

**SuperMOS - PDFN5X6-8L -30V  $V_{DSS}$ , 13m $\Omega$   $R_{DS(on)}$ , P-channel MOSFET**

**1. Description**

The ESN6435 is P-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 ESN6435 is Pb-free.

**2. Features**

- -30V,  $R_{DS(ON)}=13m\Omega(TYP.) @V_{GS}=-10V$
- $R_{DS(ON)}=18m\Omega(TYP.) @V_{GS}=-4.5V$
- Fast Switching
- High density cell design for low  $R_{DS(on)}$
- Material: Halogen free
- Reliable and rugged
- Avalanche Rated
- Low leakage current

**3. Applications**


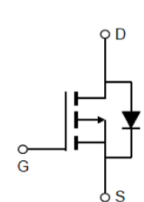
- PWM applications
- Load switch
- Power management in portable/desktop PCs
- DC/DC conversion

**100% UIS TESTED!**

**4. Ordering Information**

Part Number	Package	Marking	Material	Packing	Quantity per reel	Flammability Rating	Reel size
ESN6435	PDFN5X6-8L	ESN6435/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 °C ambient temperature unless otherwise specified.

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$BV_{DSS}$	-30	V
Gate-Source Voltage	$V_{GS}$	$\pm 25$	V
Continuous Drain Current	$I_D$	$T_C=25^\circ\text{C}$	-31
		$T_C=75^\circ\text{C}$	-24
Maximum Power Dissipation	$P_D$	$T_C=25^\circ\text{C}$	31.3
		$T_C=75^\circ\text{C}$	18.8
Pulsed Drain Current <sup>a</sup>	$I_{DM}$	-120	A
Avalanche Current, Single Pulsed <sup>b</sup>	$I_{AS}$	-22	A
Avalanche Energy, Single Pulsed <sup>b</sup>	$E_{AS}$	72.6	mJ
Operating Junction Temperature	$T_J$	150	°C
Storage Temperature Range	$T_{stg}$	-55 to +150	°C

#### Thermal resistance ratings

Single Operation				
Parameter		Symbol	Typical	Unit
Junction-to-Ambient Thermal Resistance	$t \leq 10 \text{ s}$	$R_{\theta JA}$	40	°C/W
Junction-to-Case Thermal Resistance	Steady State	$R_{\theta JC}$	4.0	

Note:

a: Repetitive rating, pulse width limited by junction temperature,  $t_p=10\mu\text{s}$ , Duty Cycle=1%

b: EAS condition:  $T_J=25^\circ\text{C}$ ,  $V_{DD}=-30\text{V}$ ,  $V_G=-10\text{V}$ ,  $L=0.3\text{mH}$ ,  $R_g=25\Omega$

## Electrical Characteristics

At TA = 25°C unless otherwise specified

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>OFF CHARACTERISTICS</b>						
Drain-to-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-30			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{GS}=0V, V_{DS}=-30V$			-1	$\mu A$
Gate-to-source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 25V, V_{DS}=0V$			$\pm 100$	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS}=V_{DS}, I_D=-250\mu A$	-1.0	-1.5	-2.0	V
Drain-to-source On-resistance	$R_{DS(on)}$	$V_{GS}=-10V, I_D=-20A$		13	21	m $\Omega$
		$V_{GS}=-4.5V, I_D=-15A$		18	27	
<b>CHARGES, CAPACITANCES AND GATE RESISTANCE</b>						
Input Capacitance	$C_{ISS}$	$V_{GS}=0V, V_{DS}=-15V,$ $f=1MHz$		1150		pF
Output Capacitance	$C_{OSS}$			260		
Reverse Transfer Capacitance	$C_{RSS}$			145		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS}=-10V, V_{DS}=-15V,$ $I_D=-20A$		24		nC
Gate-to-Source Charge	$Q_{GS}$			6		
Gate-to-Drain Charge	$Q_{GD}$			6.3		
<b>SWITCHING CHARACTERISTICS</b>						
Turn-On Delay Time	$t_{d(ON)}$	$V_{GS}=-10V, V_{DS}=-15V,$ $R_L=1\Omega, R_G=3\Omega$		10		ns
Rise Time	$t_r$			10		
Turn-Off Delay Time	$t_{d(OFF)}$			15		
Fall Time	$t_f$			10		
<b>BODY DIODE CHARACTERISTICS</b>						
Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_{SD}=-10A$			-1.5	V

