

SuperMOS – PDFN5*6-8L 30V BV_{DSS}, 5mΩ R_{DS(on)}, N-channel MOSFET

1. Description

The ESDNJ03R4 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 ESDNJ03R4 is Pb-free.

2. Features

- 30V, R_{DS(ON)}=5.0mΩ(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

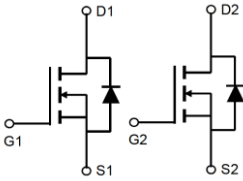
- PWM applications
- Load switch
- Power management in portable/desktop PCs
- DC/DC conversion

100% UIS TESTED!

4. Ordering Information

Part Number	Package	Marking	Material	Packing	Quantity per reel	Flammability Rating	Reel Size
ESDNJ03R4	PDFN5*6-8L	ESDNJ03R4/LOT	Halogen free	Tape & Reel	5,000 PCS	UL 94V-0	13 inches

5. Pin Configuration and Functions

Pin	Function	Outline	Circuit Diagram
2	Gate1		
1	Source1		
7/8	Drain1		
4	Gate2		
3	Source2		
5/6	Drain2		

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}	± 20	V
Continuous Drain Current	$T_C=25^{\circ}\text{C}$	I_D	41	A
	$T_C=75^{\circ}\text{C}$		32	
Maximum Power Dissipation	$T_C=25^{\circ}\text{C}$	P_D	20.8	W
	$T_C=75^{\circ}\text{C}$		12.5	
Pulsed Drain Current		I_{DM}	164	A
Avalanche Current, Single Pulsed ^a		I_{AS}	30	A
Avalanche Energy, Single Pulsed ^a		E_{AS}	135	mJ
Operating Junction Temperature		T_J	150	$^{\circ}\text{C}$
Lead Temperature		T_L	260	$^{\circ}\text{C}$
Storage Temperature Range		T_{stg}	-55 to 150	$^{\circ}\text{C}$

Thermal resistance ratings

Single Operation				
Parameter		Symbol	Typical	Unit
Junction-to-Ambient Thermal Resistance	$t \leq 10 \text{ s}$	$R_{\theta JA}$	20	$^{\circ}\text{C/W}$
Junction-to-Case Thermal Resistance	Steady State	$R_{\theta JC}$	6	

Note:

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

ESDNJ03R4

Rev-1.4

Electrical Characteristics

At TA = 25°C 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	1.7	2.5	V
Drain-to-source On-resistance	R _{DS(on)}	V _{GS} =10V, I _D =20A		5.0	6.5	mΩ
		V _{GS} =4.5V, I _D =20A		6.5	8.5	
Forward Trans conductance	g _{FS}	V _{DS} =5.0V, I _D =20A			100	S
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C _{ISS}	V _{GS} =0V, f=1MHz, V _{DS} =15V		1983		pF
Output Capacitance	C _{OSS}			275		
Reverse Transfer Capacitance	C _{RSS}			242		
Total Gate Charge	Q _{G(TOT)}	V _{GS} =10V, V _{DS} =15V, I _D =20A		48		nC
Gate-to-Source Charge	Q _{GS}			4.8		
Gate-to-Drain Charge	Q _{GD}			12		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	t _{d(ON)}	V _{GS} =10V, V _{DS} =15V, R _L =0.75Ω, R _G =1.8Ω		8.5		ns
Rise Time	t _r			9		
Turn-Off Delay Time	t _{d(OFF)}			32		
Fall Time	t _f			11		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V _{SD}	V _{GS} =0V, I _S =20A		0.75	1.5	V

