

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
30V	8mΩ@10V	52A
	11mΩ@4.5V	

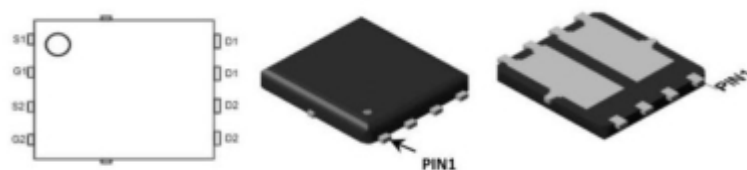
Feature

- $V_{DS} = 30V, I_D = 52A$
- $R_{DS(ON)} < 8m\Omega @ V_{GS} = 10V$
- High density cell design for ultra low R_{dson}
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation

Application

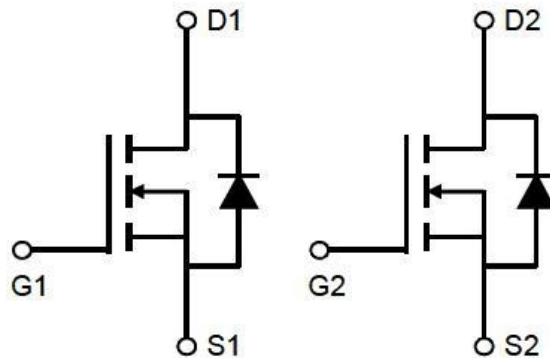
- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply

Package



PDFNWB5X6-8L

Circuit diagram



Marking



30N06D : Product code
* : Month code.

Absolute maximum ratings

($T_a=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	52	A
Pulsed Drain Current	I_{DM}	208	A
Maximum Power Dissipation	P_D	46	W
Single pulse avalanche energy ¹	E_{AS}	57.8	mJ
Thermal Resistance,Junction-to-Case ²	$R_{\theta JC}$	2.7	$^{\circ}\text{C}/\text{W}$
Operating Junction and Storage Temperature Range	T_{STG}, T_J	-55 To 175	$^{\circ}\text{C}$

Electrical characteristics

($T_A=25^{\circ}\text{C}$, unless otherwise noted)

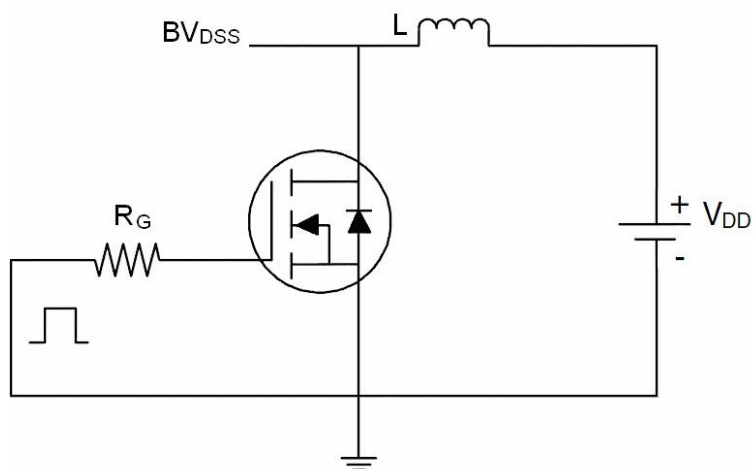
Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	$BV_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	30			V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 30V, V_{GS} = 0V$			1	μA
Gate-body leakage current	I_{GSS}	$V_{DS} = 0V, V_{GS} = \pm 20V$			± 100	μA
Gate-source threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.0	1.5	2.5	V
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 20A$		8	10	m Ω
		$V_{GS} = 4.5V, I_D = 10A$		11	15	
Dynamic Characteristics ⁴						
Input Capacitance	C_{iss}	$V_{DS}=15V, V_{GS}=0V,$ $f=1MHz$		1614		pF
Output Capacitance	C_{oss}			245		
Reverse Transfer Capacitance	C_{rss}			215		
Switching Characteristics ⁴						
Turn-on Delay Time	$T_{d(on)}$	$V_{DS}=15V, I_D = 20A,$ $V_{GS}=10V, R_G=3\Omega$		7.5		nS
Turn-on Rise Time	T_r			14.5		
Turn-off Delay Time	$T_{d(off)}$			35.2		
Turn-off Fall Time	T_f			9.6		
Total Gate Charge	Q_g	$V_{DS}=10V, I_D = 25A,$ $V_{GS}=10V$		33.7		pF
Gate-Source Charge	Q_{gs}			8.5		
Gate-Drain(“Miller”) Charge	Q_{gd}			7.5		
Drain-Source Diode Characteristics						
Diode Forward Voltage ³	V_{SD}	$V_{GS}=0V, I_S=12A$			1.2	V

