

40V N-Channel Mosfet

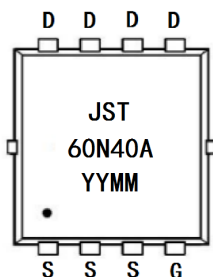
FEATURES

- $R_{DS(ON)} \leq 10 \text{ m}\Omega$ (7.8 m Ω Typ.)
@ $V_{GS}=10\text{V}$
- $R_{DS(ON)} \leq 15 \text{ m}\Omega$ (10.5 m Ω Typ.)
@ $V_{GS}=4.5\text{V}$

APPLICATIONS

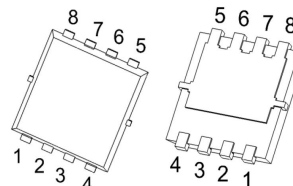
- PWM Applications
- Load Switch
- Power Management

MARKING



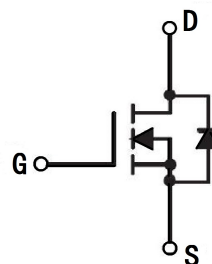
YYMM:Date Code(year & month)

PDFNWB3.3*3.3-8L



1: S 3: S 5: D 7: D
2: S 4: G 6: D 8: D

N-CHANNEL MOSFET



Absolute Maximum Ratings ($T_C=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter		Max.	Units
V_{DSS}	Drain-Source Voltage		40	V
V_{GSS}	Gate-Source Voltage		± 16	V
I_D	Continuous Drain Current	$T_C = 25^\circ\text{C}$	50	A
		$T_C = 100^\circ\text{C}$	35	A
I_{DM}	Pulsed Drain Current ^{note1}		200	A
E_{AS}	Single Pulsed Avalanche Energy ^{note2}		57	mJ
P_D	Power Dissipation	$T_C = 25^\circ\text{C}$	35.7	W
$R_{\theta JC}$	Thermal Resistance, Junction to Case		3.5	$^\circ\text{C}/\text{W}$
T_J, T_{STG}	Operating and Storage Temperature Range		-55 to +150	$^\circ\text{C}$

Electrical Characteristics (T_c=25°C unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V,I _D =250μA	40	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =40V, V _{GS} = 0V,	-	-	1.0	μA
I _{GSS}	Gate to Body Leakage Current	V _{DS} =0V,V _{GS} = ±16V	-	-	±100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D =250μA	1.1	1.5	2.4	V
R _{DS(on)}	Static Drain-Source on-Resistance note3	V _{GS} =10V, I _D =30A	-	7.8	10	mΩ
		V _{GS} =4.5V, I _D =20A	-	10.5	15	
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =15A	10	27	-	S
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} = 20V, V _{GS} =0V, f = 1.0MHz	-	965	-	pF
C _{oss}	Output Capacitance		-	212	-	pF
C _{rss}	Reverse Transfer Capacitance		-	102	-	pF
Q _g	Total Gate Charge	V _{DS} =20V, I _D =30A, V _{GS} =10V	-	28	-	nC
Q _{gs}	Gate-Source Charge		-	6.5	-	nC
Q _{gd}	Gate-Drain(“Miller”) Charge		-	6	-	nC
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DD} =20V, I _D =30A, R _L =1Ω, R _{GEN} =3Ω, V _{GS} =10V	-	10	-	ns
t _r	Turn-on Rise Time		-	28	-	ns
t _{d(off)}	Turn-off Delay Time		-	40	-	ns
t _f	Turn-off Fall Time		-	15	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Drain to Source Diode Forward Current		-	-	50	A
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	200	A
V _{SD}	Drain to Source Diode Forward Voltage	V _{GS} =0V, I _S =30A	-	0.8	1.2	V
t _{rr}	Body Diode Reverse Recovery Time	T _J =25℃, I _F =20A,dI/dt=100A/μs	-	12	-	ns
Q _{rr}	Body Diode Reverse Recovery Charge		-	4	-	nC

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. EAS condition T_J=25°C, V_{DD}=20V, V_G=16V, I_D=8A, I_H=I_D*0.9=7.2A, I_L=I_D*0.1=0.8A, L=1mH

