

## SuperMOS - PDFN3X3-8L -30V $V_{DSS}$ , 13m $\Omega$ $R_{DS(on)}$ , P-channel MOSFET

### 1. Description

The ESN7403 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 ESN7403 is Pb-free.

### 2. Features

- -30V,  $R_{DS(ON)}=13m\Omega(TYP.) @V_{GS}=-10V$
- $R_{DS(ON)}=17m\Omega(TYP.) @V_{GS}=-4.5V$
- Fast Switching
- High density cell design for low  $R_{DS(on)}$
- Material: Halogen free
- Reliable and rugged
- Avalanche Rated
- Low leakage current

### 3. Applications


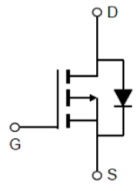
- PWM applications
- Load switch
- Power management in portable/desktop PCs
- DC/DC conversion

**100% UIS TESTED!**

### 4. Ordering Information

Part Number	Package	Marking	Material	Packing	Quantity per reel	Flammability Rating	Reel size
ESN7403	PDFN3X3-8L	ESN7403/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	$T_C=25^\circ\text{C}$	$I_D$	-31	A
	$T_C=75^\circ\text{C}$		-24	
Maximum Power Dissipation	$T_C=25^\circ\text{C}$	$P_D$	30	W
	$T_C=75^\circ\text{C}$		18	
Pulsed Drain Current <sup>a</sup>		$I_{DM}$	-124	A
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	$R_{\theta JC}$	4.2	

Note:

