SuperMOS – PDFN3X3-8L 30V BV_{DSS} 4mΩ $R_{DS(on)}$, N-channel MOSFET

1. Description

The ESD3066DN33 is N-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. Device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product ESD3066DN33 is Pb-free.

2. Features

- 30V, $R_{DS(ON)}$=4.0mΩ(TYP.) @V_{GS}=10V
  $R_{DS(ON)}$=6.5mΩ(TYP.) @V_{GS}=4.5V
- Use trench MOSFET technology
- High density cell design for low $R_{DS(on)}$
- Material: Halogen free
- Reliable and rugged
- Avalanche Rated
- Low leakage current

3. Applications

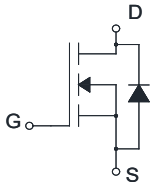
- PWM applications
- Load switch
- Power management in portable/desktop PCs
- DC/DC conversion

100% UIS TESTED!

4. Ordering Information

Part Number	Package	Marking	Material	Packing	Quantity per reel	Flammability Rating	Reel Size
ESD3066DN33	PDFN3X3-8L	ES3343/lot	Halogen free	Tape & Reel	5,000 PCS	UL 94V-0	13 inches

5. Pin Configuration and Functions

Pin	Function	Outline	Circuit Diagram
4	Gate		
1/2/3	Source		
5/6/7/8	Drain		

6. Specification

Absolute Maximum Rating & Thermal Characteristics

Ratings at 25 ℃ ambient temperature unless otherwise specified.

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		BV_{DSS}	30	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_C=25°C	I_D	45	A
	T_C=75°C		35	
Maximum Power Dissipation	T_C=25°C	P_D	30	W
	T_C=75°C		18	
Pulsed Drain Current [a]		I_{DM}	180	A
Avalanche Current, Single Pulsed [b]		I_{AS}	30	A
Avalanche Energy, Single Pulsed [b]		E_{AS}	135	mJ
Operating Junction Temperature		T_J	150	°C
Lead Temperature		T_L	260	°C
Storage Temperature Range		T_{stg}	-55 to 150	°C

Thermal resistance ratings

Single Operation				
Parameter		Symbol	Typical	Unit
Junction-to-Ambient Thermal Resistance	t ≤ 10 s	$R_{\theta JA}$	40	°C/W
Junction-to-Case Thermal Resistance	Steady State	$R_{\theta JC}$	4.2	

Note:

a: Repetitive rating, pulse width limited by junction temperature, tp=10μs, Duty Cycle=1%

b: EAS condition：Tj=25℃,V_{DD}=30V,V_G=10V,L=0.3mH,Rg=25Ω

Electrical Characteristics

At TA = 25℃ unless otherwise specified

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250uA	30			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=30V, V_{GS}=0V			1.0	uA
Gate-to-source Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS}=±20V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS}=V_{DS}, I_D=250uA	1.0	1.75	2.5	V
Drain-to-source On-resistance	$R_{DS(on)}$	V_{GS}=10V, I_D=20A		4.0	7.5	mΩ
		V_{GS}=4.5V, I_D=16A		6.5	9.5	
Forward Trans conductance	g_{FS}	V_{DS}=5.0V, I_D=10A		25	40	S
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C_{ISS}	V_{GS}=0V, f=1MHz, V_{DS} =25V		2200		pF
Output Capacitance	C_{OSS}			275		
Reverse Transfer Capacitance	C_{RSS}			242		
Total Gate Charge	$Q_{G(TOT)}$	V_{GS}=10V, V_{DS}=24V, I_D=30A		48		nC
Gate-to-Source Charge	Q_{GS}			8.8		
Gate-to-Drain Charge	Q_{GD}			10.0		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	$t_{d(ON)}$	V_{GS}=4.5V, V_{DS}=20V, I_D=60A, R_G=1.8Ω		12.5		ns
Rise Time	t_r			90		
Turn-Off Delay Time	$t_{d(OFF)}$			142		
Fall Time	t_f			85		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V_{SD}	V_{GS}=0V, I_S=1.0A		0.75	1.5	V

