

SuperMOS – SOT-23 20V BV_{DSS} , 25m Ω $R_{DS(on)}$, N-channel MOSFET

1. Description

The NDS331N-ES is N-Channel enhancement MOS Field Effect Transistor. Uses advanced 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 NDS331N-ES is Pb-free.

2. Features

- 20V, $R_{DS(ON)}=25m\Omega$ (Typ.), $V_{GS}=4.5V$
 $R_{DS(ON)}=29m\Omega$ (Typ.), $V_{GS}=2.5V$
- 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

4. Ordering Information

Part Number	Package	Marking	Material	Packing	Quantity per reel	Flammability Rating	Reel Size
NDS331N-ES	SOT-23	2300	Halogen free	Tape & Reel	3,000 PCS	UL 94V-0	7 inches

Table-1 Ordering information

5. Pin Configuration and Functions

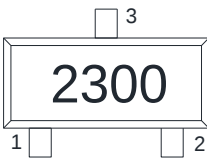
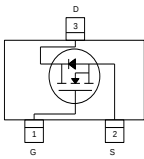
Pin	Function	Outline	Circuit Diagram
1	Gate		
2	Source		
3	Drain		

Table-2 Pin configuration

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}	20	V
Gate-Source Voltage		V_{GS}	± 12	V
Continuous Drain Current	$T_A=25^{\circ}\text{C}$	I_D	4	A
	$T_A=100^{\circ}\text{C}$		3	
Maximum Power Dissipation		P_D	1.2	W
Pulsed Drain Current		I_{DM}	16	A
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

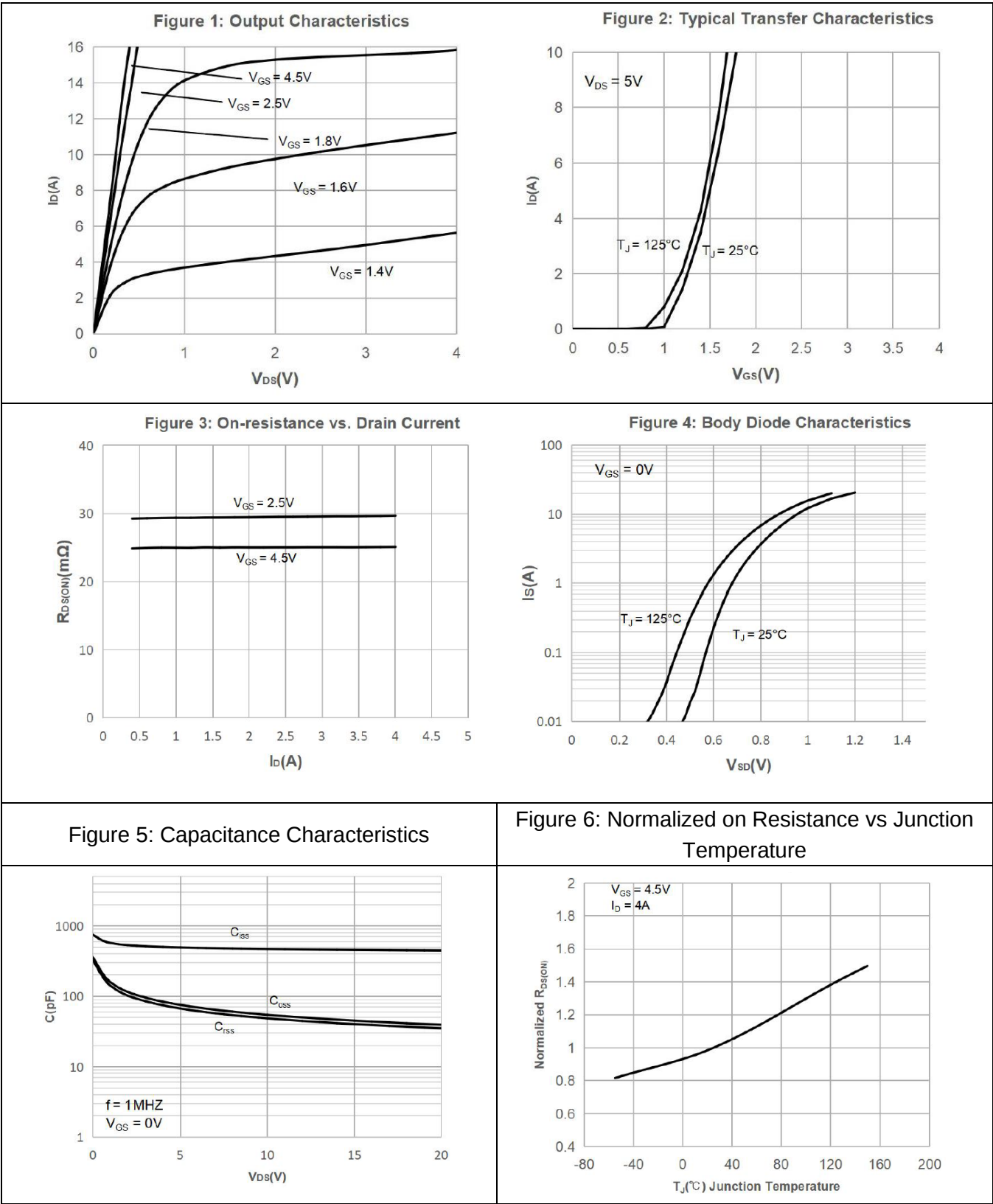
Single Operation				
Parameter	Symbol	Typical	Maximum	Unit
Junction-to-Ambient Thermal Resistance	$R_{\theta JA}$		106	$^{\circ}\text{C/W}$

