Description

The ENP3400 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=5.8A
- $R_{DS(ON)}$(Typ.)=22mΩ @VGS=4.5V
- $R_{DS(ON)}$(Typ.)=28mΩ @VGS=2.5V
- High power and current handing capability
- Lead free product is acquired
- Surface mount package

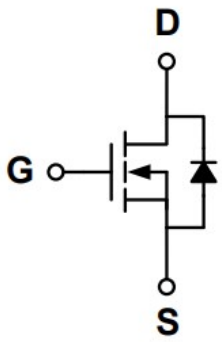
Application

- PWM applications
- Load switch

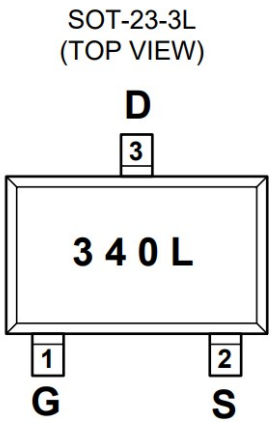
Package

- SOT-23-3L

Schematic diagram



Marking and pin assignment



Ordering Information

ENP3400 XX GR

B1=SOT23-3L

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	5.8	A
	T_A=70℃		5.0	
Pulsed Drain Current [C]		I_{DM}	30	A
Maximum power dissipation [B]	T_A=25℃	P_D	1.4	
	T_A=70℃		0.9	W
Operating junction Temperature range		T_j	-55—150	℃

Thermal Characteristics

Parameter		Symbol	Typ	Max	Unit
Maximum Junction-to-Ambient	≤ 10s	$R_{\theta JA}$	70	90	℃/W
Maximum Junction-to-AmbientA D	Steady-State		100	125	
Maximum Junction-to-Lead	Steady-State	$R_{\theta JL}$	63	80	

A. The value of $R_{\theta JA}$ is measured with the device mounted on 1in2 FR-4 board with 2oz. Copper, in a still air environment with TA =25°C. The value in any given application depends on the user's specific board design.

B. The power dissipation P_D 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 initialTJ=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.

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	0.8	1.1	V
Drain-source on-state resistance	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=5A	-	22	28	mΩ
		V_{GS}=2.5V, I_D=4A	-	28	38	
Forward transconductance	gfs	V_{GS}=5V, I_D=5.8A	-	33	-	S
Dynamic Characteristics						
Input capacitance	C_{ISS}	V_{DS}=15V ,V_{GS}=0V f=1.0MHz	-	630	-	pF
Output capacitance	C_{OSS}		-	76	-	
Reverse transfer capacitance	C_{RSS}		-	55	-	
Switching Characteristics						
Turn-on delay time	$t_{D(ON)}$	V_{DS}=15V V_{GS}=10V R_L=2.6 ohm R_{GEN}=3ohm	-	3	-	ns
Rise time	tr		-	2.5	-	
Turn-off delay time	$t_{D(OFF)}$		-	25	-	
Fall time	tf		-	4	-	
Total gate charge	Qg	V_{DS}=15V, I_D=5.8A V_{GS}=4.5V	-	6	-	nC
Gate-source charge	Qgs		-	1.3	-	
Gate-drain charge	Qgd		-	1.8	-	
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode forward voltage	V_{SD}	V_{GS}=0V, Is=1A	-	0.76	1.16	V

Typical Performance Characteristics

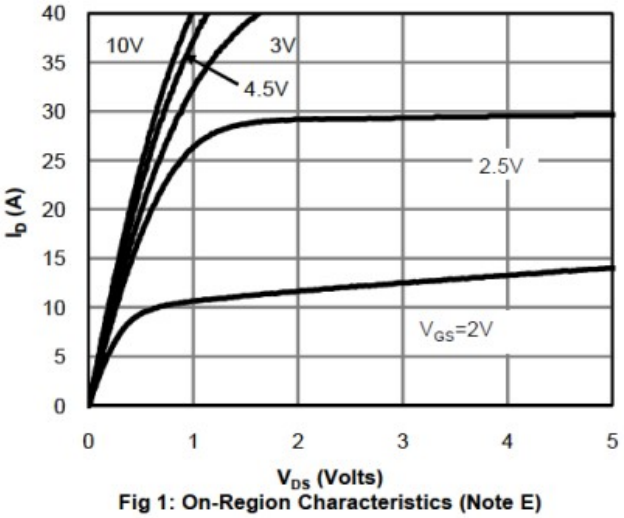


Fig 1: On-Region Characteristics (Note E)

