

## Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	$I_D$
30V	6mΩ@10V	45A
	9.4mΩ@4.5V	

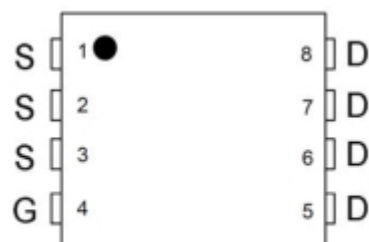
## Feature

- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and Current
- Good stability and uniformity with high EAS
- Excellent package for good heat dissipation
- Special process technology for high ESD capability

## Application

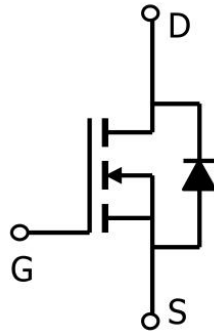
- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply

## Package

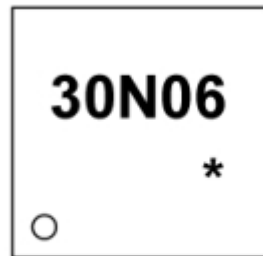


PDFN3X3-8L

## Circuit diagram



## Marking



30N06 =Device Code  
\* =Month Code

## Absolute maximum ratings

(T<sub>a</sub>=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V <sub>DS</sub>	30	V
Gate-Source Voltage	V <sub>GS</sub>	±20	V
Drain Current-Continuous	I <sub>D</sub>	45	A
Drain Current-Continuous(TC=100°C)	I <sub>D(100°C)</sub>	30	A
Pulsed Drain Current	I <sub>DM</sub>	180	A
Single Pulse Avalanche Energy	E <sub>AS</sub>	56	mJ
Maximum Power Dissipation	P <sub>D</sub>	16.6	W
Thermal Resistance,Junction-to-Case	R <sub>θJC</sub>	7.56	°C/W
Operating Junction and Storage Temperature Range	T <sub>STG</sub> , T <sub>J</sub>	-55~+150	°C

## Electrical characteristics

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

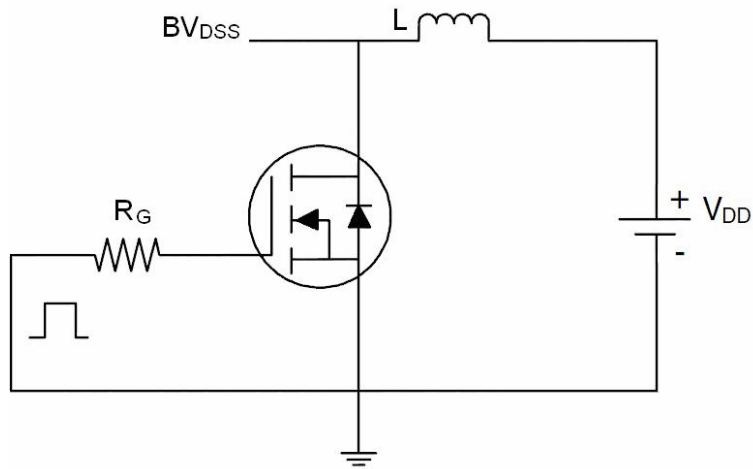
Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV (BR)DSS	V <sub>GS</sub> = 0V, I <sub>D</sub> =250μA	30			V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =30V, V <sub>GS</sub> = 0V			1	uA
Gate-Source Leakage	I <sub>GSS</sub>	V <sub>GS</sub> = ±20V, V <sub>DS</sub> =0V			±100	uA
On Characteristics <sup>(Note 2)</sup>						
Gate-Source Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1	1.5	2.5	V
Drain-Source On-Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =20A		6	7.5	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =15A		7.5	10	
Dynamic Characteristics <sup>(Note 3)</sup>						
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =15V, f=1MHz		1614		pF
Output Capacitance	C <sub>oss</sub>			245		
Reverse Transfer Capacitance	C <sub>rss</sub>			215		
Switching Characteristics <sup>(Note 3)</sup>						
Turn-on Delay Time	T <sub>d(on)</sub>	V <sub>DS</sub> =15V, I <sub>D</sub> =30A, R <sub>GEN</sub> =3Ω, V <sub>GS</sub> =10V		7.5		nS
Turn-on Rise Time	T <sub>r</sub>			14.5		
Turn-off Delay Time	T <sub>d(off)</sub>			35.2		
Turn-off Fall Time	T <sub>f</sub>			9.6		
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =15V, I <sub>D</sub> =30A, V <sub>GS</sub> =10V		33.7		pF
Gate-Source Charge	Q <sub>gs</sub>			8.5		
Gate-Drain Charge	Q <sub>gd</sub>			7.5		
Drain-Source Diode Characteristics						
Diode Forward Voltage <sup>(Note 2)</sup>	V <sub>SD</sub>	V <sub>GS</sub> =0V , I <sub>S</sub> =30A			1.2	V