3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

Typical Performance Characteristics

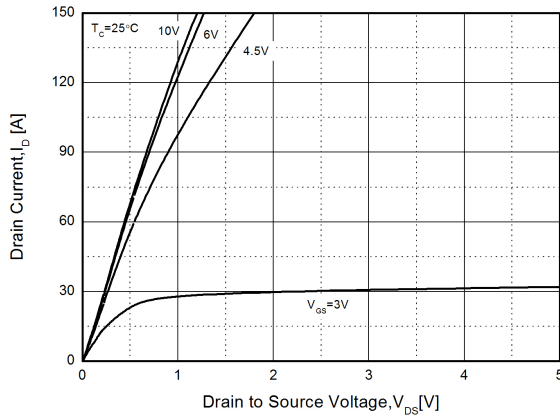


Figure1. Output Characteristics

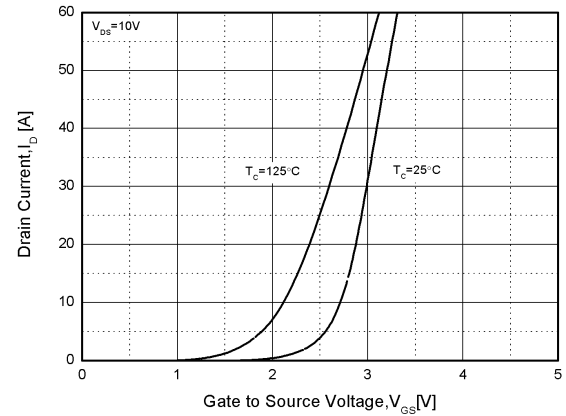


Figure2. Transfer Characteristics

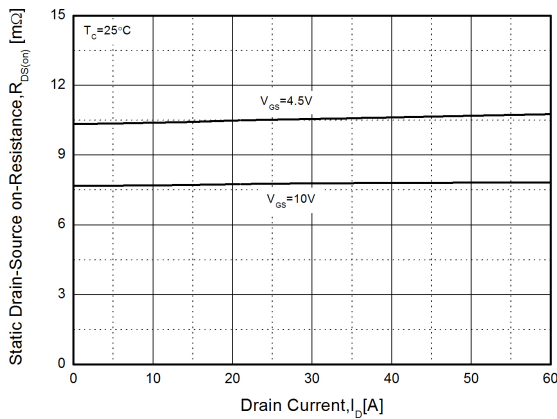


Figure3. Rdson-Drain Current

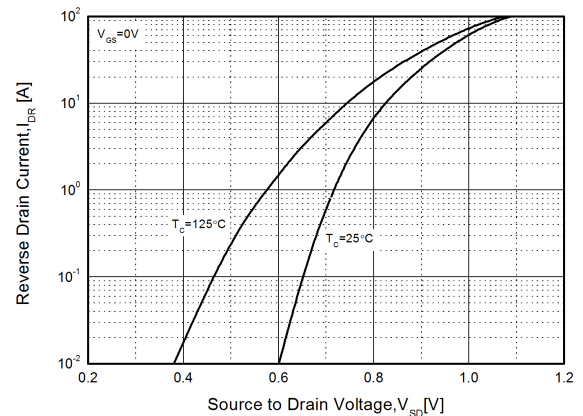


Figure4. Typical Source-Drain Diode Forward Voltage

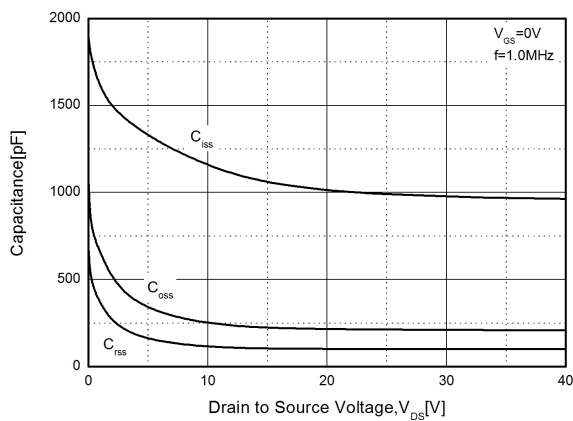


Figure5. Capacitance Characteristics

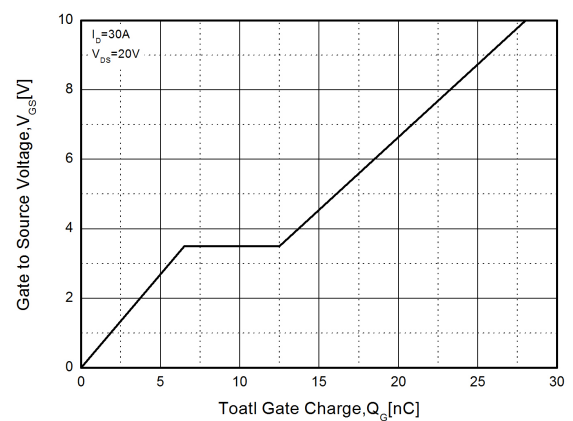