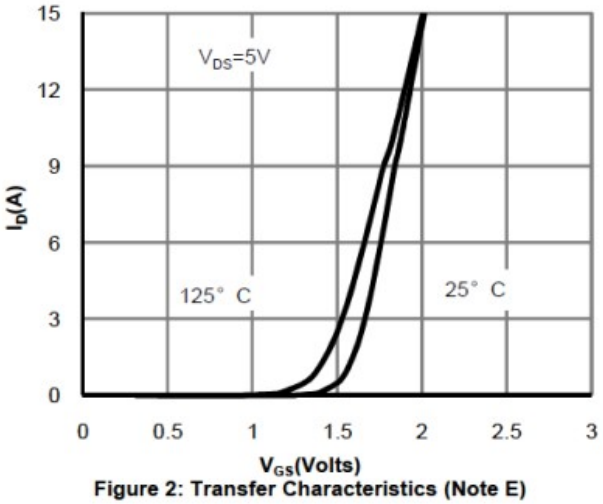


Figure 2: Transfer Characteristics (Note E)

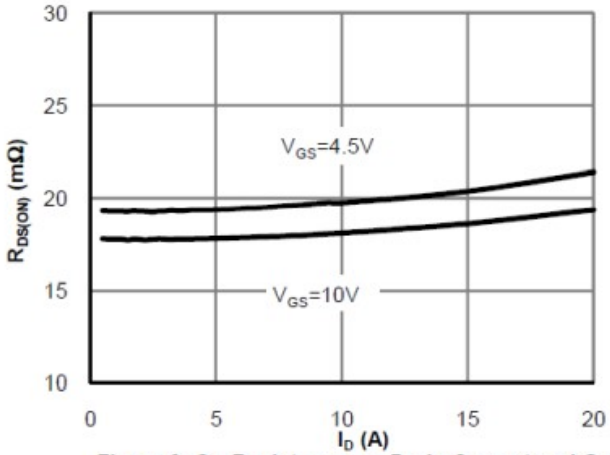


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

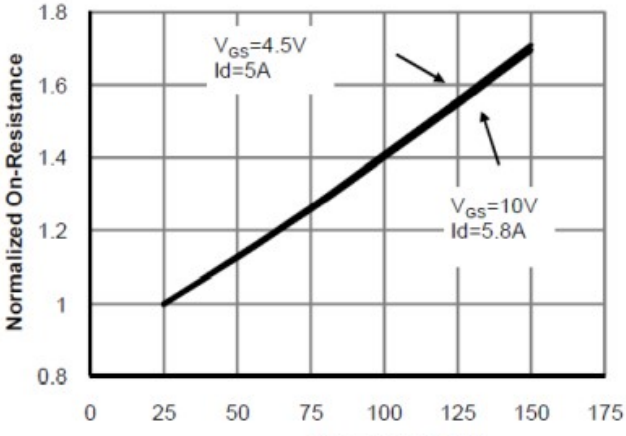


Figure 4: On-Resistance vs. Junction Temperature (Note E)