### Notes:

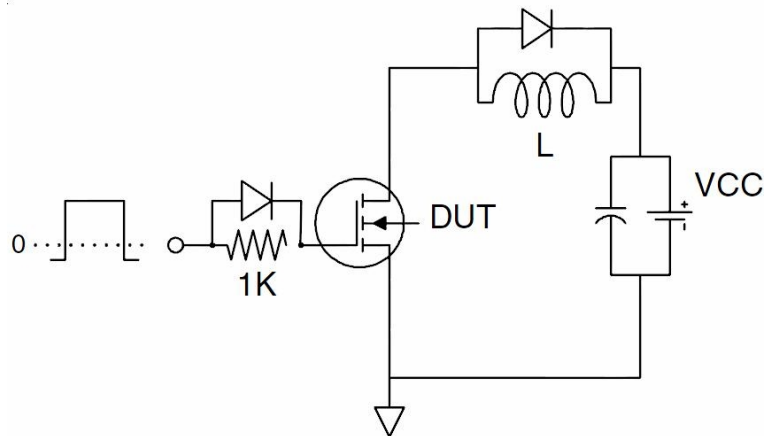
1.  $E_{AS}$  condition:  $T_J=25^{\circ}\text{C}, V_{DD}=15V, V_G=10V, R_G=25\Omega, L=0.5mH, I_{AS}=15A$
2. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
3. Guaranteed by design, not subject to production