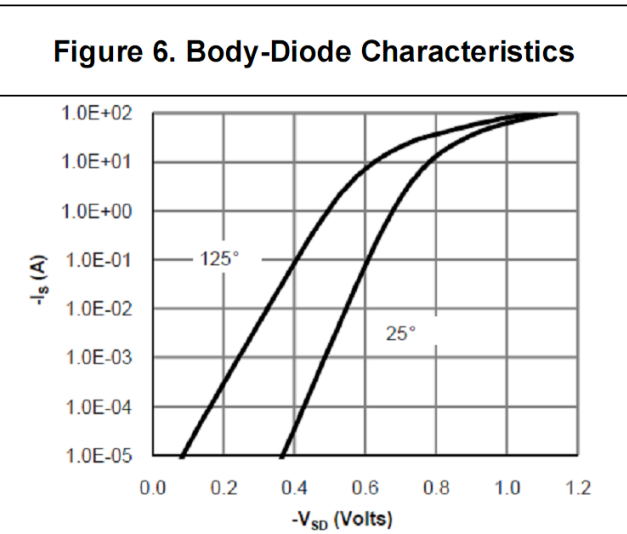
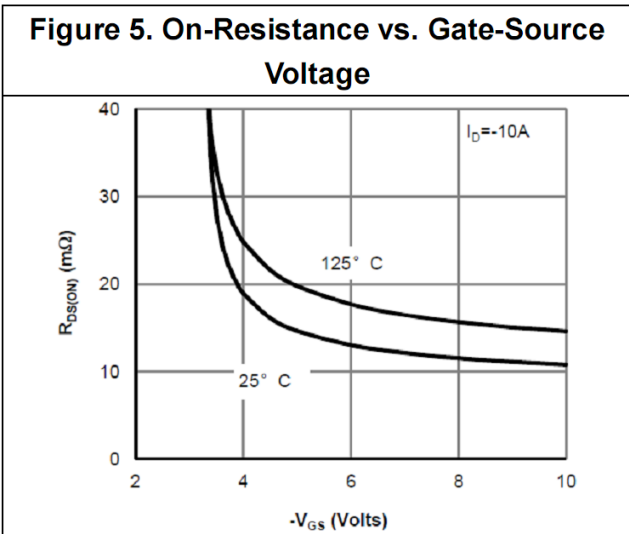
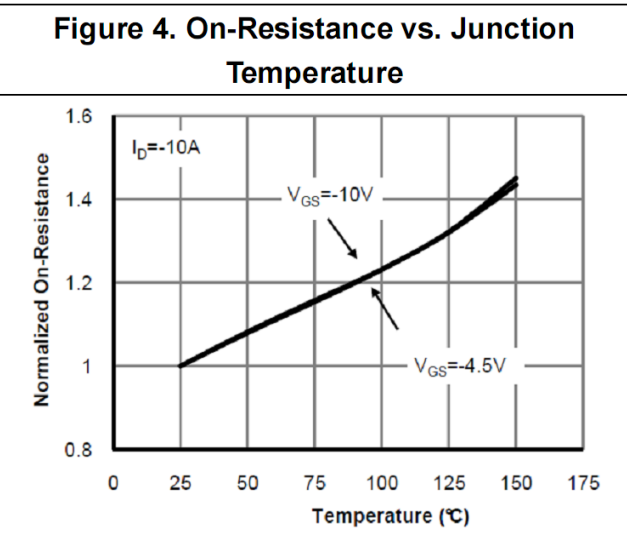
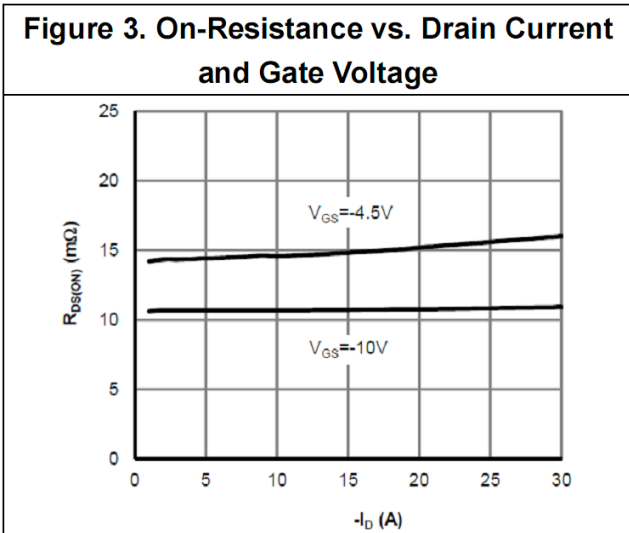
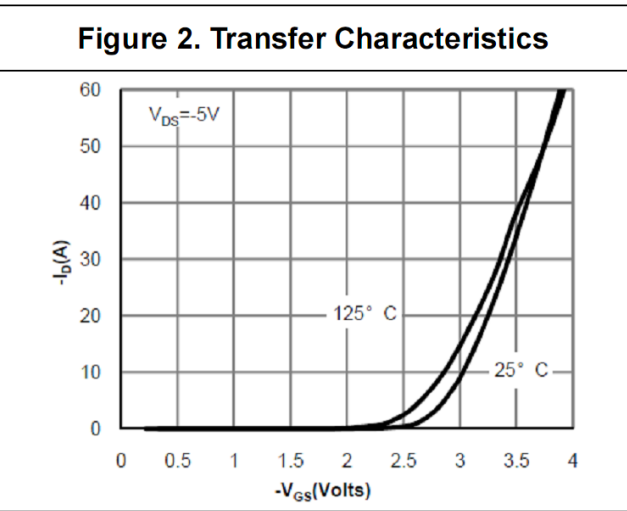
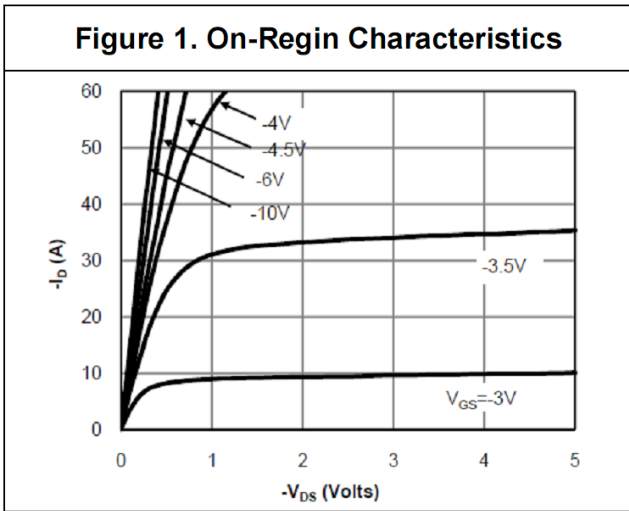
a: Repetitive rating, pulse width limited by junction temperature,  $t_p=10\mu\text{s}$ , Duty Cycle=1%

