30V P-Channel Enhancement Mode MOSFET

Description

The NP3411MR 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} =-30V，I_D =-9A
  $R_{DS(ON)}$(Typ.)=28mΩ @V_{GS}=-4.5V
  $R_{DS(ON)}$(Typ.)=22mΩ @V_{GS}=-10V
- High power and current handing capability
- Lead free product is acquired
- Surface mount package

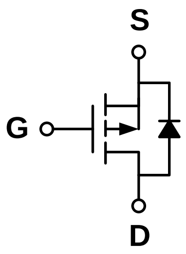
Application

- PWM applications
- Load switch

Package

- SOT-23-3L

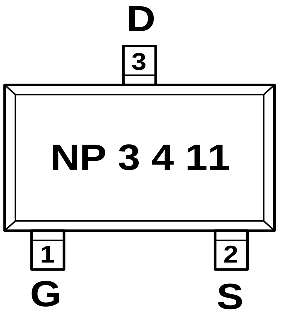
Schematic diagram



Marking and pin assignment

（Thickness 0.55mm）

SOT-23
(TOP VIEW)



NP----Natlinear Power

3411----NP3411

Ordering Information

Part Number	Storage Temperature	Package	Devices Per Reel
NP3411MR-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}	±20	V
Drain current-continuous[a]@Tj=125℃	I_D	-9	A
-pulse d[b]	I_{DM}	-36	A
Drain-source Diode forward current	Is	-9	A
Maximum power dissipation	P_D	18	W
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}=±20V	-	-	±100	nA
ON Characteristics						
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-250μA	-1	-1.7	-2.5	V
Drain-source on-state resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-9A	-	22	28	mΩ
		V_{GS}=-4.5V, I_D=-6A	-	28	36	
Forward transconductance	gfs	V_{GS}=-5V, I_D=-9A	-	5	-	S
Dynamic Characteristics						
Input capacitance	C_{ISS}	V_{DS}=-15V ,V_{GS}=0V f=1.0MHz	-	1092	-	pF
Output capacitance	C_{OSS}		-	124	-	
Reverse transfer capacitance	C_{RSS}		-	99	-	
Switching Characteristics						
Turn-on delay time	$t_{D(ON)}$	V_{DS}=-15V V_{GS}=-10V R_L=2.3Ω R_{GEN}=3Ω	-	8	-	ns
Rise time	tr		-	6	-	
Turn-off delay time	$t_{D(OFF)}$		-	17	-	
Fall time	tf		-	5	-	
Total gate charge	Qg	V_{DS}=-15V,I_D=-6A V_{GS}=-10V	-	11.4	-	nC
Gate-source charge	Qgs		-	4.3	-	
Gate-drain charge	Qgd		-	3.5	-	
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode forward voltage	V_{SD}	V_{GS}=0V,Is=-1.25A	-	-0.81	-1.2	V

Notes:

a. surface mounted on FR4 board,t≤10sec
b. pulse test: pulse width≤300μs,duty≤2%
c. guaranteed by design, not subject to production testing