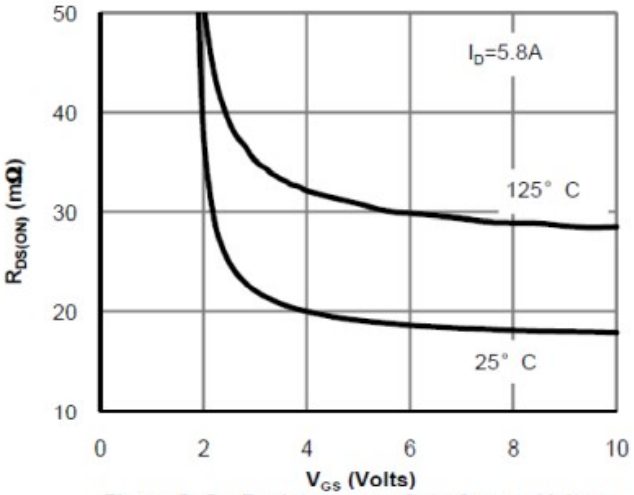


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

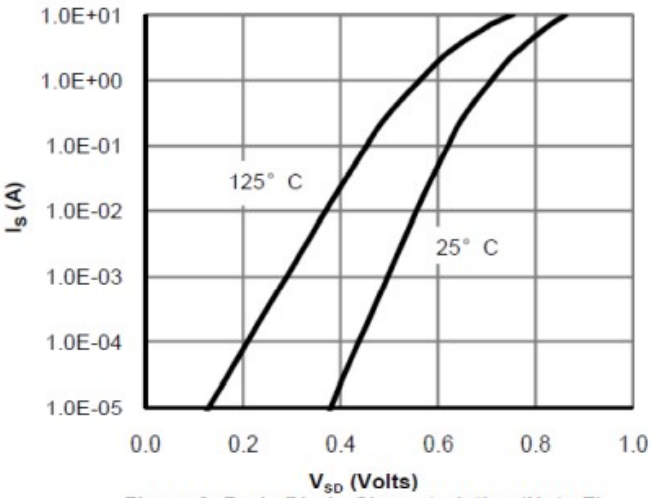


Figure 6: Body-Diode Characteristics (Note E)

