100V N-Channel Enhancement Mode MOSFET

Description

The NP2N11MR 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} =110V，I_D =2A
  $R_{DS(ON)}$(Typ.)=220mΩ @V_{GS}=10V
  $R_{DS(ON)}$(Typ.)=240mΩ @V_{GS}=4.5V
- High power and current handing capability
- Lead free product is acquired
- Surface mount package

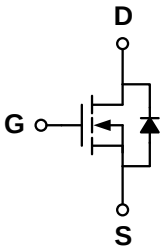
Application

- PWM applications
- Load switch

Package

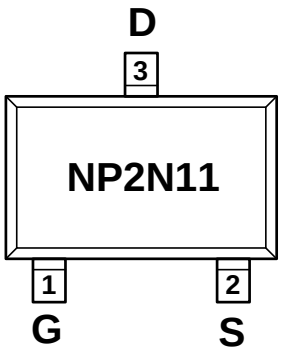
- SOT-23-3L

Schematic diagram



Marking and pin assignment

SOT-23-3L
(TOP VIEW)



Ordering Information

Part Number	Storage Temperature	Package	Devices Per Reel
NP2N11MR-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}	110	V
Gate-source voltage	V_{GS}	±20	V
Drain current-continuous@Tj=125℃	I_D	2	A
-pulse d^C	I_{DM}	8	A
Drain-source Diode forward current	Is	2	A
Avalanche Current	I_{AS}	4.8	A
Single Pulse Avalanche Energy	E_{AS}	6.3	mJ
Maximum power dissipation^B	P_D	1.25	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	110	-	-	V
Zero gate voltage drain current	I_{DSS}	V_{DS}=110V, 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	1.2	1.9	2.5	V
Drain-source on-state resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=2A	-	220	240	mΩ
		V_{GS}=4.5V, I_D=2A		240	260	
Forward transconductance	gfs	V_{GS}=5V, I_D=1A	1	-	-	S
Dynamic Characteristics						
Input capacitance	C_{ISS}	V_{DS}=55V ,V_{GS}=0V f=1.0MHz	-	190	-	pF
Output capacitance	C_{OSS}		-	22	-	
Reverse transfer capacitance	C_{RSS}		-	13	-	
Switching Characteristics						
Turn-on delay time	$t_{D(ON)}$	V_{DD}=55V R_L=39 ohm V_{GS}=10V R_G=1ohm	-	6	-	ns
Rise time	tr		-	10	-	
Turn-off delay time	$t_{D(OFF)}$		-	10	-	
Fall time	tf		-	6	-	
Total gate charge	Qg	V_{DS}=55V I_D=1.3A V_{GS}=10V	-	5.2	-	nC
Gate-source charge	Qgs		-	0.75	-	
Gate-drain charge	Qgd		-	1.4	-	
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode forward voltage	V_{SD}	V_{GS}=0V,Is=2A	-	0.76	1.16	V

Thermal Characteristics

Parameter		Symbol	Typ.	Max.	Unit
Maximum Junction-to-Ambient [A]	t≤ 10s	$R_{θJA}$	70	90	℃/W
Maximum Junction-to-Ambient [A D]	Steady-State		100	125	
Maximum Junction-to-Lead	Steady-State	$R_{θJL}$	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 $R_{θJA}$ is the sum of the thermal impedence from junction to lead $R_{θJL}$ and lead to ambient.