Thermal Characteristics

Thermal Resistance junction-to ambient	Rth JA	100	℃/W

Typical Performance Characteristics

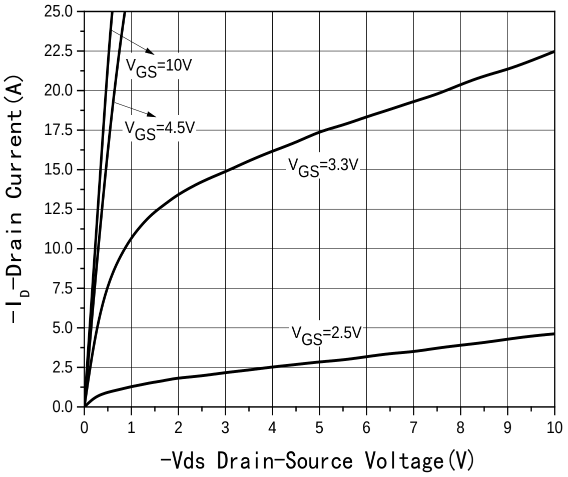


Fig1 Output Characteristics

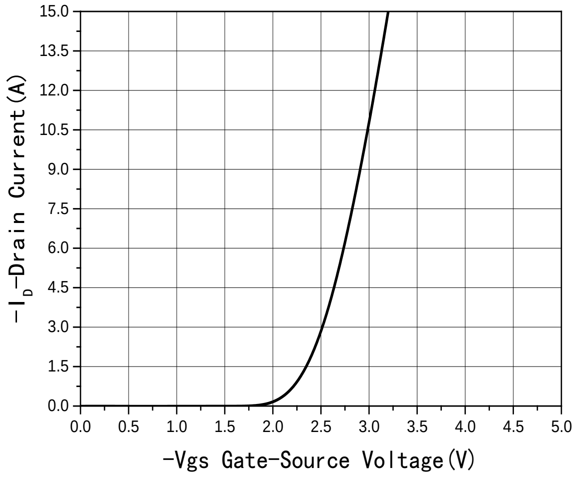


Fig2 Transfer Characteristics

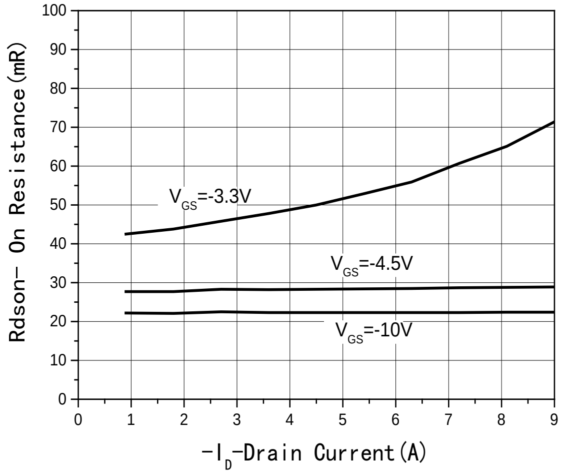


Fig3 Rdson-Drain current

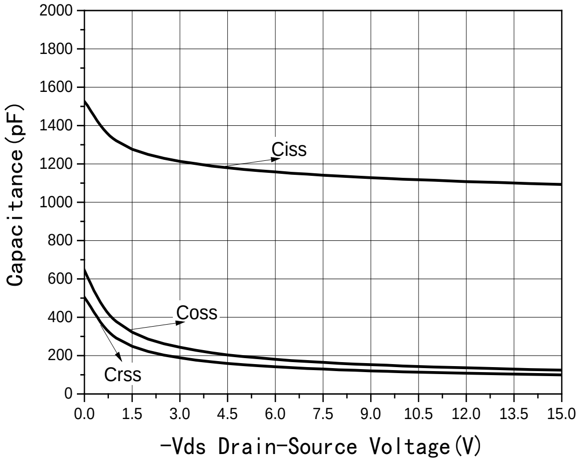