## Electrical Characteristics

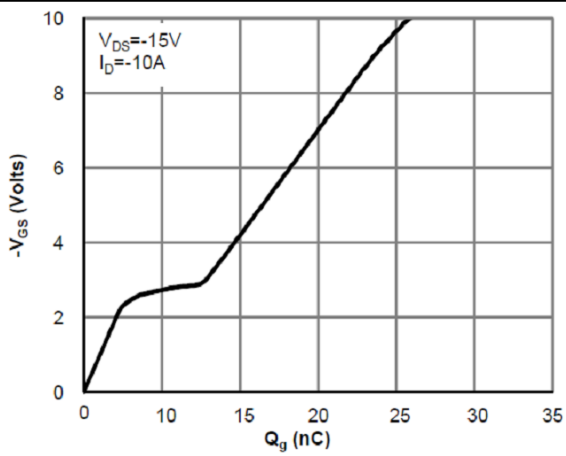
At TA = 25°C unless otherwise specified

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	$R_{DS(on)}$	$V_{GS}=-10V, I_D=-8A$		13	20	m $\Omega$
		$V_{GS}=-4.5V, I_D=-7A$		17	27	
<b>CHARGES, CAPACITANCES AND GATE RESISTANCE</b>						
Input Capacitance	$C_{ISS}$	$V_{GS}=0V, V_{DS}=-15V$ $f=1MHz$		1230		pF
Output Capacitance	$C_{OSS}$			160		
Reverse Transfer Capacitance	$C_{RSS}$			145		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS}=-10V, V_{DS}=-15V$ $I_D=-10A$		26.4		nC
Gate-to-Source Charge	$Q_{GS}$			6		
Gate-to-Drain Charge	$Q_{GD}$			4.3		
<b>SWITCHING CHARACTERISTICS</b>						
Turn-On Delay Time	$t_{d(ON)}$	$V_{GS}=-10V, V_{DS}=-15V$ $R_L=1\Omega, R_G=3\Omega$		18		ns
Rise Time	$t_r$			22		
Turn-Off Delay Time	$t_{d(OFF)}$			55		
Fall Time	$t_f$			42		
<b>BODY DIODE CHARACTERISTICS</b>						
Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_{SD}=-10A$			-1.5	V

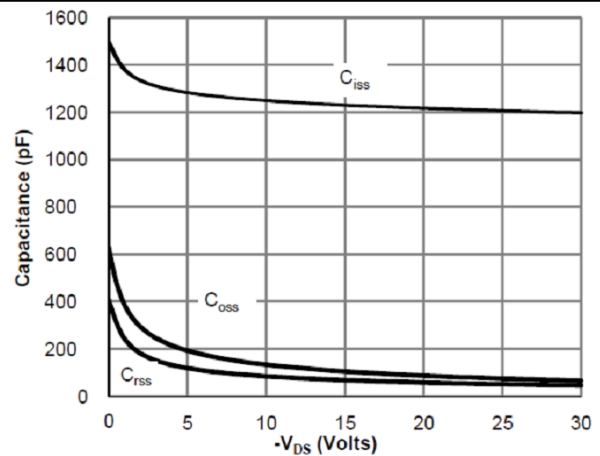
7. Typical Characteristic



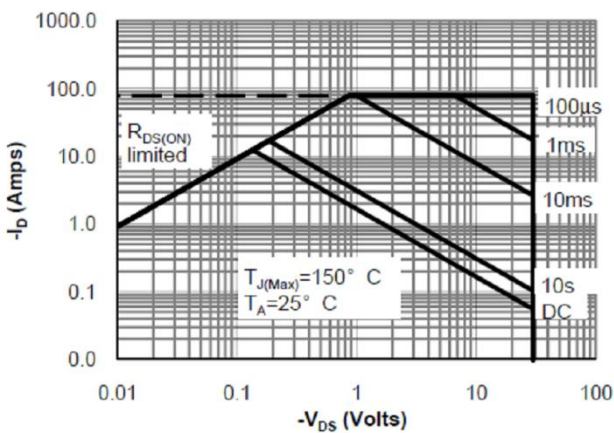
**Figure 7. Gate-Charge Characteristics**