Notes:

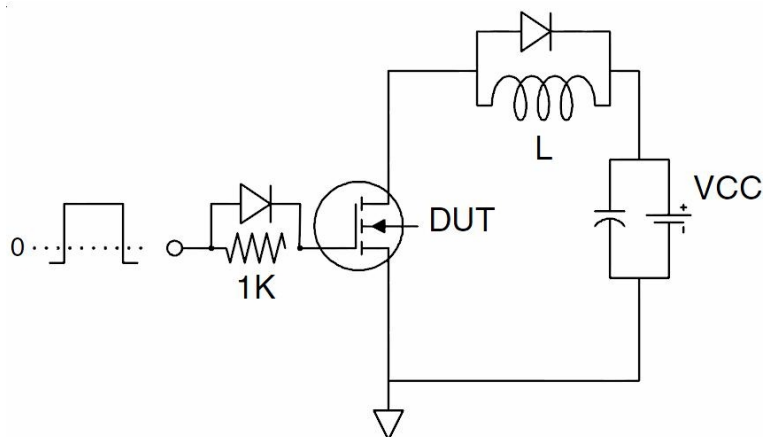
1. E_{AS} condition : $T_j=25^{\circ}\text{C}, V_{DD}=25V, V_G=10V, L=0.1mH$
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production