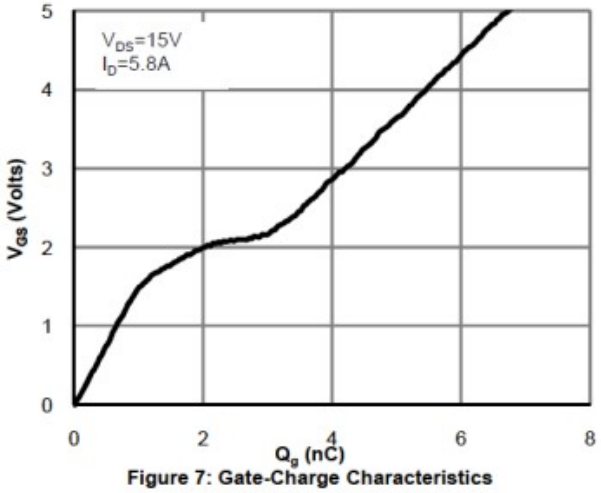


Figure 7: Gate-Charge Characteristics

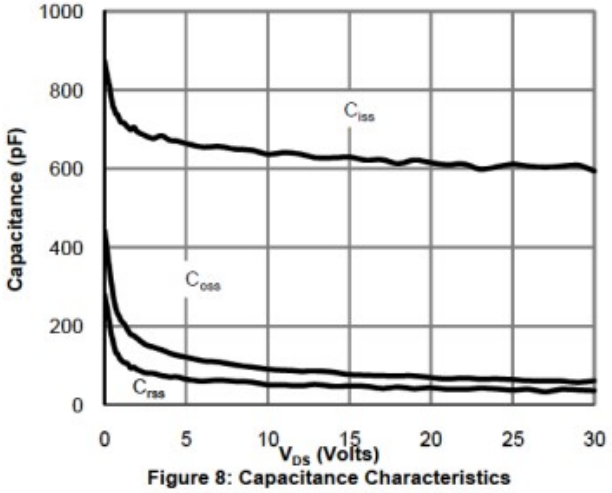


Figure 8: Capacitance Characteristics

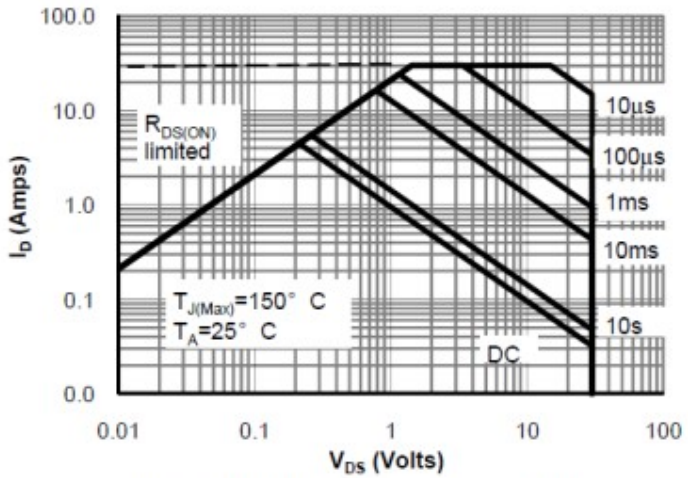


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

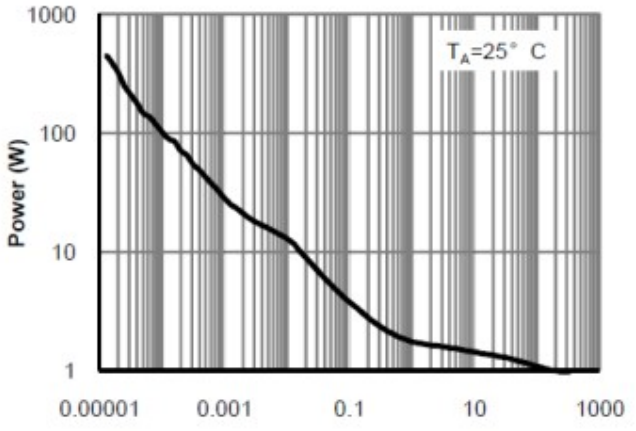


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

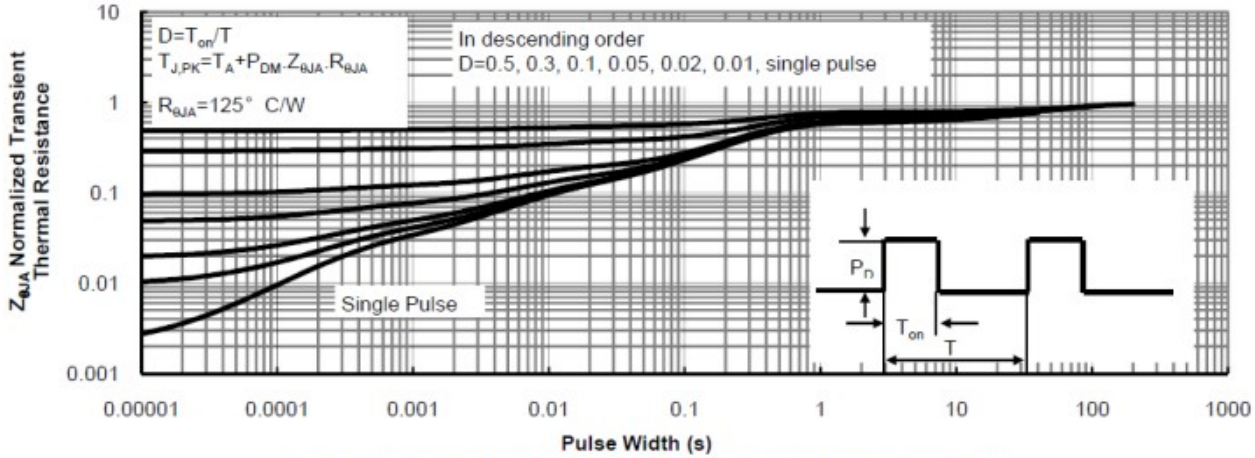
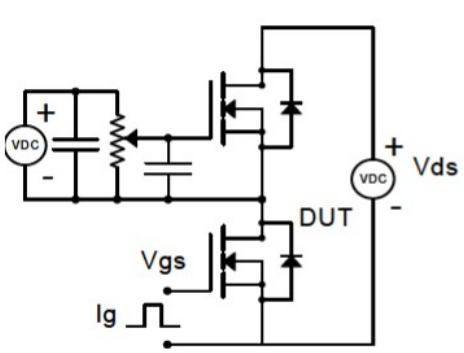
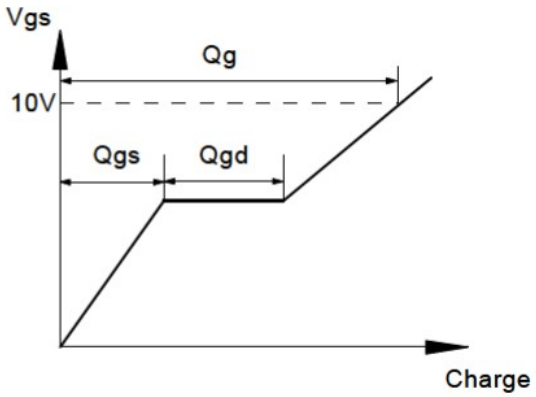