Typical Performance Characteristics

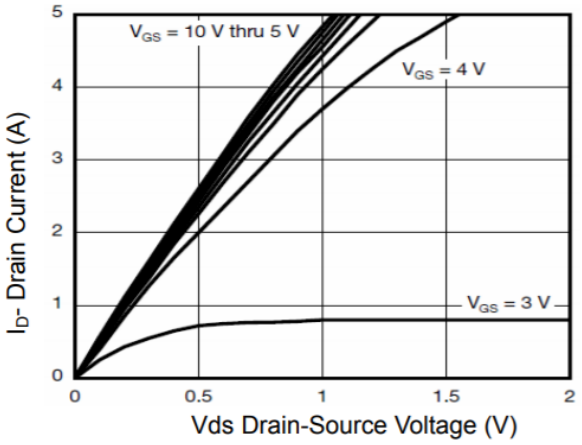


Figure 1 Output Characteristics

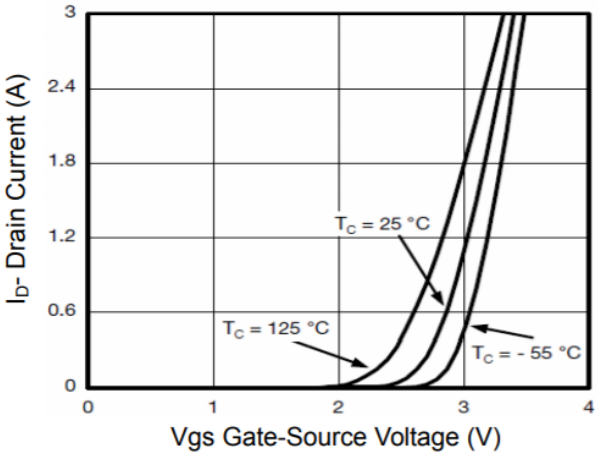


Figure 2 Transfer Characteristics

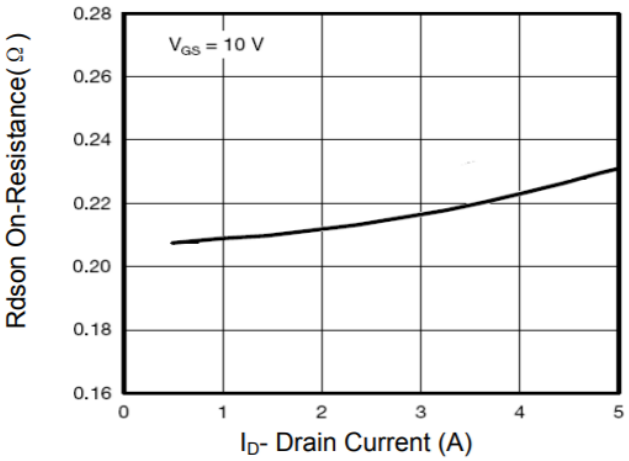


Figure 3 Rdson- Drain Current

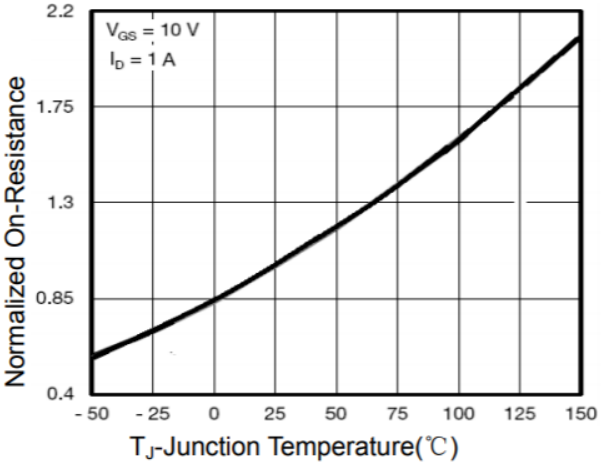