Fig4 Capacitance vs Vds

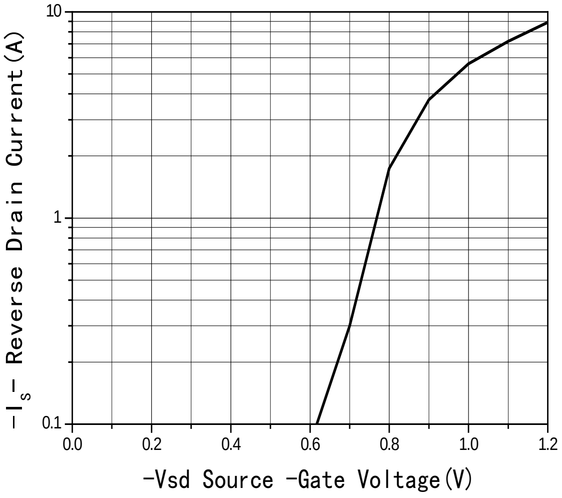


Fig5 Source-Drain Diode Forward

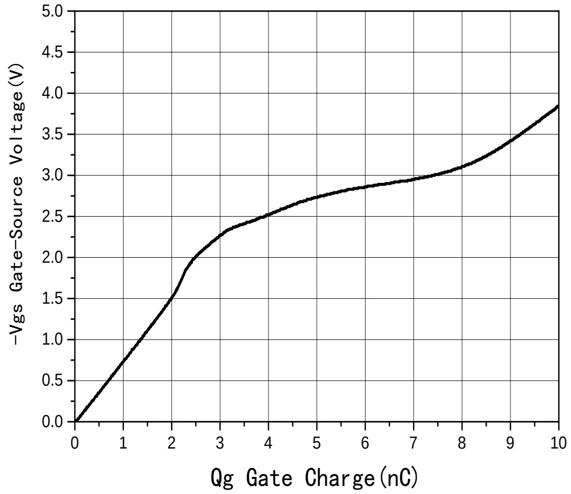


Fig6 Gate Charge

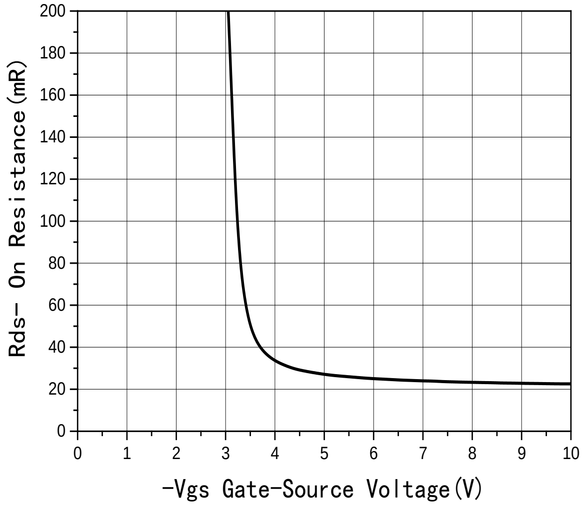


Fig7 Rdson-Gate Drain voltage

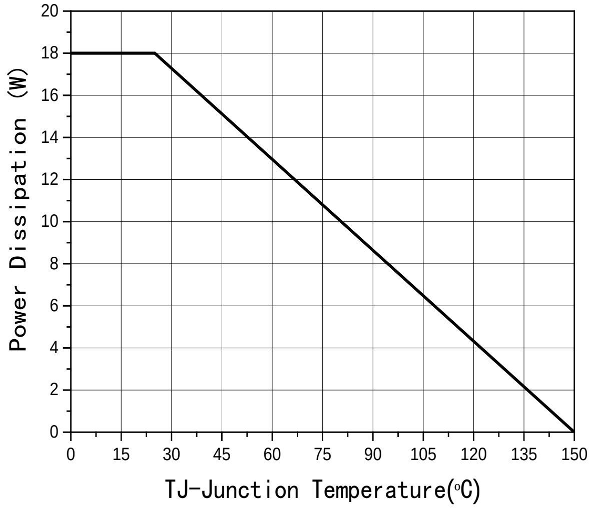
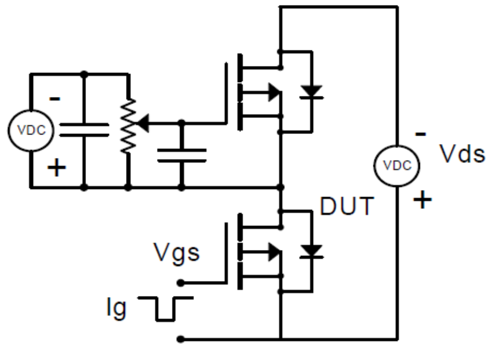
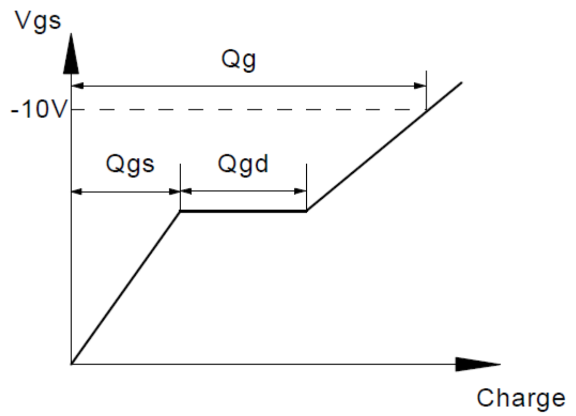