7. Typical Characteristic

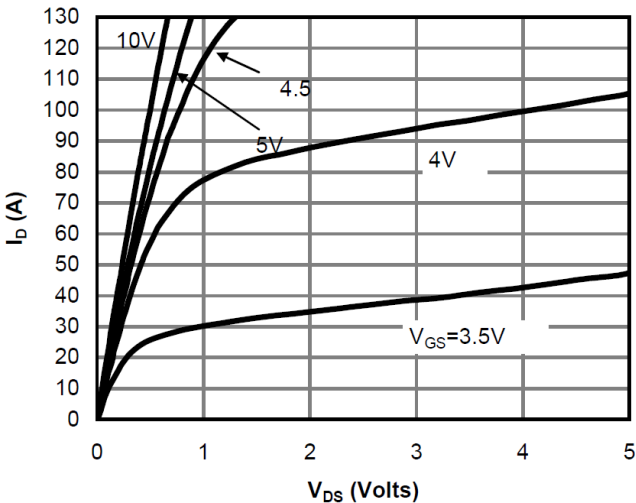


Fig 1: On-Region Characteristics

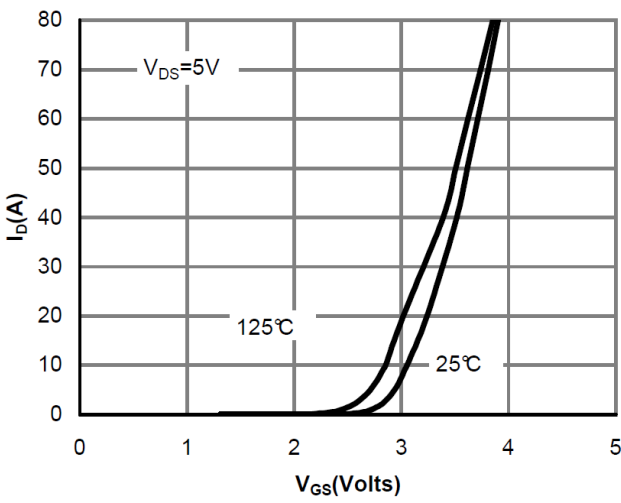


Figure 2: Transfer Characteristics

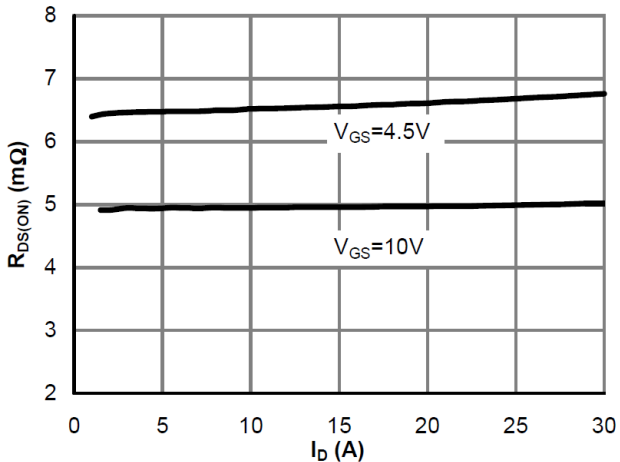


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

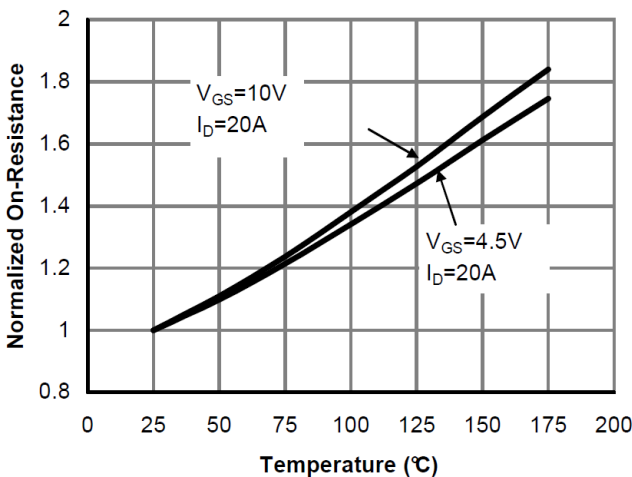