Figure 4 Rdson-JunctionTemperature

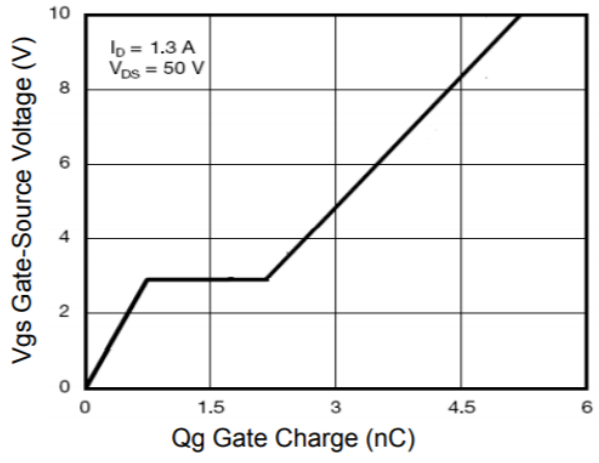


Figure 5 Gate Charge

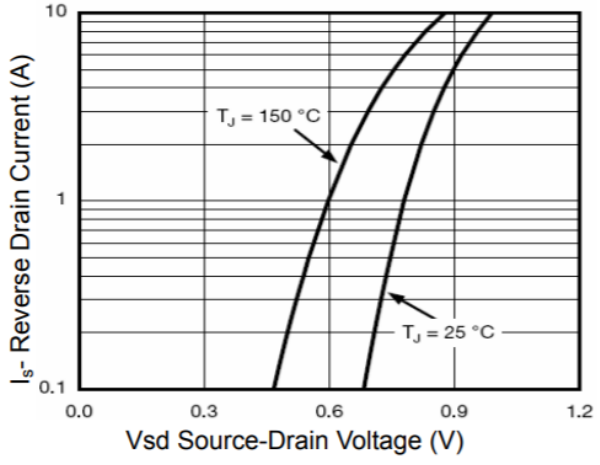


Figure 6 Source- Drain Diode Forward

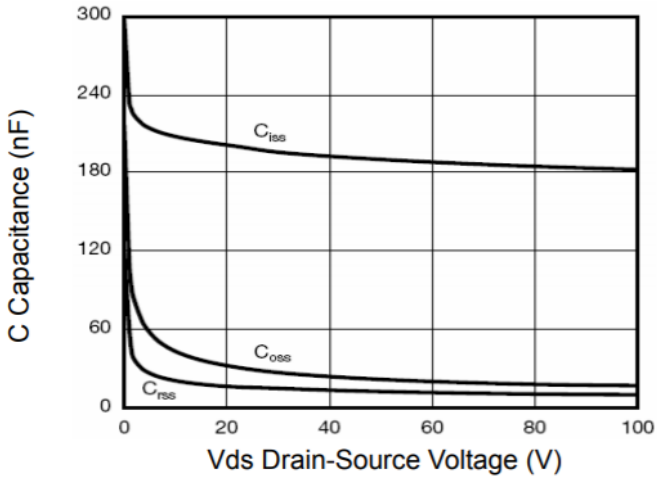


Figure 7 Capacitance vs Vds

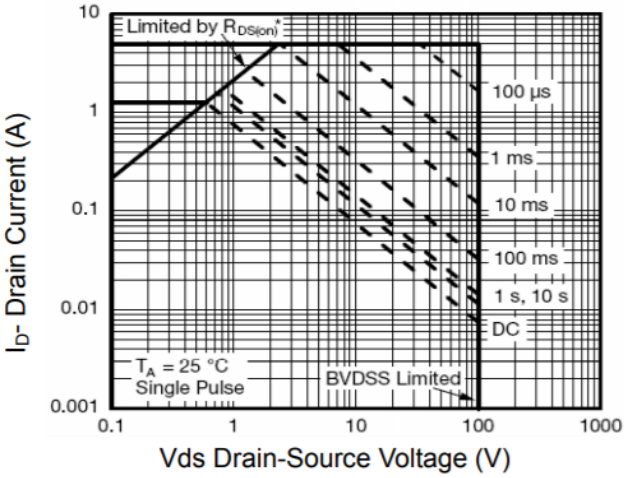