## Test Circuit

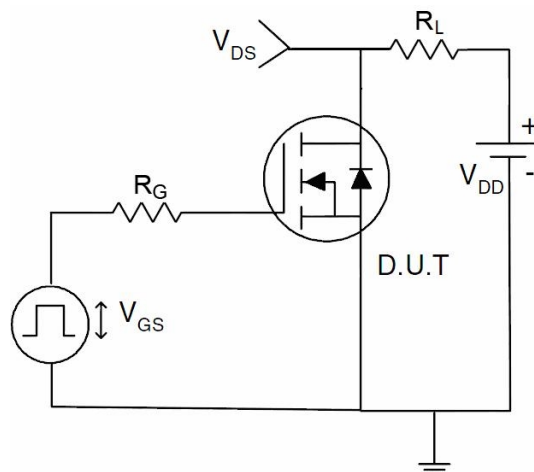
- EAS Test Circuits



- Gate Charge Test Circuit

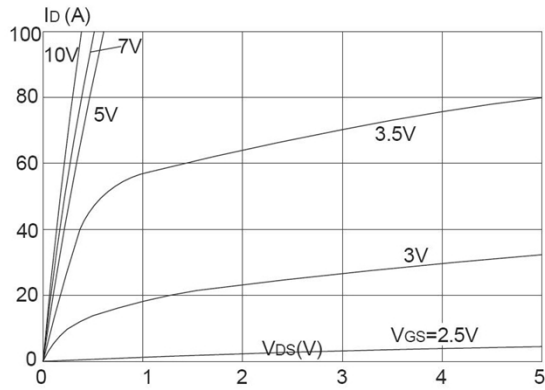


- Switch Time Test Circuit

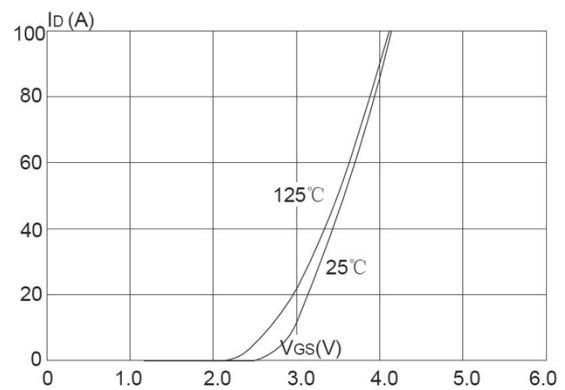


## Typical Characteristics

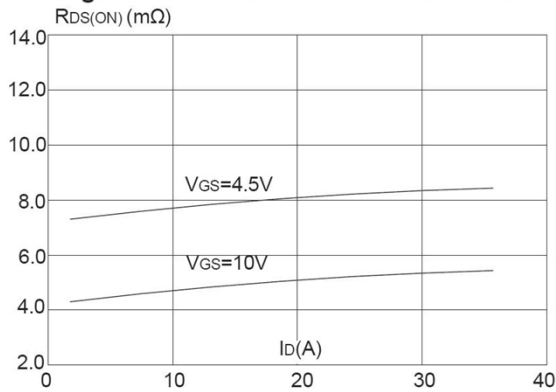
**Figure 1: Output Characteristics**



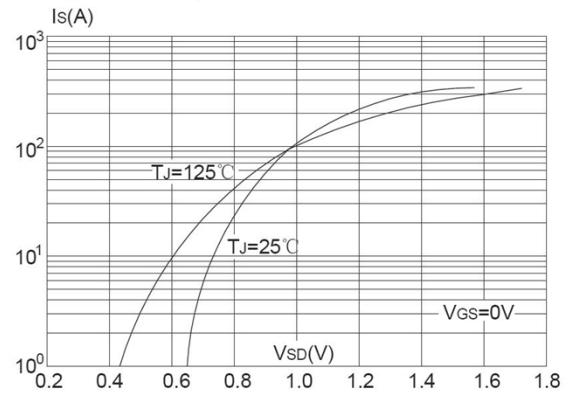
**Figure 2: Typical Transfer Characteristics**



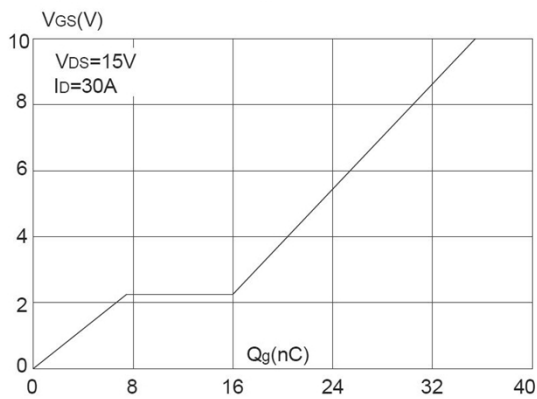
**Figure 3: On-resistance vs. Drain Current**



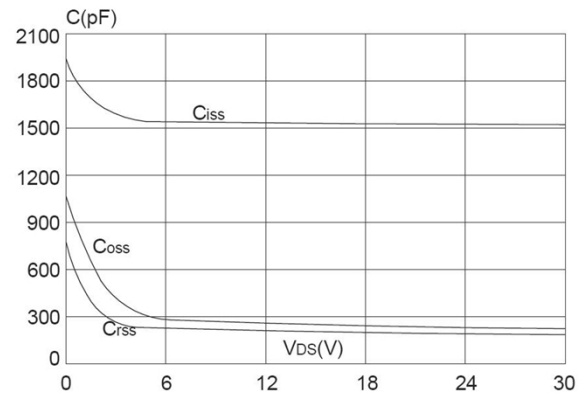
**Figure 4: Body Diode Characteristics**



