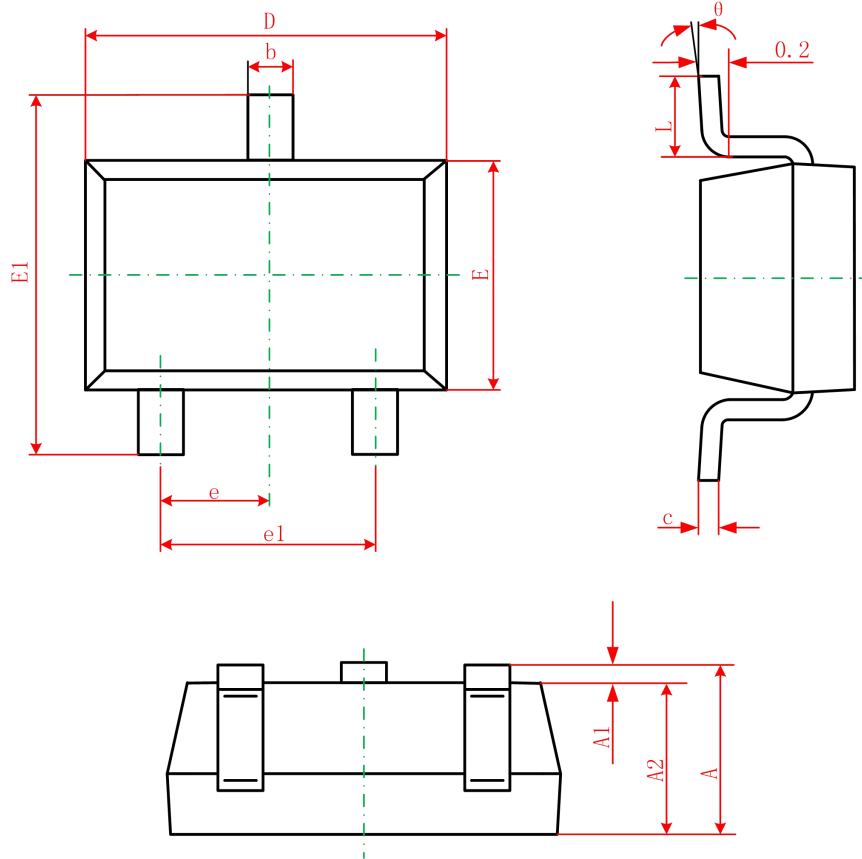**Fig8 Power De-rating**

Fig5 Source-Drain Diode Forward

Fig7 Rdson-Gate Drain voltage

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°