7. Typical Characteristic

Figure 1. Typ. Output

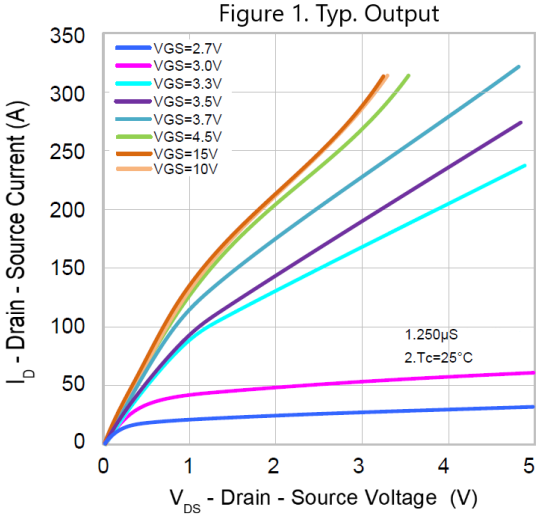


Figure 2. Transfer Characteristics

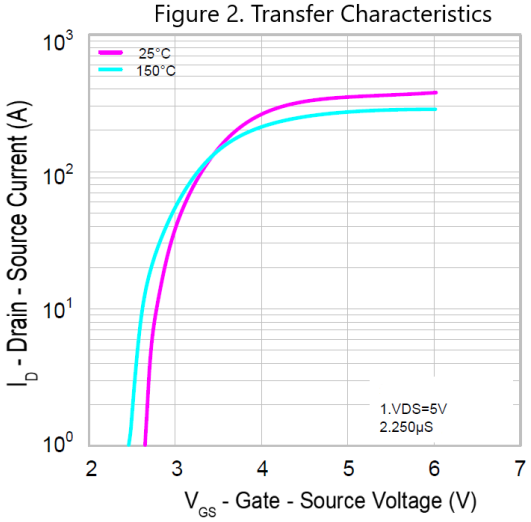


Figure 3 . Rdson-Drain Current

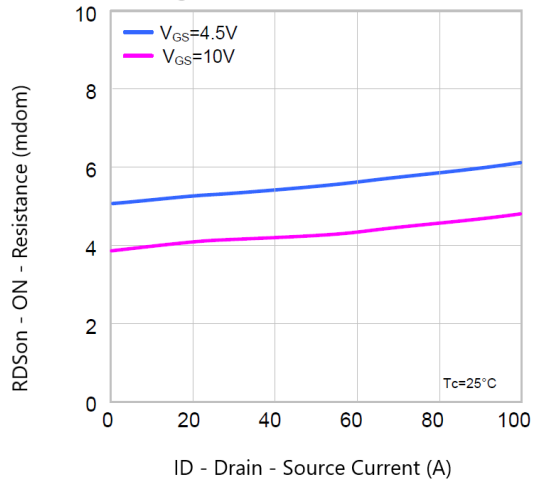


Figure 4. Body-Diode Characteristics

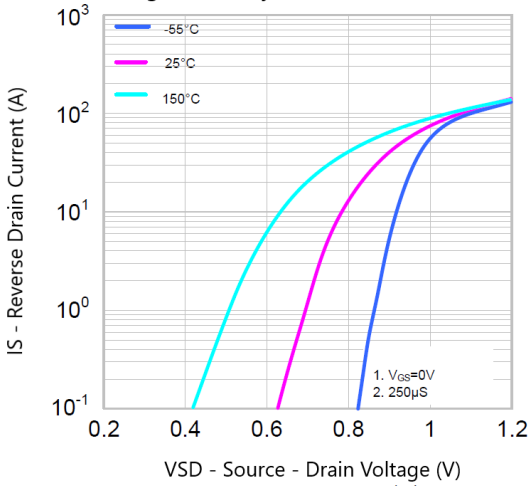


Figure 5. Capacitance Characteristics

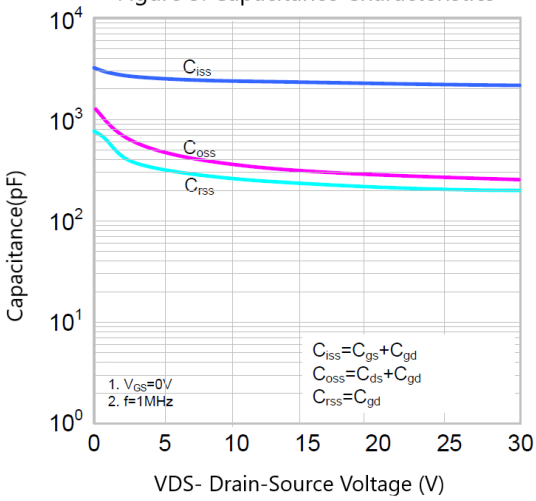


Figure 6. Gate Charge Waveform

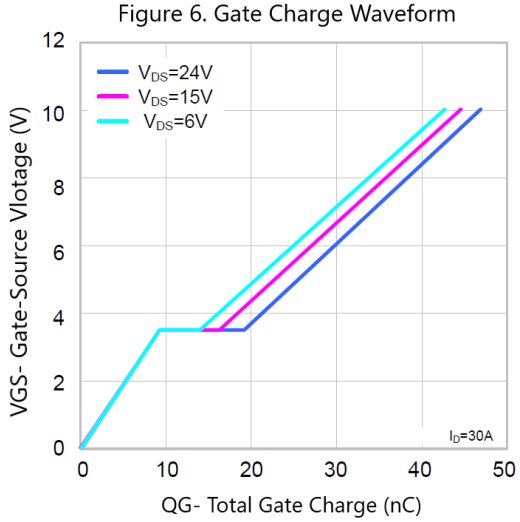


Figure 7. BVDSS-Junction Temperature(℃)