Figure 8 Safe Operation Area

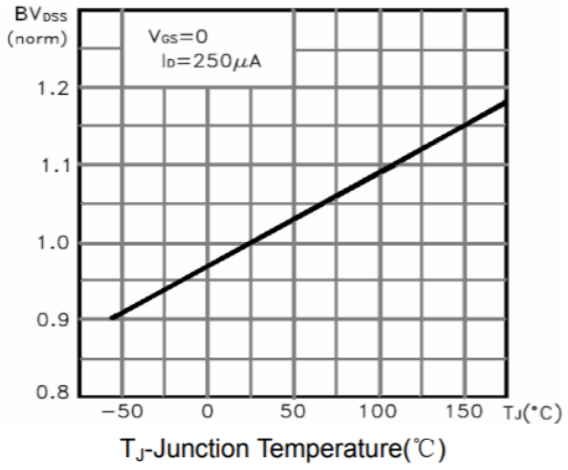


Figure 9 BV_{DSS} vs Junction Temperature

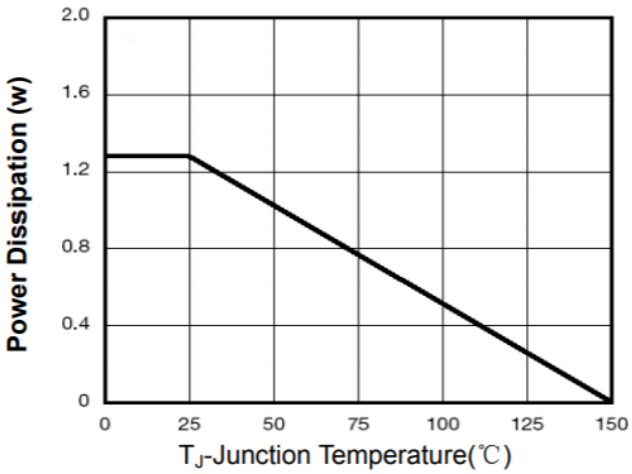


Figure 10 Power De-ratin

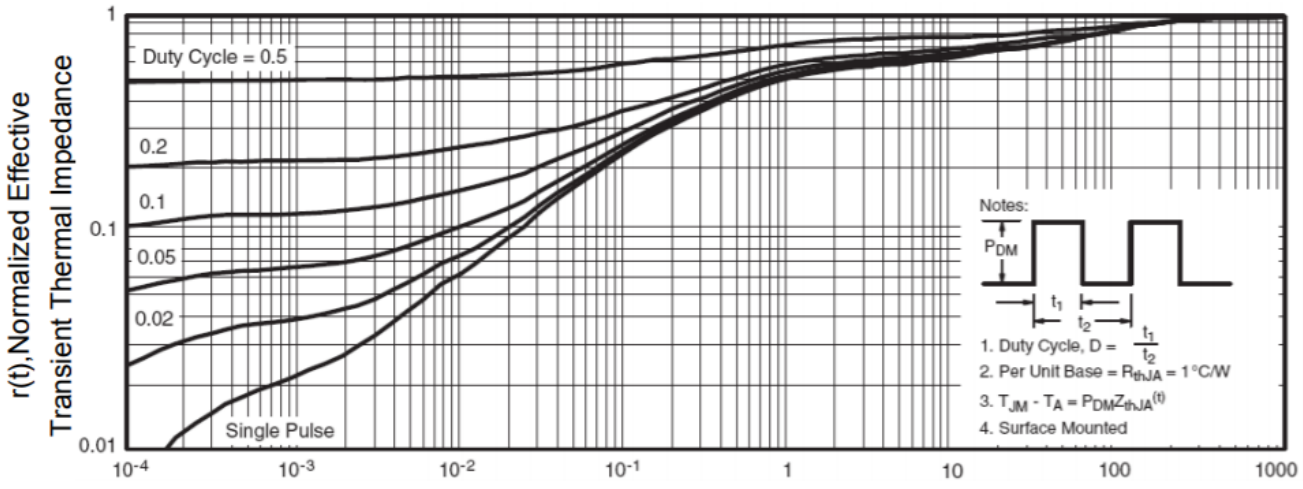
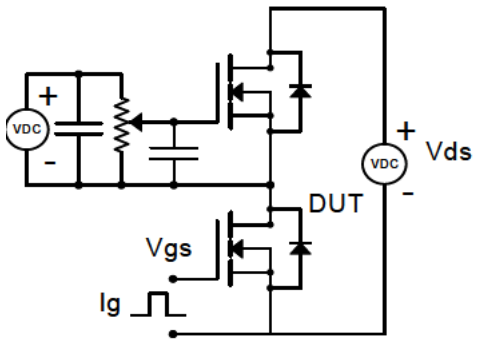
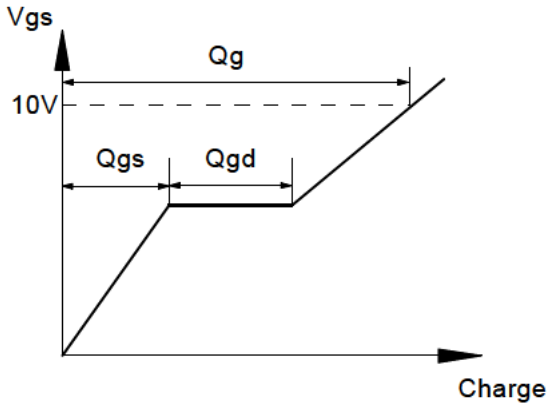