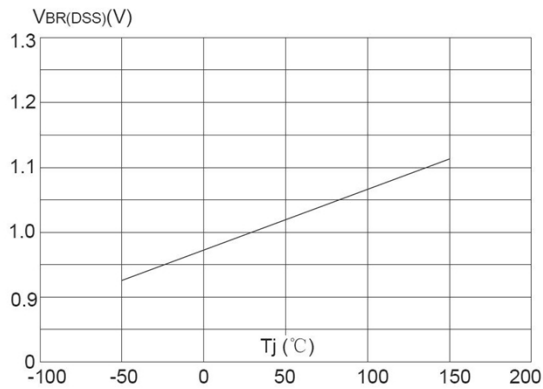
**Figure 5: Gate Charge Characteristics**



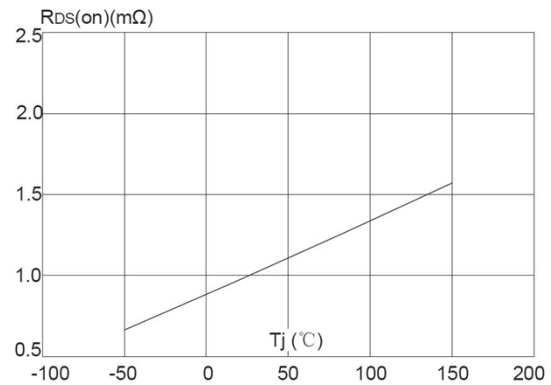
**Figure 6: Capacitance Characteristics**



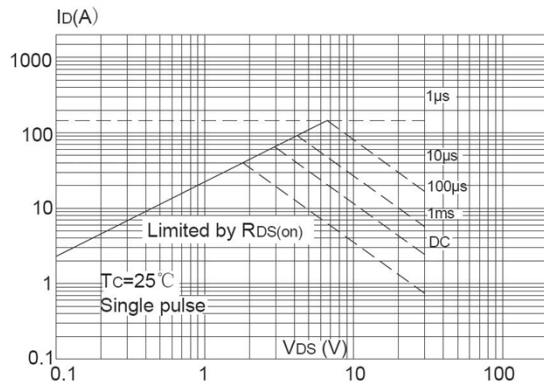
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



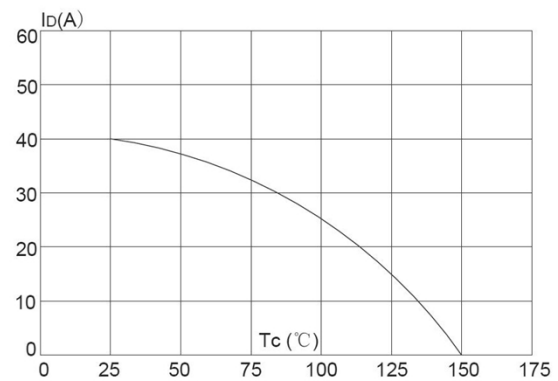
**Figure 8:** Normalized on Resistance vs. Junction Temperature



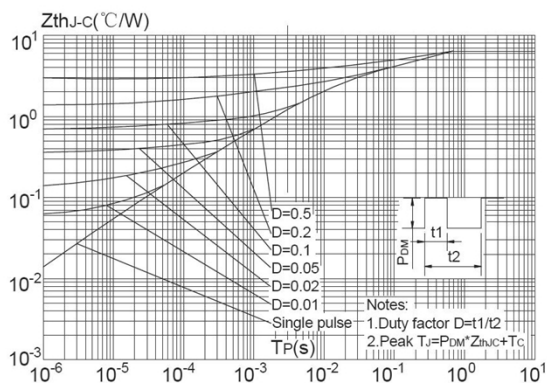
**Figure 9:** Maximum Safe Operating Area