7. Typical Characteristic

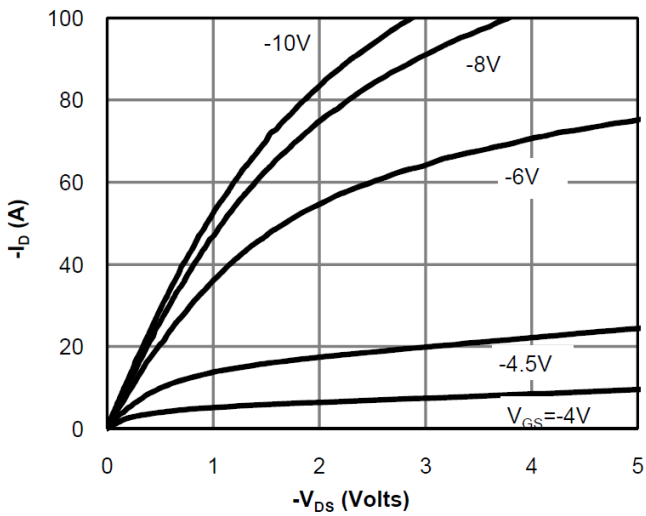


Fig 1: On-Region Characteristics

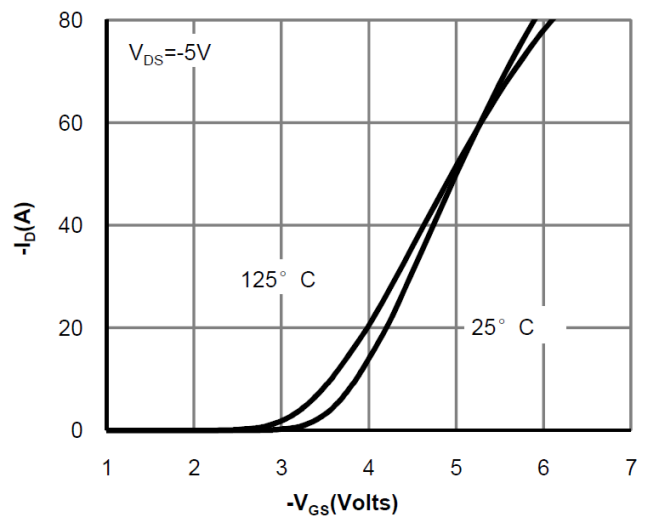


Figure 2: Transfer Characteristics

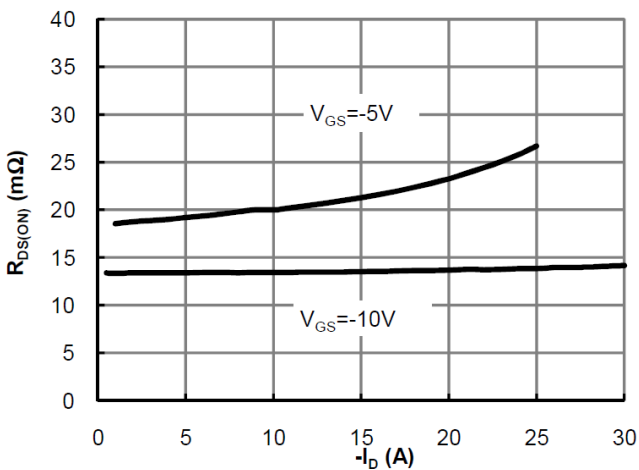


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

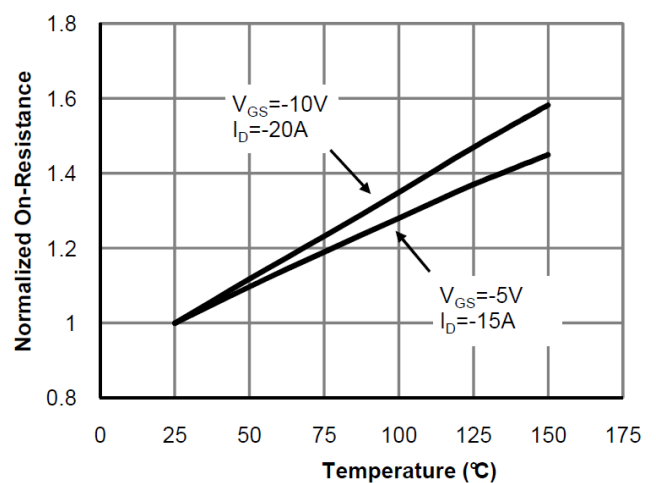


Figure 4: On-Resistance vs. Junction Temperature