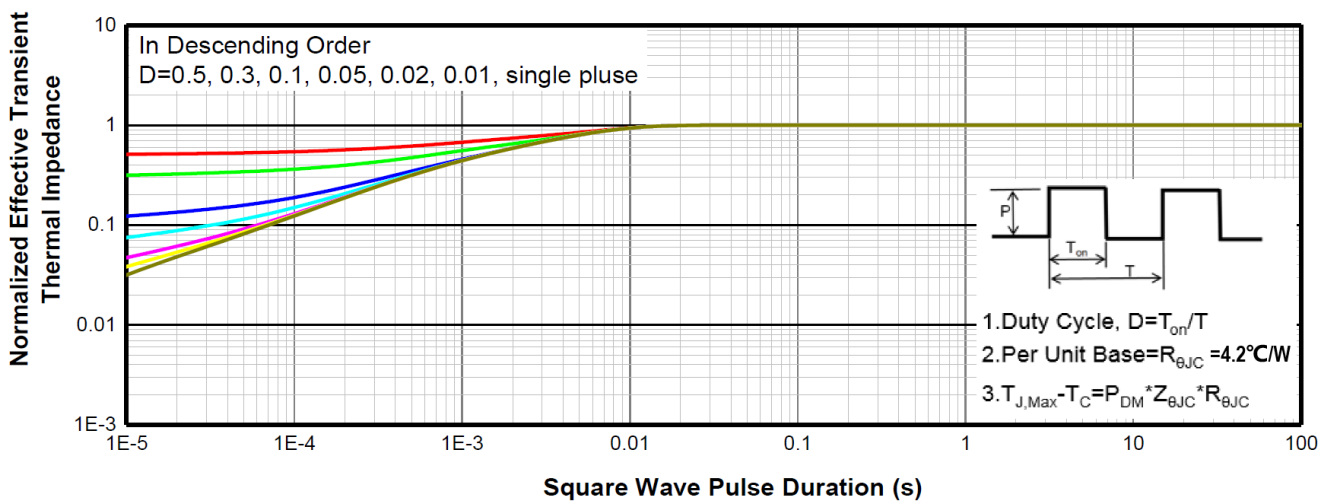
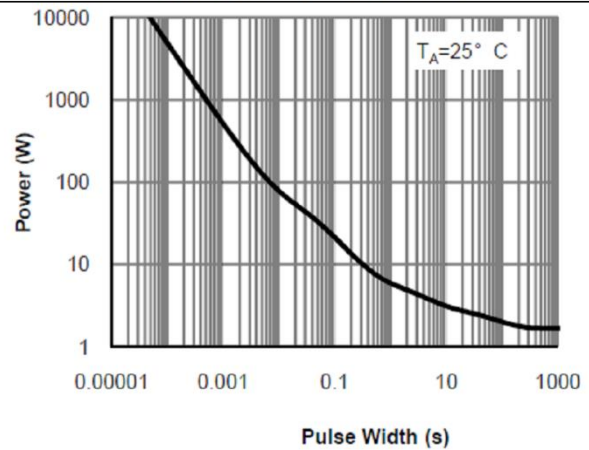
**Figure 8. Capacitance Characteristics**



**Figure 9. Maximum Forward Biased Safe Operating Area**

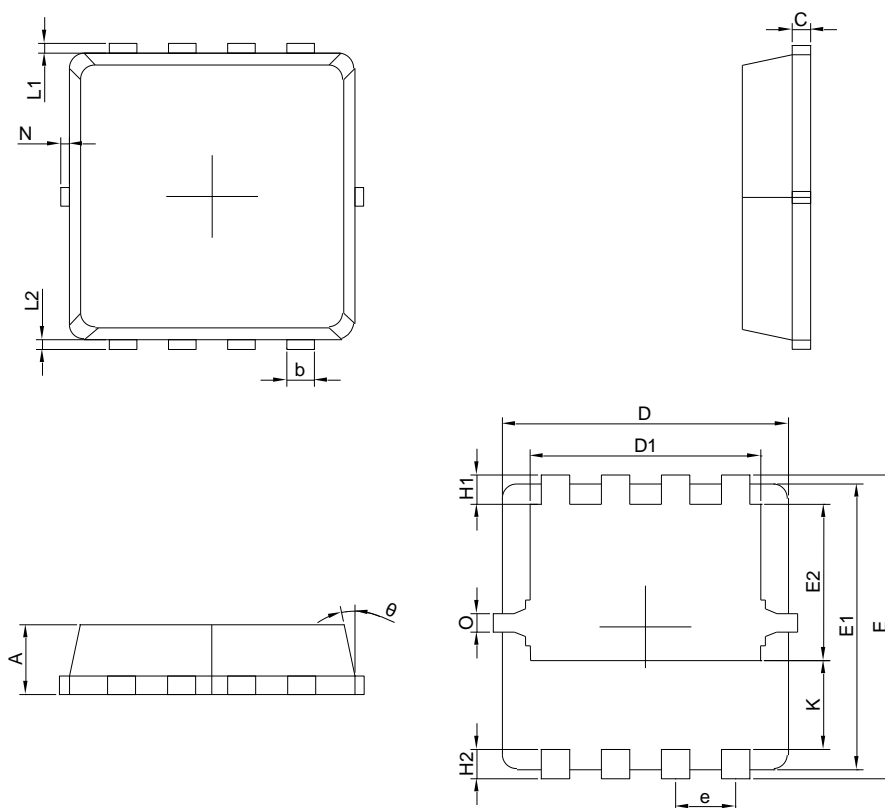


**Figure 10. Single Pulse Power Rating Junction-to-Ambient**



**Transient Thermal Response (Junction-to-Case)**

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	theta	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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