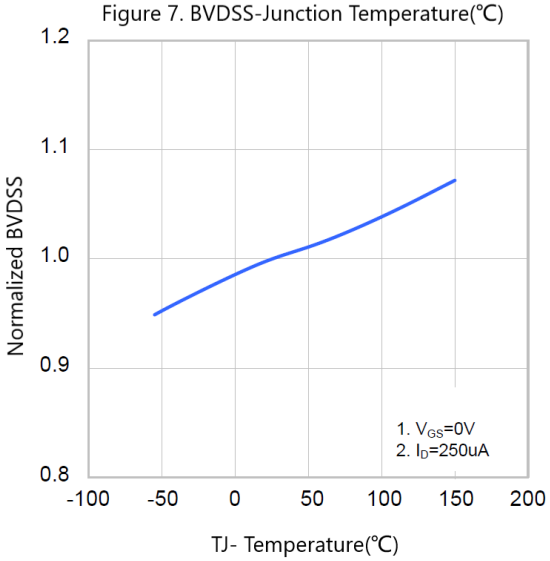


Figure 8. Rdson-Junction Temperature(℃)

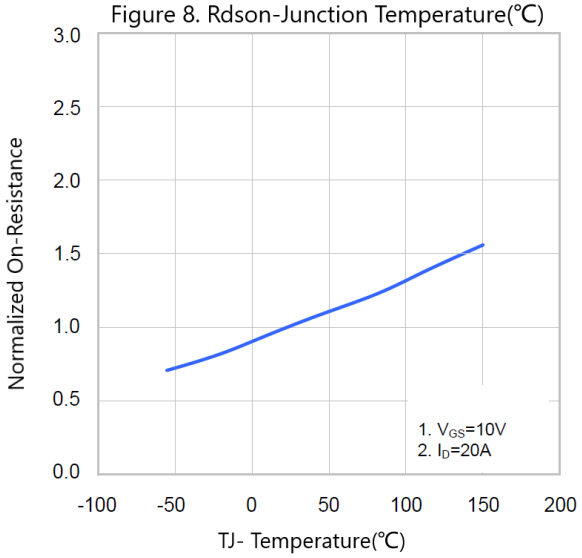


Figure 9. Maximum Safe Operation Area

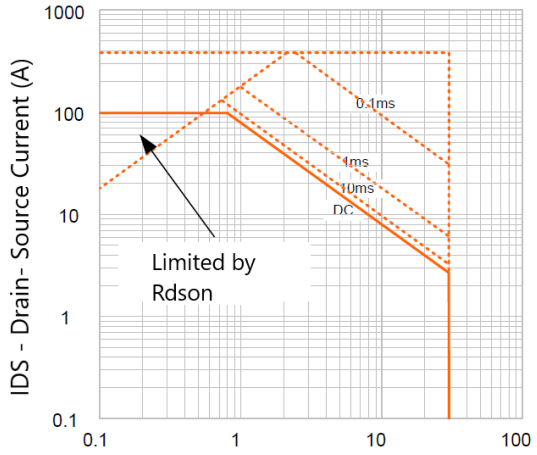
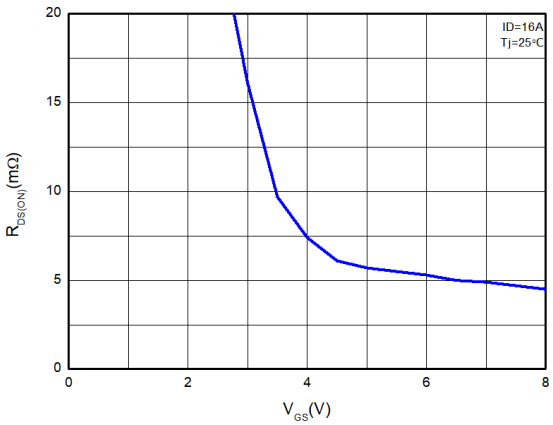