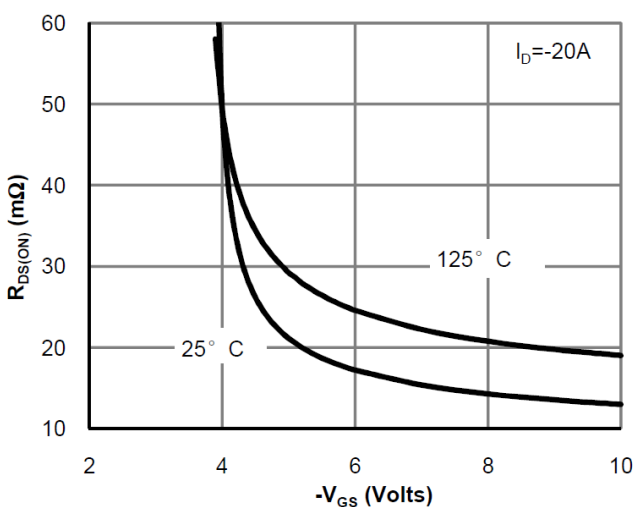


Figure 5: On-Resistance vs. Gate-Source Voltage

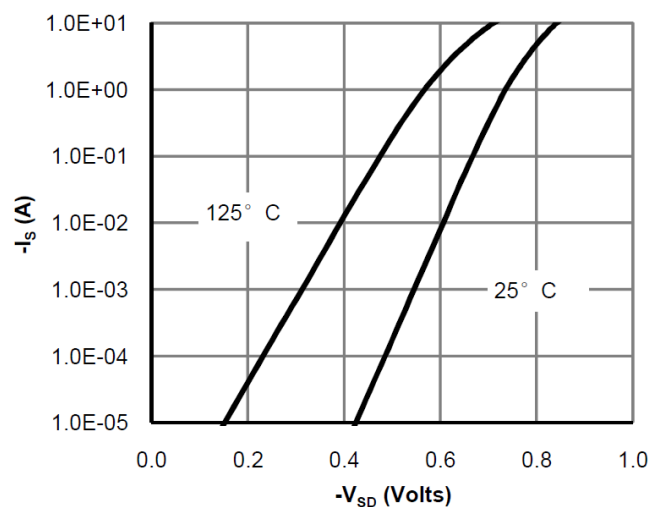


Figure 6: Body-Diode Characteristics

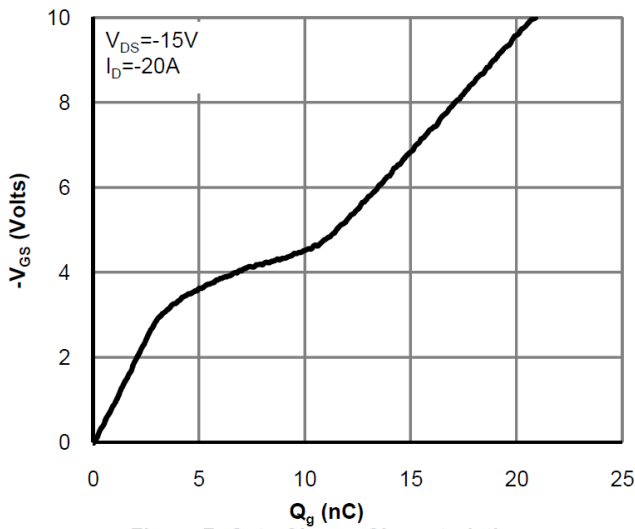


Figure 7: Gate-Charge Characteristics

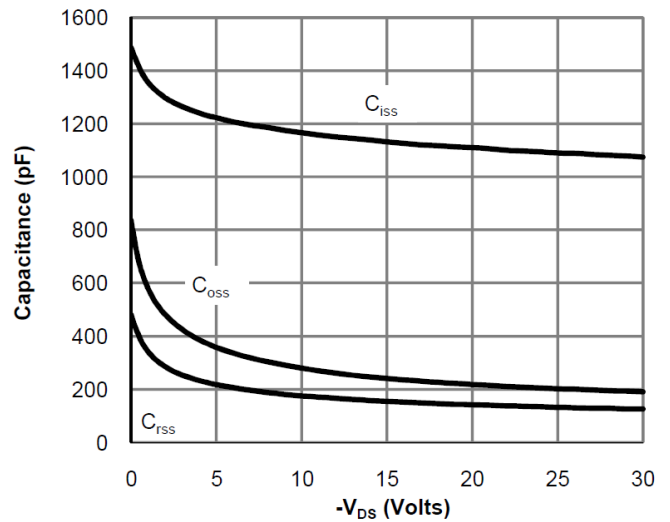


Figure 8: Capacitance Characteristics

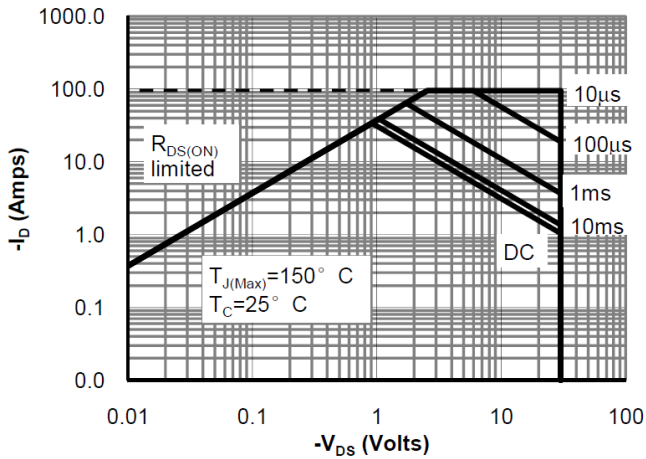