Figure6. Gate Charge

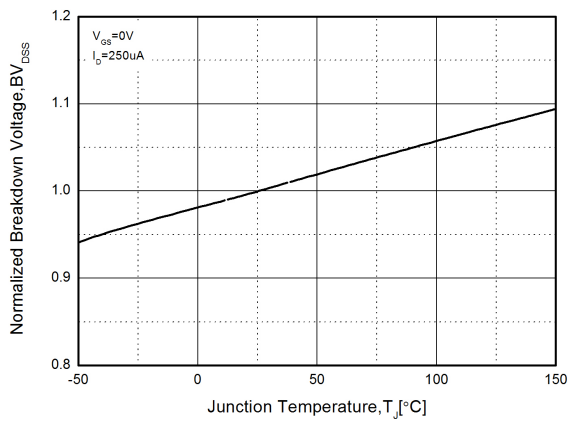


Figure7. Normalized Breakdown Voltage vs. Temperature

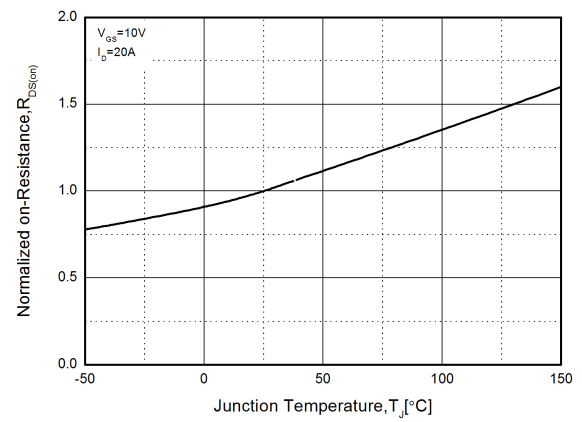


Figure8. Normalized on Resistance vs. Temperature

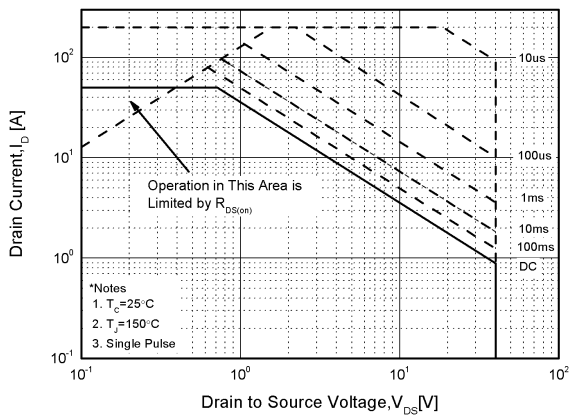


Figure9. Safe Operation Area

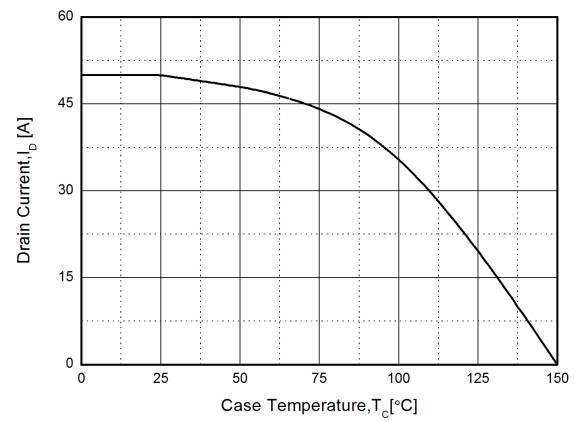


Figure10. Drain Current vs. Case Temperature

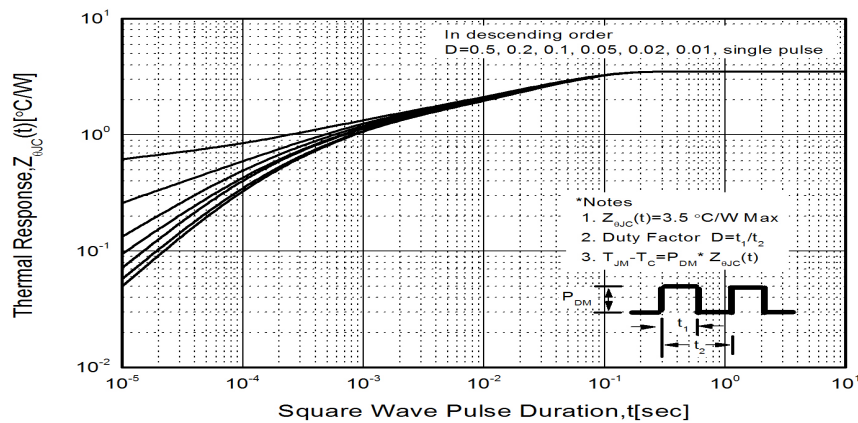


Figure11. Transient Thermal Response Curve

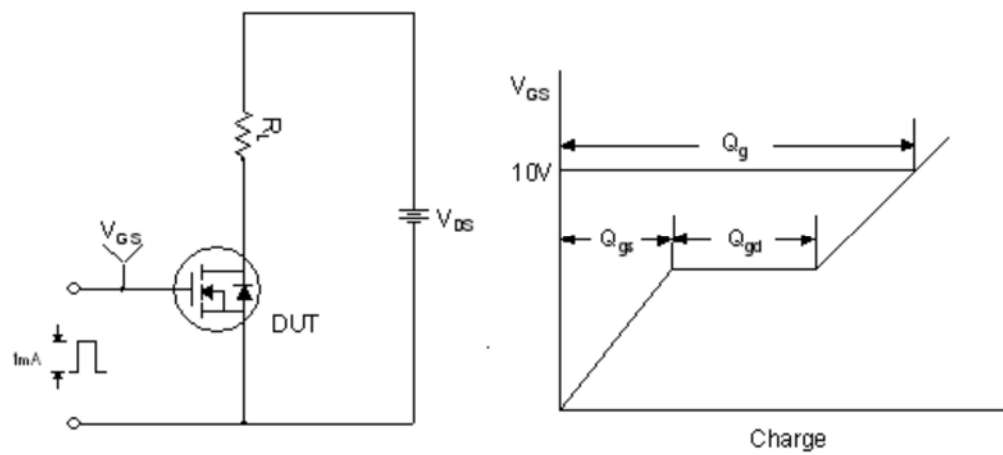