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

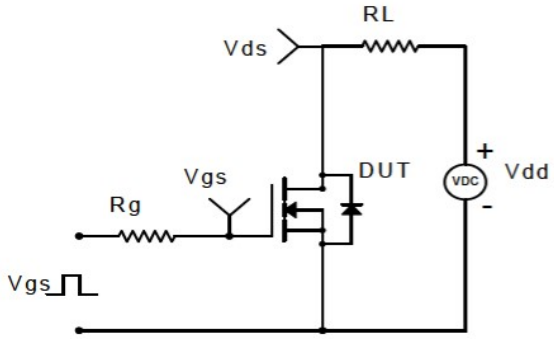
Gate Charge Test Circuit & Waveform

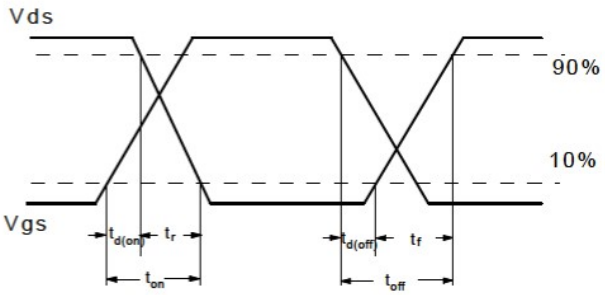




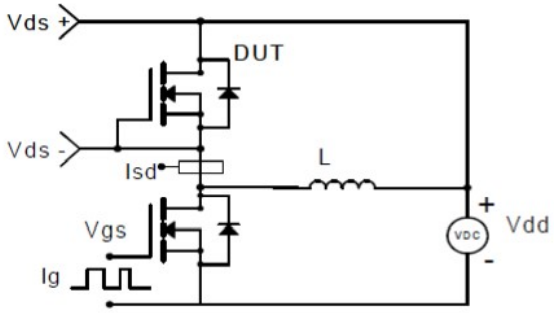
Resistive Switching Test Circuit & Waveforms

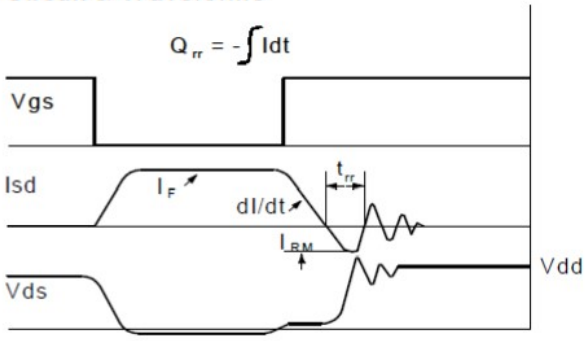
Resistive Switching Test Circuit & Waveforms





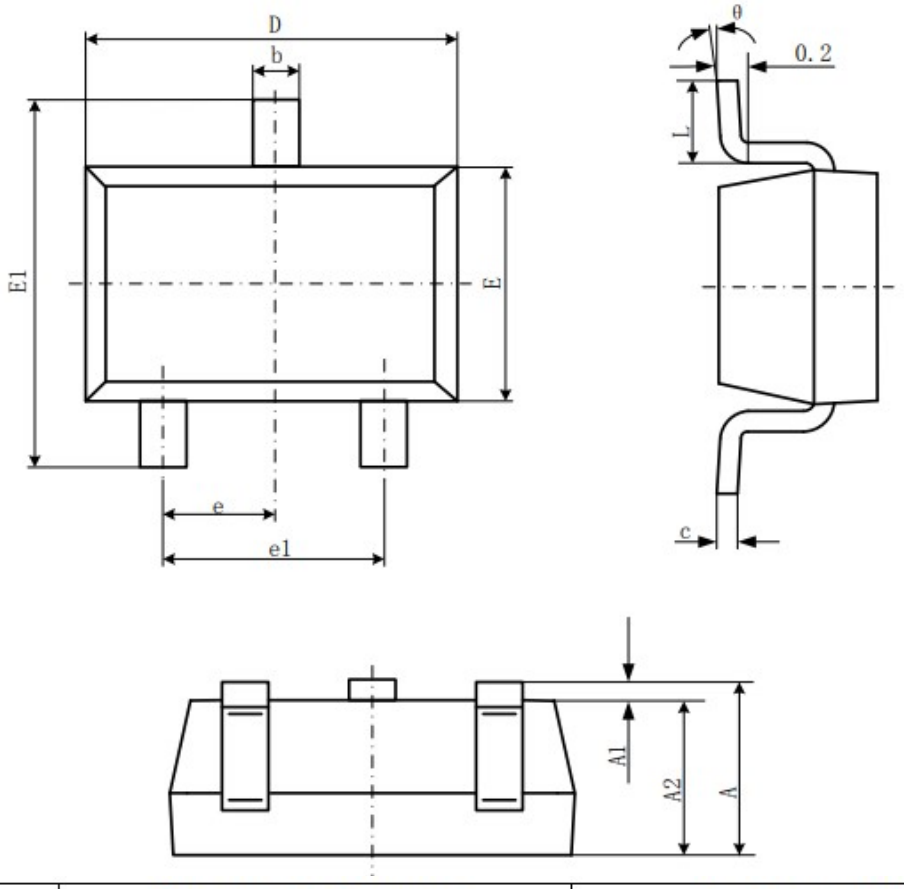
Diode Recovery Test Circuit & Waveforms





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°