Figure10: On-Resistance vs. V_{GS}



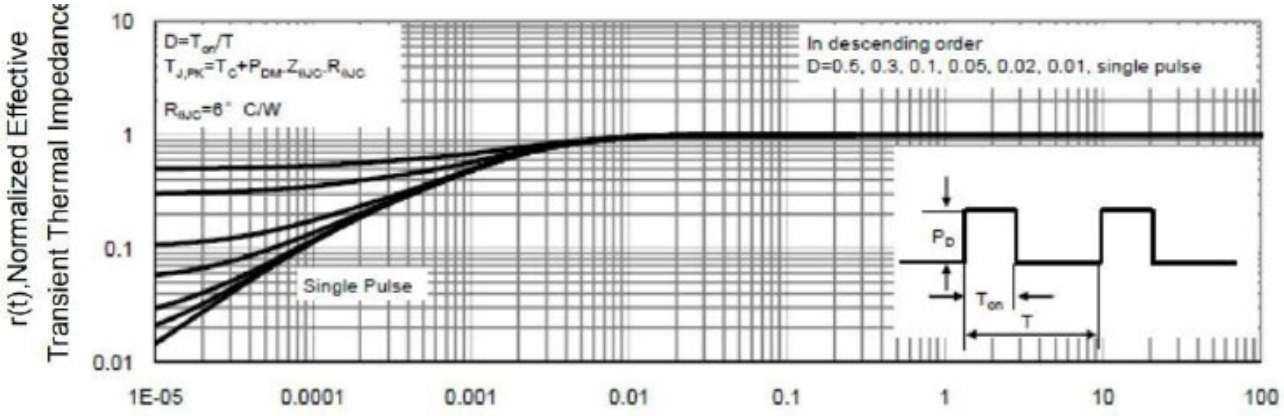
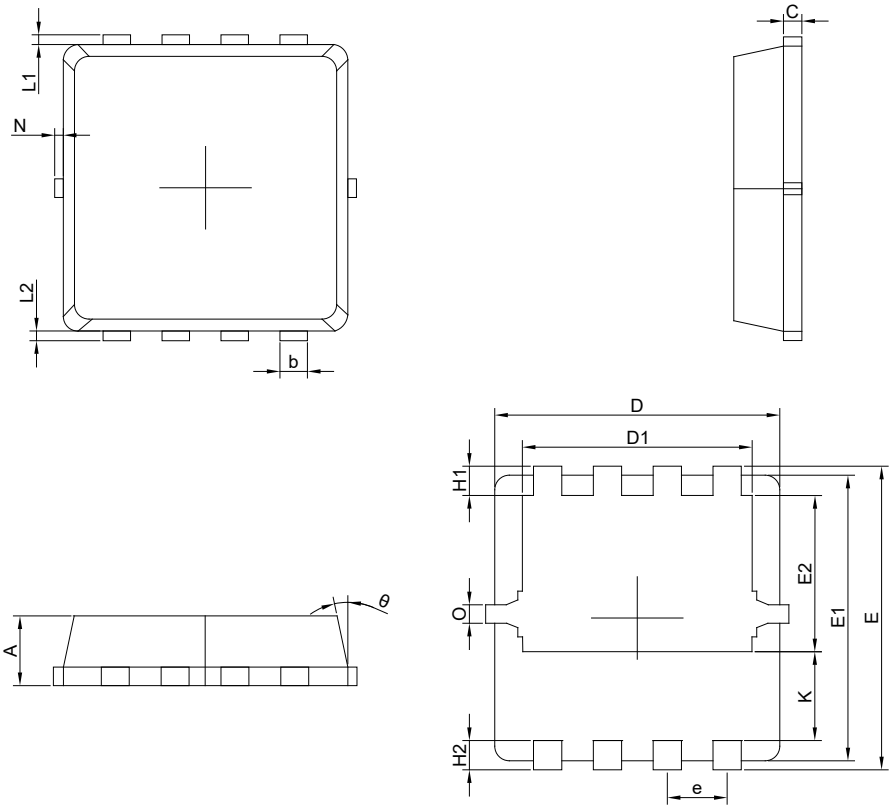


Figure 11 Normalized Maximum Transient Thermal Impedance

8. Dimension (PDFN3X3-8L)



Symbol	Dimensions in Millimeters			Symbol	Dimensions in Millimeters		
	MIN	NOM	MAX		MIN	NOM	MAX
A	0. 65	0.75	0.85	e	0. 65 BSC.		
b	0. 25	0. 30	0. 35	H1	0. 21	0.31	0. 41
C	0. 15	0. 20	0. 25	H2	0. 30	0. 40	0.50
D	3. 00	3.10	3. 20	K	0.78	0. 88	0. 98
D1	2. 40	2. 50	2. 60	L1/L2	0. 10 REF.		
E	3. 20	3. 30	3. 40	θ	11°	12°	13°
E1	3. 00	3.10	3. 20	N	0	-	0.15
E2	1. 60	1.70	1.80	O	0. 2 REF.		

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