Figure 11 Normalized Maximum Transient Thermal Impedance

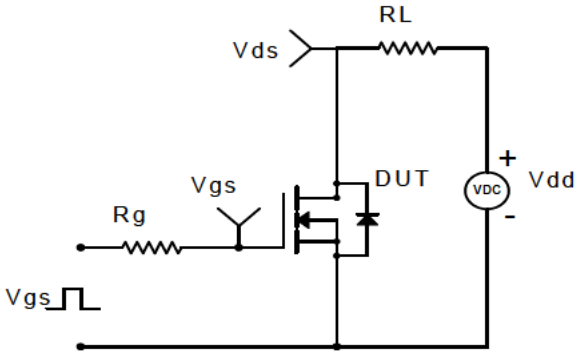
Gate Charge Test Circuit & Waveform

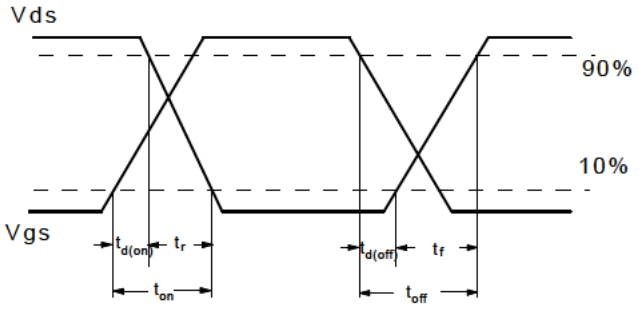




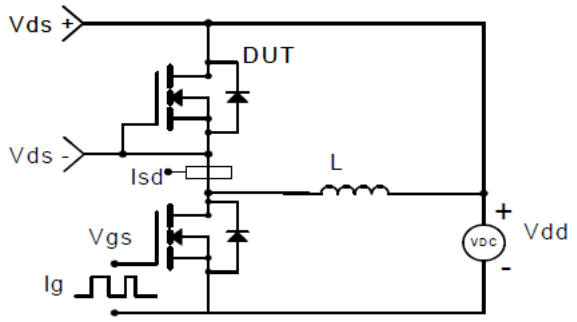
Resistive Switching Test Circuit & Waveforms

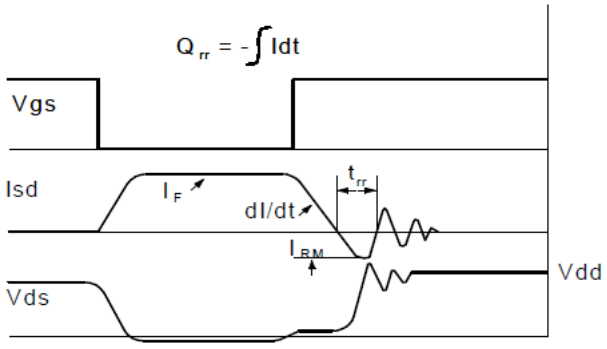
Resistive Switching Test Circuit & Waveforms





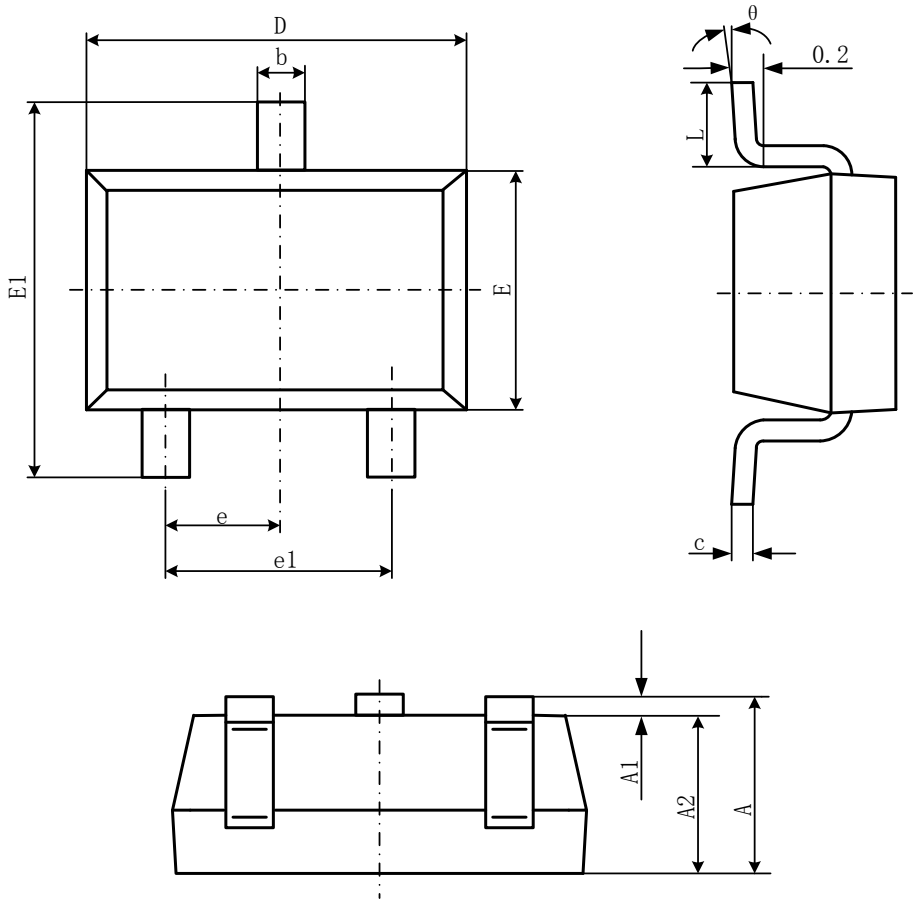
Diode Recovery Test Circuit & Waveforms





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°