Figure 4: On-Resistance vs. Junction Temperature

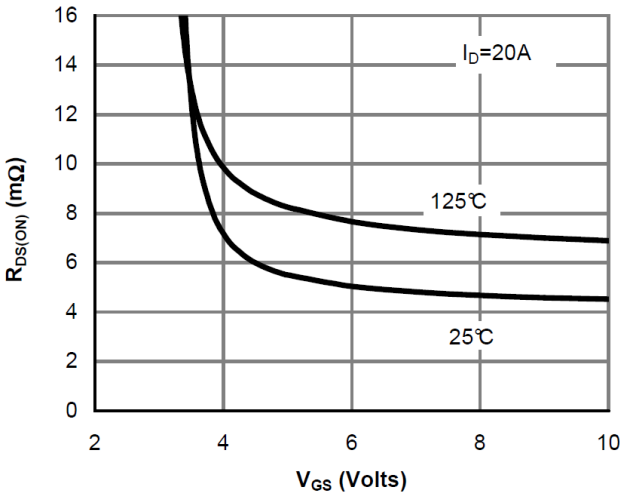


Figure 5: On-Resistance vs. Gate-Source Voltage

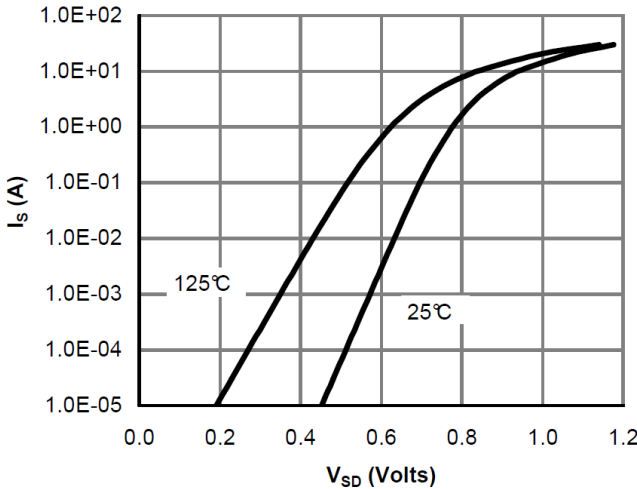


Figure 6: Body-Diode Characteristics

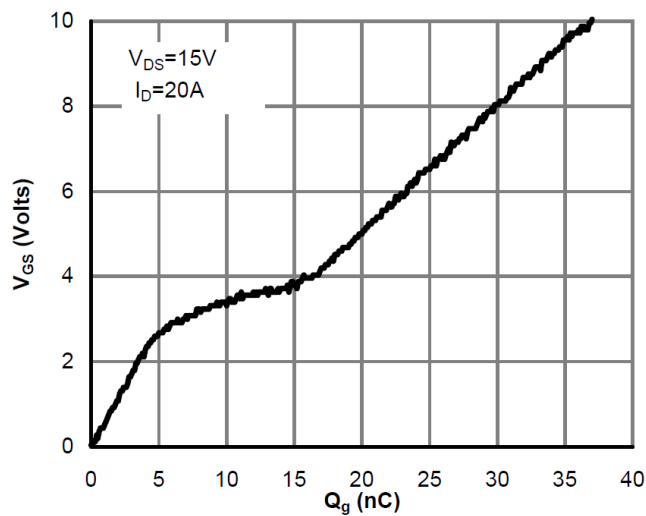


Figure 7: Gate-Charge Characteristics

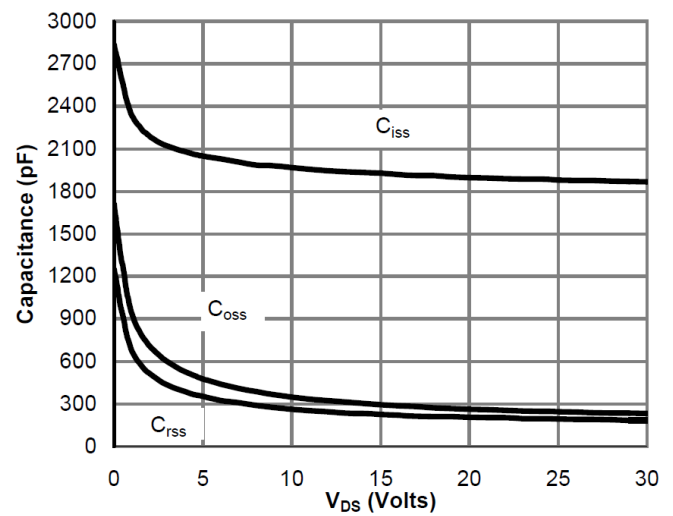