Electrical Characteristics

At TA = 25°C unless otherwise specified

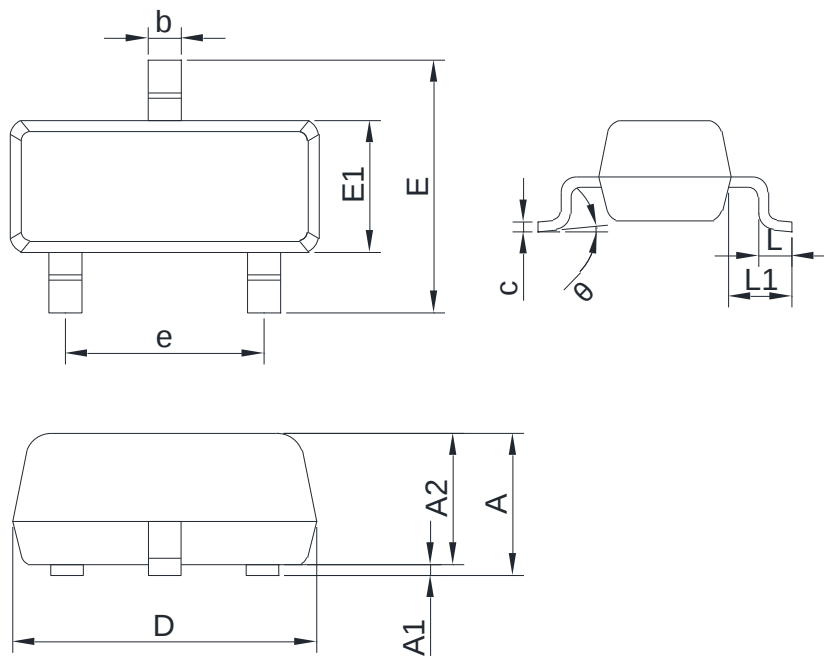
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250uA	20			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =20V, V _{GS} =0V			1	uA
Gate-to-source Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} =±12V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{GS} =V _{DS} , I _D =250uA	0.5	0.75	1.0	V
Drain-to-source On-resistance	R _{DS(on)}	V _{GS} =4.5V, I _D =4A		25	32	mΩ
		V _{GS} =2.5V, I _D =3A		29	38	
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C _{ISS}	V _{GS} =0V, f=1MHz, V _{DS} =10V		470		pF
Output Capacitance	C _{OSS}			55		
Reverse Transfer Capacitance	C _{RSS}			50		
Total Gate Charge	Q _{G(TOT)}	V _{GS} =4.5V, V _{DS} =10V, I _D =2A		6		nC
Gate-to-Source Charge	Q _{GS}			1		
Gate-to-Drain Charge	Q _{GD}			1.5		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	t _{d(ON)}	V _{GS} =4.5V, V _{DS} =10V, I _D =2A, R _G =3Ω		4		ns
Rise Time	t _r			13		
Turn-Off Delay Time	t _{d(OFF)}			65		
Fall Time	t _f			33		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V _{SD}	V _{GS} =0V, I _S =4A			1.5	V

7. Typical Characteristic



8. Dimension (SOT-23)

POD(Z)



COMMON DIMENSIONS CUNITS MEASURE=MILLIMETER					
SYMBOL	MIN	MAX	SYMBOL	MIN	MAX
A	0.90	1.20	E	2.25	2.55
A1	0.00	0.10	E1	1.20	1.40
A2	0.90	1.10	e	1.80	2.00
b	0.30	0.50	L	0.30	0.50
c	0.07	0.18	L1	0.475	0.625
D	2.80	3.04	θ	0°	8°

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