Figure 1. Gate Charge Test Circuit & Waveform

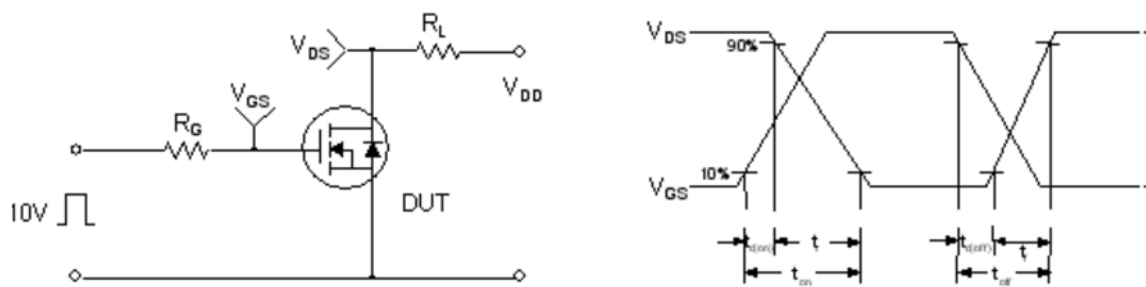


Figure 2. Resistive Switching Test Circuit & Waveforms

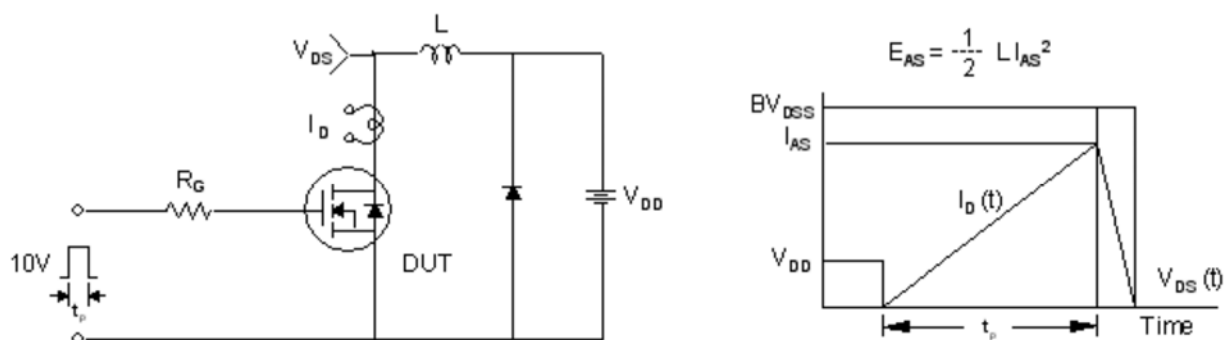
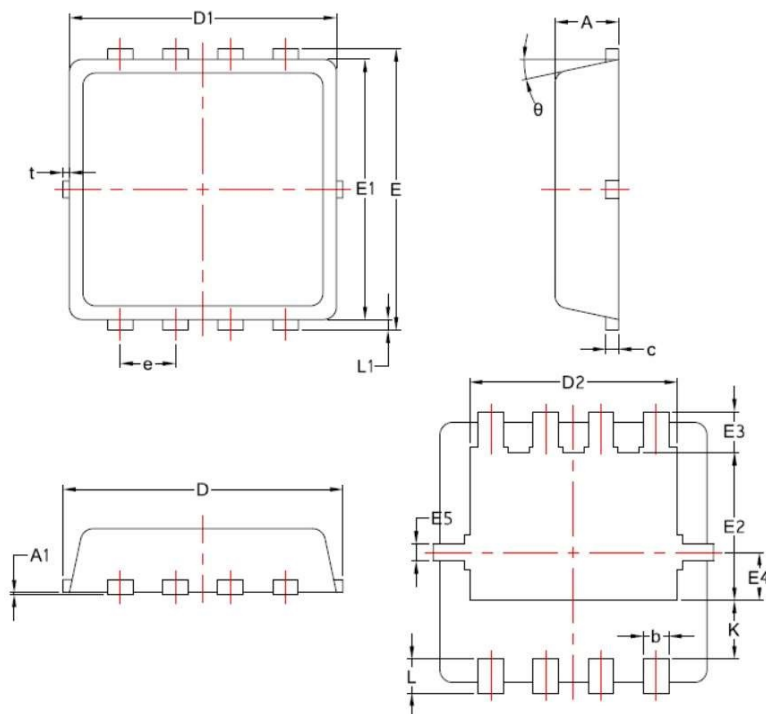


Figure 3. Unclamped Inductive Switching Test Circuit & Waveforms

PDFNWB3.3*3.3-8L Package Outline Dimensions



Symbols	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.70	0.75	0.85	0.028	0.030	0.033
A1	---	---	0.05	---	---	0.002
b	0.20	0.30	0.40	0.008	0.012	0.016
c	0.10	0.152	0.25	0.004	0.152	0.010
D	3.15	3.30	3.45	0.124	0.130	0.136
D1	3.00	3.15	3.25	0.118	0.124	0.128
D2	2.29	2.45	2.65	0.090	0.096	0.104
E	3.15	3.30	3.45	0.124	0.130	0.136
E1	2.90	3.05	3.20	0.114	0.120	0.126
E2	1.54	1.74	1.94	0.060	0.069	0.076
E3	0.28	0.48	0.65	0.011	0.019	0.026
E4	0.37	0.57	0.77	0.015	0.022	0.030
E5	0.10	0.20	0.30	0.004	0.008	0.012
e	0.60	0.65	0.70	0.024	0.026	0.028
K	0.59	0.69	0.89	0.023	0.027	0.035
L	0.30	0.40	0.50	0.012	0.016	0.020
L1	0.06	0.125	0.20	0.002	0.005	0.008
t	0	0.075	0.13	0	0.003	0.005
θ	10°	12°	14°	10°	12°	14°