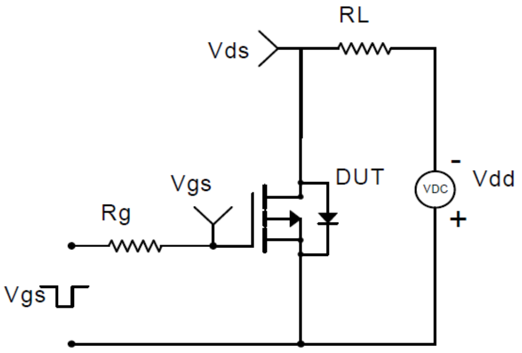
Fig8 Power De-rating

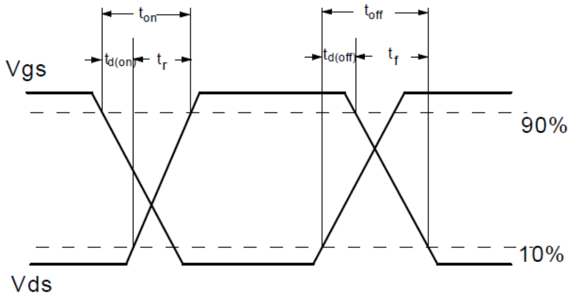
Gate Charge Test Circuit & Waveform



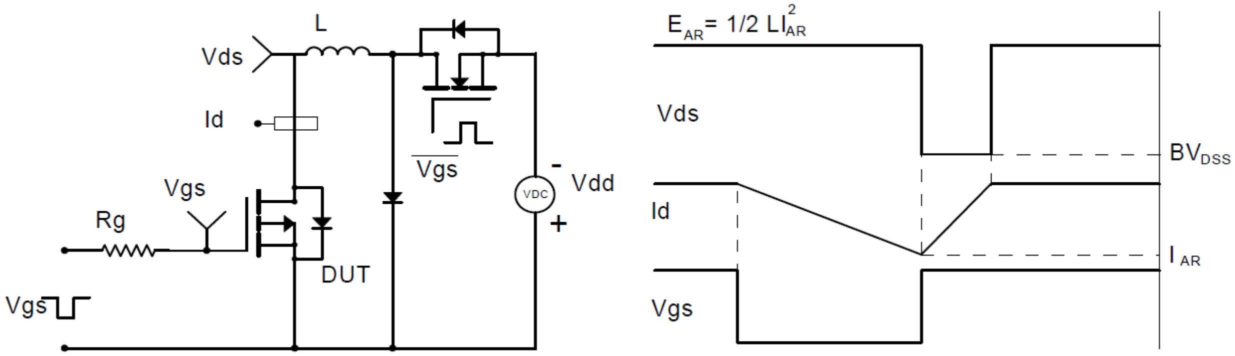


Resistive Switching Test Circuit & Waveforms