Test Circuit

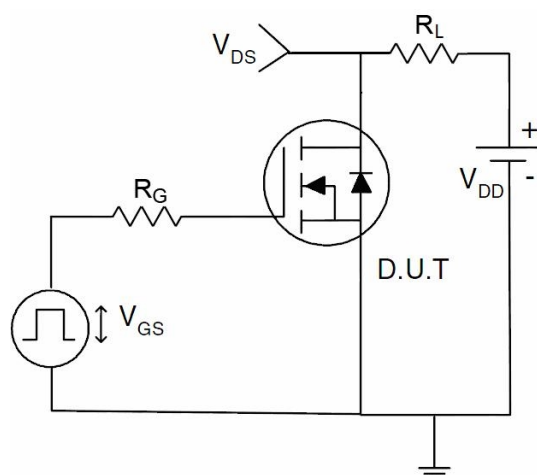
- EAS Test Circuits



- Gate Charge Test Circuit



- Switch Time Test Circuit



Typical Characteristics

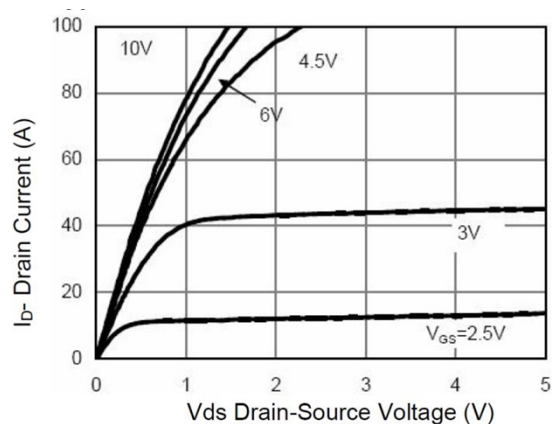


Figure 1 Output Characteristics

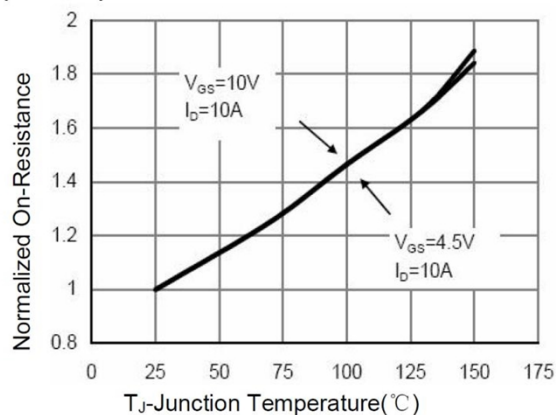


Figure 4 Rdson-Junction Temperature

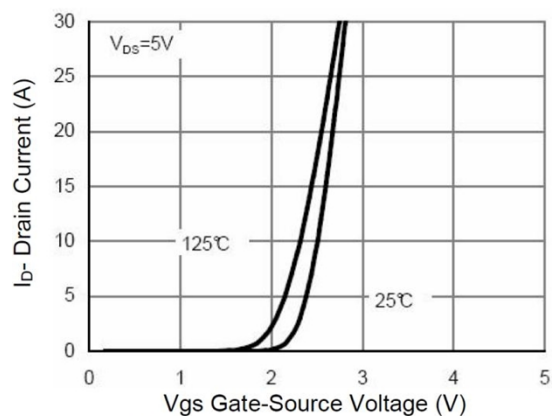


Figure 2 Transfer Characteristics

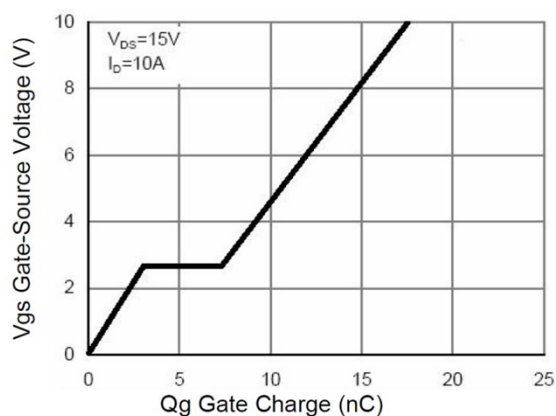


Figure 5 Gate Charge

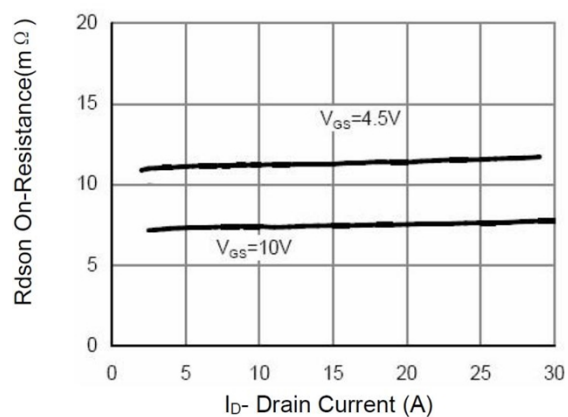