Figure 8: Capacitance Characteristics

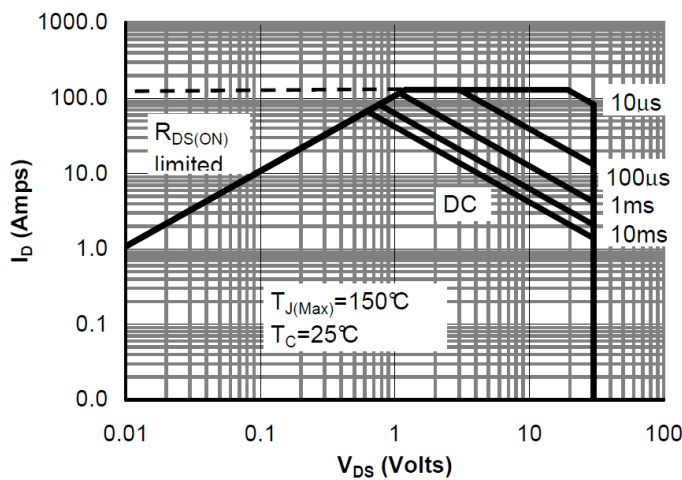


Figure 9: Maximum Forward Biased Safe Operating Area

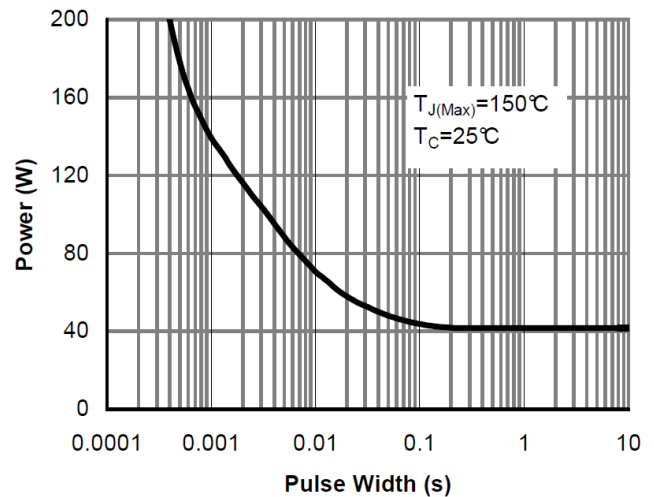


Figure 10: Single Pulse Power Rating Junction-to-Case

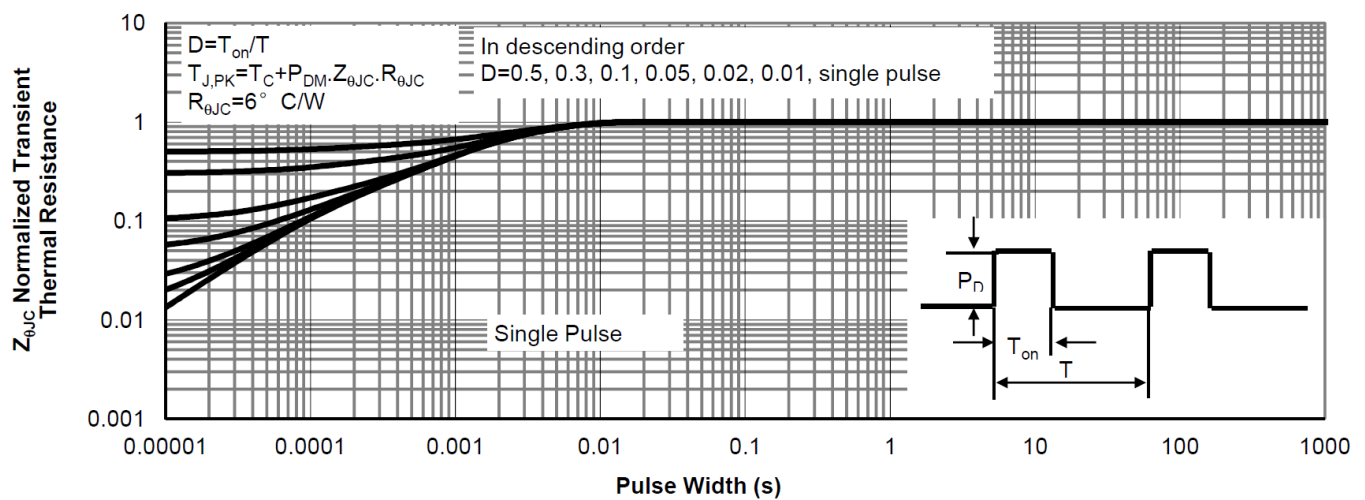
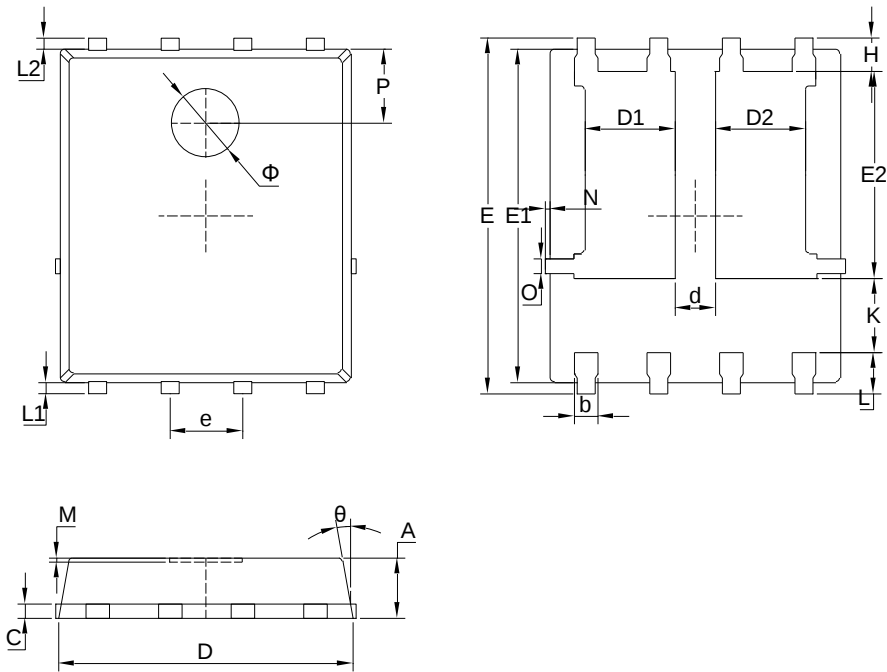


Figure 11: Normalized Maximum Transient Thermal Impedance

8. Dimension (PDFN5*6-8L)



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/D2	1.51	1.61	1.71	θ	8°	10°	12°
d	0.50	0.60	0.70	M	0.08 REF.		
E	6.00	6.15	6.30	N	0	-	0.15
E1	5.60	5.75	5.90	O	0.25 REF.		
E2	3.47	3.57	3.67	P	1.28 REF.		
e	1.27 BSC.			Φ	1.20 REF.		

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