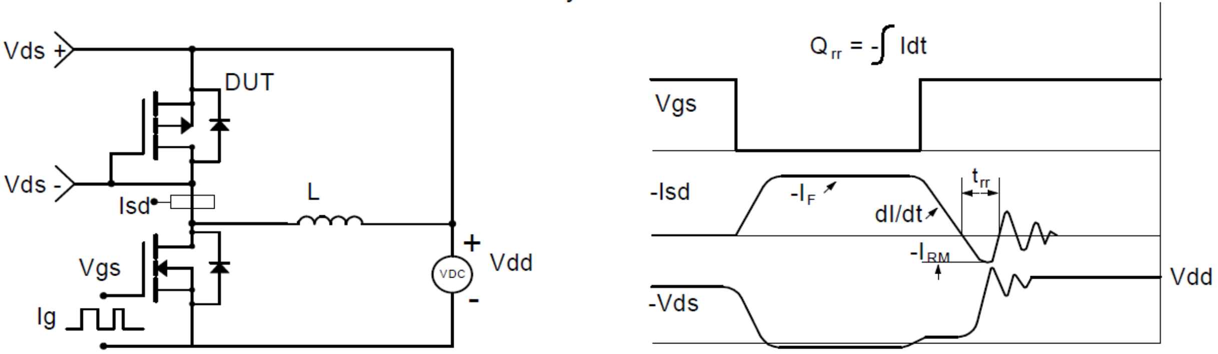




Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

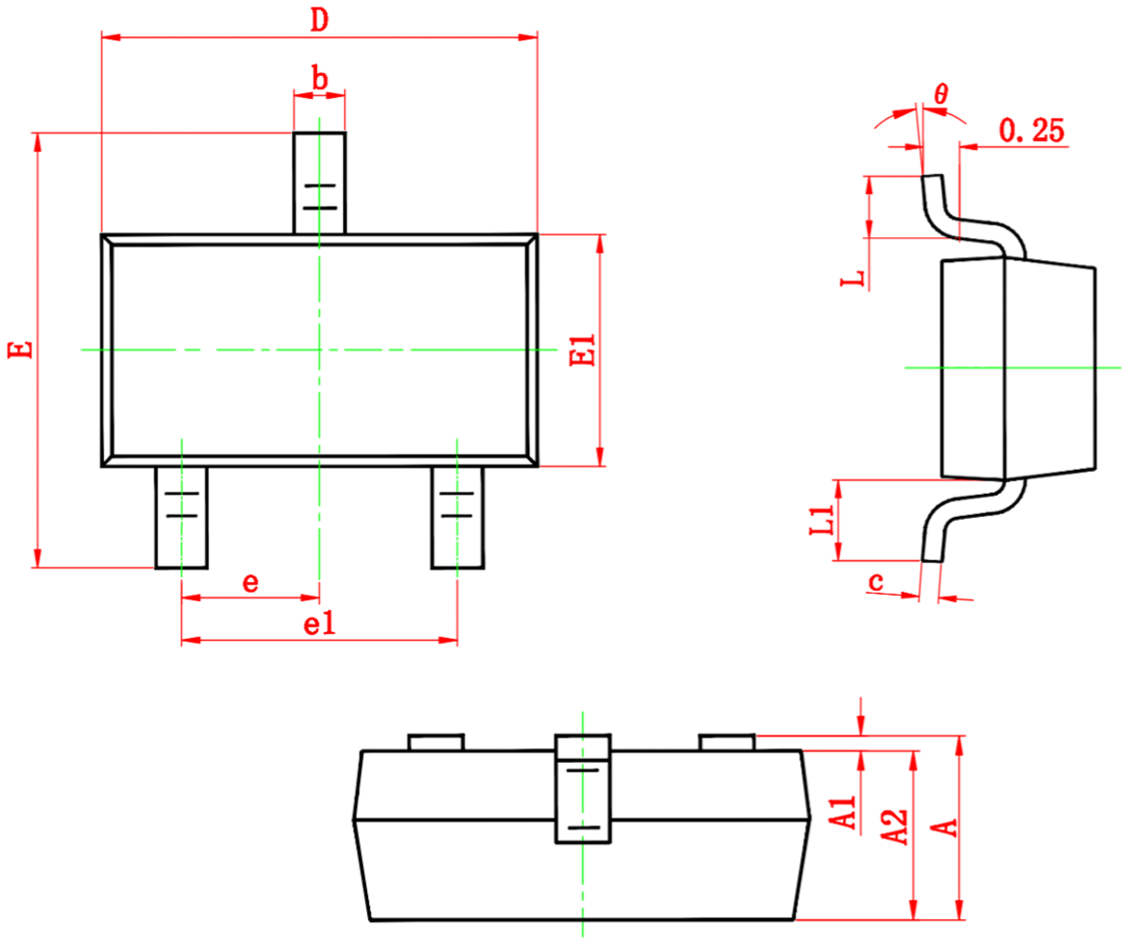


Diode Recovery Test Circuit & Waveforms



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°