Figure 3 Rdson- Drain Current

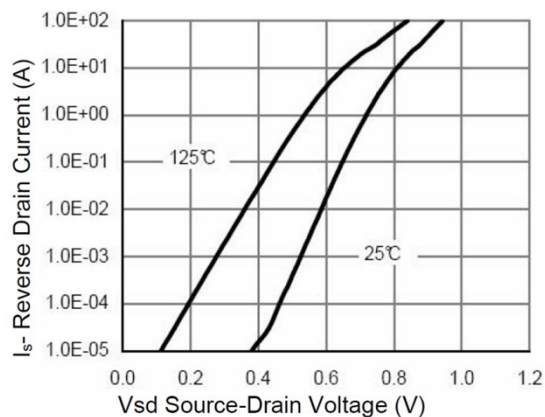


Figure 6 Source- Drain Diode Forward

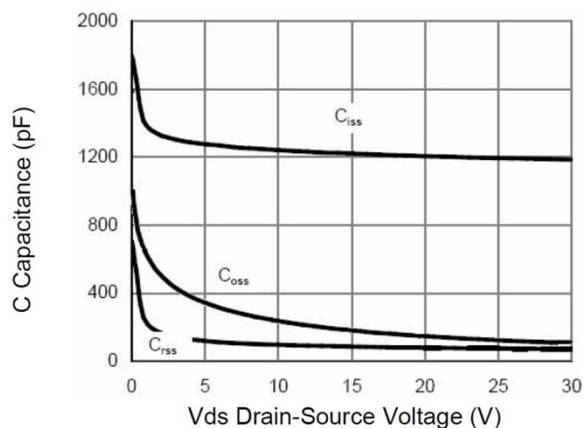


Figure 7 Capacitance vs Vds

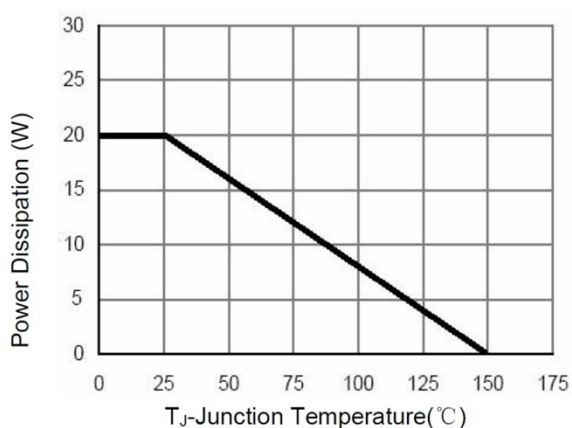


Figure 9 Power De-rating

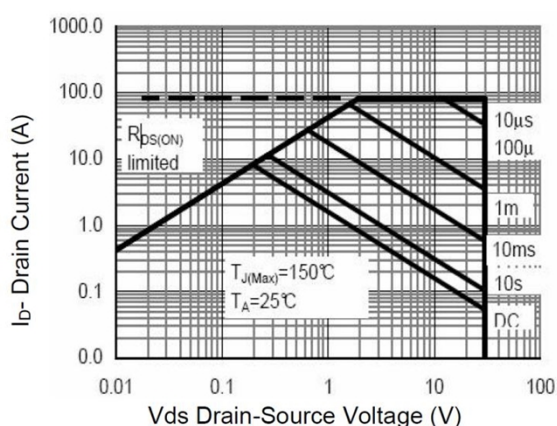


Figure 8 Safe Operation Area

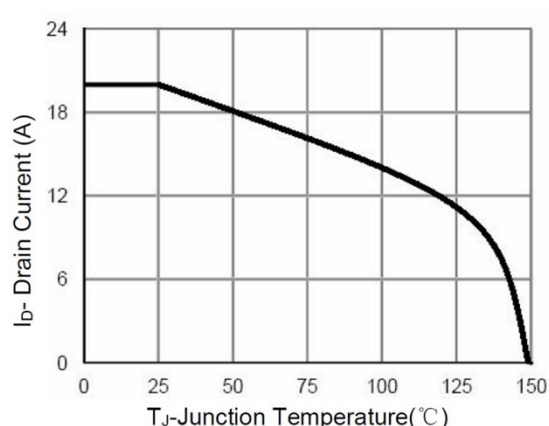


Figure 10 Id Current De-rating

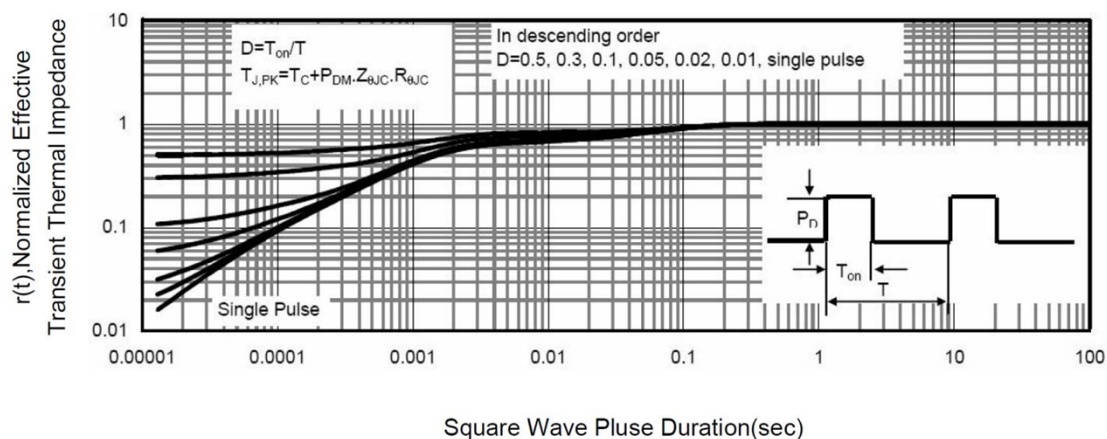
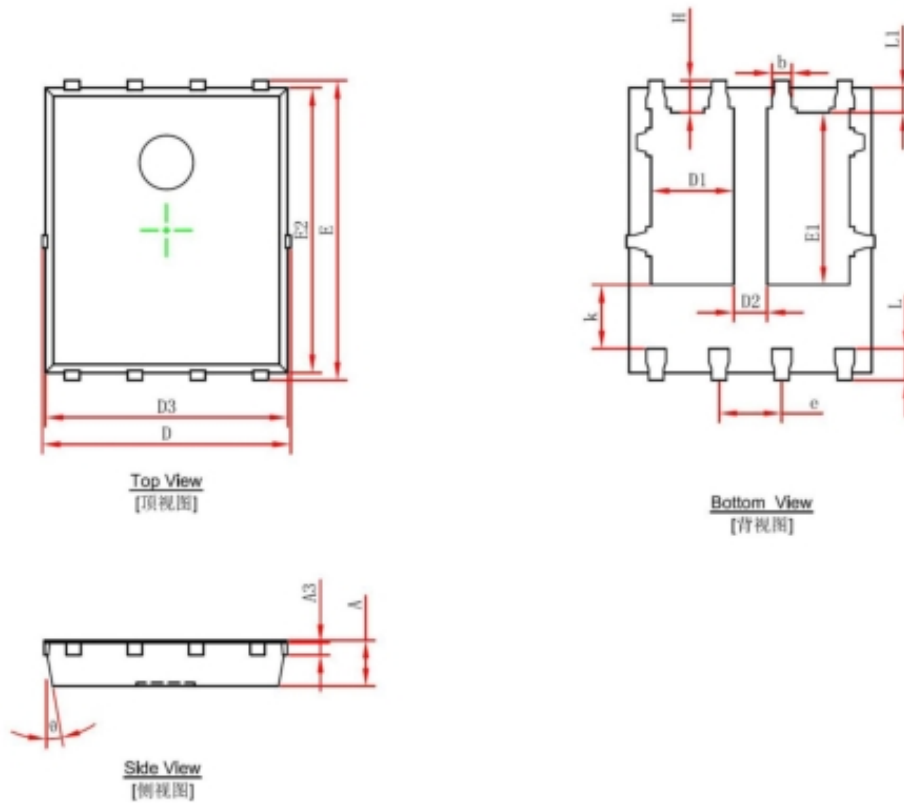


Figure 11 Normalized Maximum Transient Thermal Impedance

PDFNWB5X6-8L-A Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.000	0.035	0.039
A3	0.254 REF.		0.010 REF.	
D	4.944	5.096	0.195	0.201
E	5.974	6.126	0.235	0.241
D1	1.470	1.870	0.058	0.074
D2	0.470	0.870	0.019	0.034
E1	3.375	3.575	0.133	0.141
D3	4.824	4.976	0.190	0.196
E2	5.674	5.826	0.223	0.229
k	1.190	1.390	0.047	0.055
b	0.350	0.450	0.014	0.018
e	1.270 TYP.		0.050 TYP.	
L	0.559	0.711	0.022	0.028
L1	0.424	0.576	0.017	0.023
H	0.574	0.726	0.023	0.029
θ	10°	12°	10°	12°