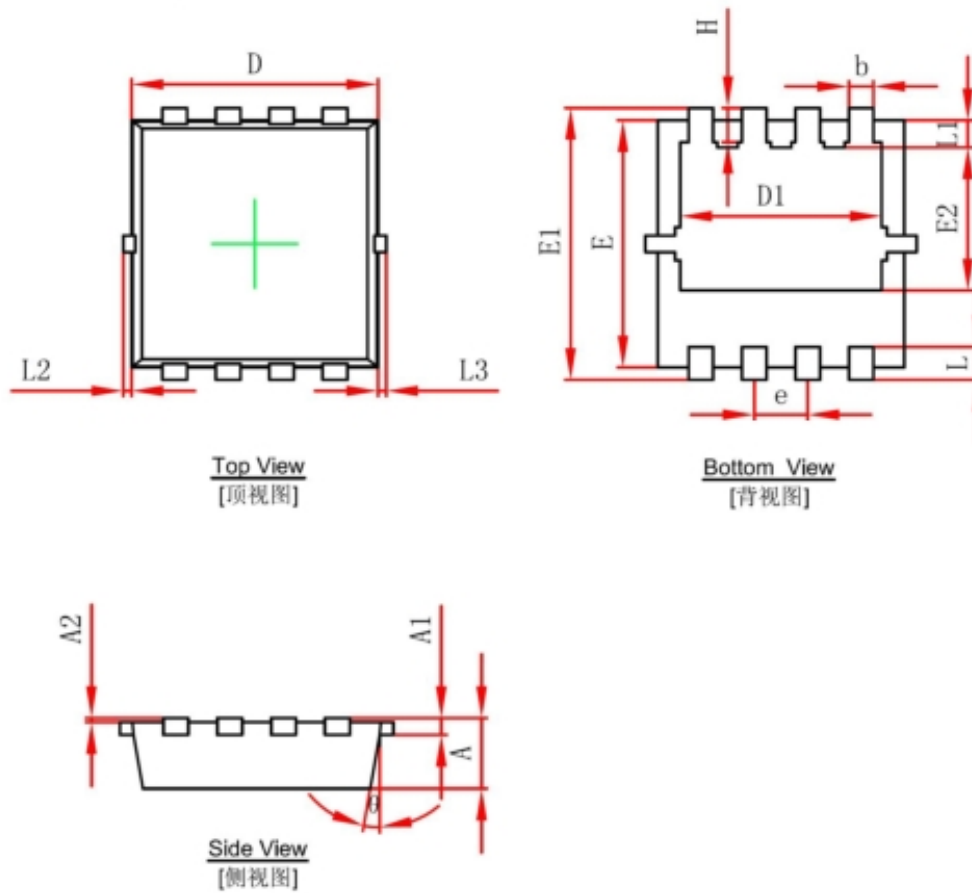
**Figure 10:** Maximum Continuous Drain Current vs. Case Temperature



**Figure.11:** Maximum Effective Transient Thermal Impedance, Junction-to-Case



## PDFN3X3-8L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.650	0.850	0.026	0.033
A1	0.152 REF.		0.006 REF.	
A2	0~0.05		0~0.002	
D	2.900	3.100	0.114	0.122
D1	2.300	2.600	0.091	0.102
E	2.900	3.100	0.114	0.122
E1	3.150	3.450	0.124	0.136
E2	1.535	1.935	0.060	0.076
b	0.200	0.400	0.008	0.016
e	0.550	0.750	0.022	0.030
L	0.300	0.500	0.012	0.020
L1	0.180	0.480	0.007	0.019
L2	0~0.100		0~0.004	
L3	0~0.100		0~0.004	
H	0.315	0.515	0.012	0.020
θ	9°	13°	9°	13°