Figure 9: Maximum Forward Biased Safe Operating Area

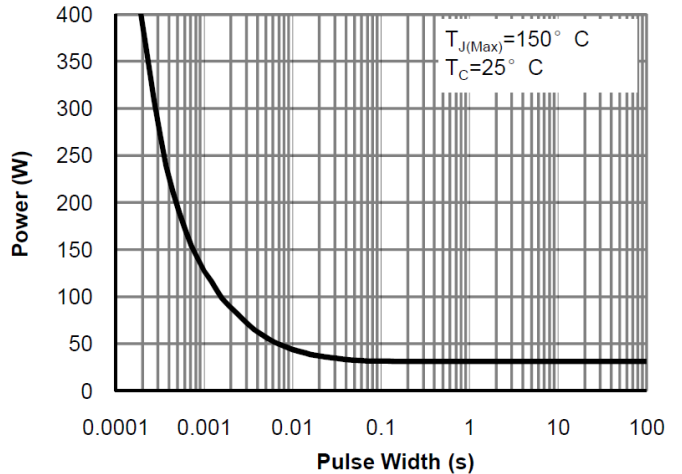


Figure 10: Single Pulse Power Rating Junction-to-Case

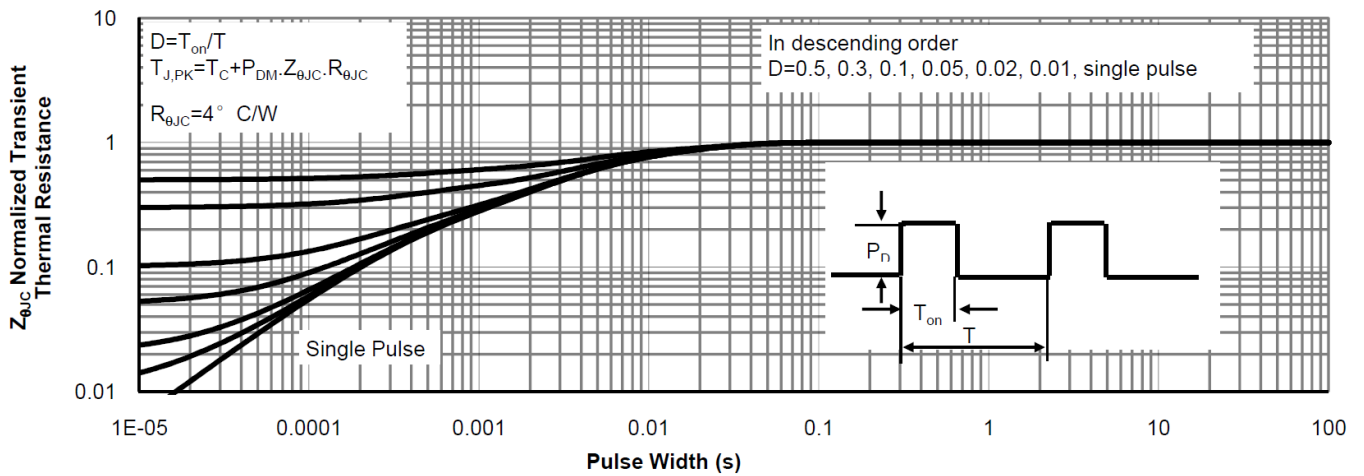
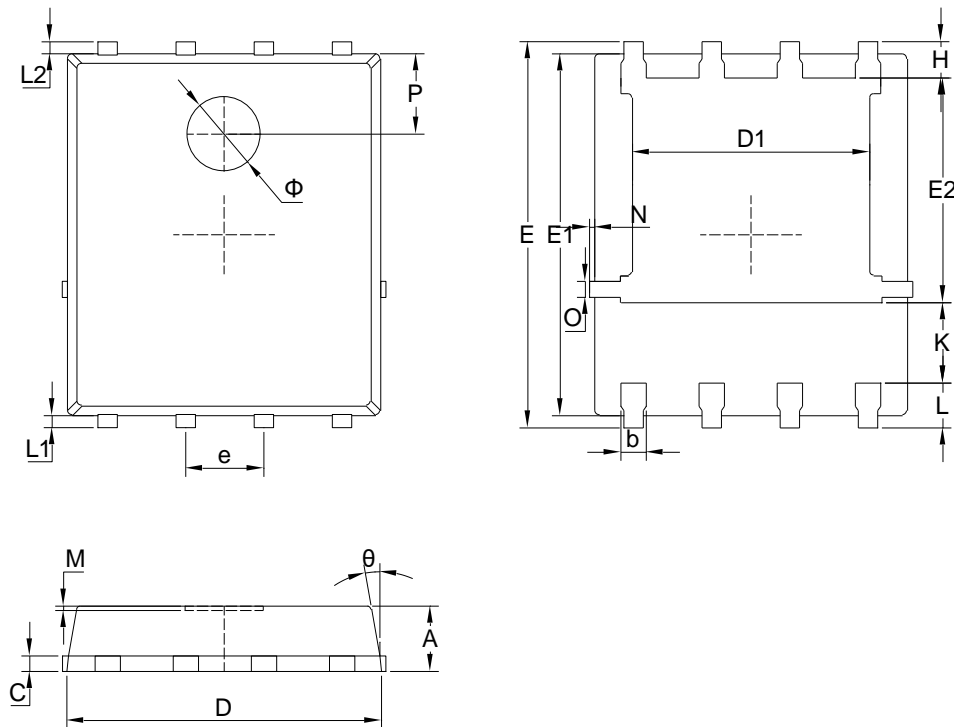


Figure 11: Normalized Maximum Transient Thermal Impedance

8. Dimension (PDFN5x6-8L)



Symbol	Dimensions in Millimeters			Symbol	Dimensions in Millimeters		
	MIN	NOM	MAX		MIN	NOM	MAX
A	0.90	1.05	1.20	H	0.48	0.58	0.68
b	0.35	0.40	0.50	K	1.17	1.27	1.37
C	0.20	0.25	0.35	L	0.64	0.74	0.84
D	4.90	5.05	5.20	L1/L2	0.20 REF.		
D1	3.72	3.82	3.92	theta	8°	10°	12°
E	6.00	6.15	6.30	M	0.08 REF.		
E1	5.60	5.75	5.90	N	0	-	0.15
E2	3.47	3.57	3.67	O	0.25 REF.		
e	1.27 BSC.			P	1.28 REF.		
phi	1.20 REF						

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