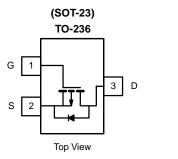
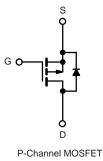


NCE2301AD-VB Datasheet

P-Channel 30 V (D-S) MOSFET

PRODUCT SUMMARY			
V _{DS} (V)	R _{DS(on)} (Ω) Typ.	I _D (A) ^a	Q _g (Typ.)
	0.046 at V _{GS} = - 10 V	- 5.6	
- 30	0.049 at V _{GS} = - 6 V	- 5	11.4 nC
	0.054 at V _{GS} = - 4.5 V	-4.5	





FEATURES

- TrenchFET[®] Power MOSFET
- 100 % R_g Tested



APPLICATIONS

- For Mobile Computing
 - Load Switch
 - Notebook Adaptor Switch
 - DC/DC Converter

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V _{DS}	- 30	V
Gate-Source Voltage		V _{GS}	± 20	
	T _C = 25 °C		- 5.6	
Continuous Drain Current (T. 150 °C)	T _C = 70 °C		- 5.1	
Continuous Drain Current ($T_J = 150 \ ^{\circ}C$)	T _A = 25 °C	I _D	- 5.4 ^{b,c}	
	T _A = 70 °C		- 4.3 ^{b,c}	А
Pulsed Drain Current (t = 100 µs)		I _{DM}	- 18	
Continous Source-Drain Diode Current	T _C = 25 °C		- 2.1	
	T _A = 25 °C	I _S	- 1 ^{b,c}	
Maximum Power Dissipation	T _C = 25 °C		2.5	
	T _C = 70 °C		1.6	14/
	T _A = 25 °C	P _D	1.25 ^{b,c}	W
	T _A = 70 °C	1	0.8 ^{b,c}	
Operating Junction and Storage Temperature Range		T _J , T _{stg}	- 55 to 150	°C

THERMAL RESISTANCE RATINGS Parameter Symbol Typical

Maximum Junction-to-Ambient^{b,d} $t \le 5 s$ $\mathsf{R}_{\mathsf{thJA}}$ 75 100 °C/W 40 Maximum Junction-to-Foot (Drain) 50 Steady State $\mathsf{R}_{\mathsf{thJF}}$

Notes:

a. Based on T_C = 25 °C.
b. Surface mounted on 1" x 1" FR4 board.

c. t = 5 s.

d. Maximum under steady state conditions is 166 °C/W.

Unit

Maximum

SPECIFICATIONS (T ₁ = 25 °C, unless otherwise noted)								
Parameter	Symbol	Test Conditions	Min.	Тур.	Max.	Unit		
Static					I.			
Drain-Source Breakdown Voltage	V _{DS}	$V_{GS} = 0 V, I_D = -250 \mu A$	- 30			V		
V _{DS} Temperature Coefficient	$\Delta V_{DS}/T_{J}$	1 050 11		- 19		1/100		
V _{GS(th)} Temperature Coefficient	$\Delta V_{GS(th)}/T_J$	Ι _D = - 250 μΑ		4		mV/°C		
Gate-Source Threshold Voltage	V _{GS(th)}	$V_{DS} = V_{GS}$, $I_D = -250 \ \mu A$	- 0.5		- 2.0	V		
Gate-Source Leakage	I _{GSS}	$V_{DS} = 0 V, V_{GS} = \pm 20 V$			± 100	nA		
	1	$V_{DS} = -30 \text{ V}, \text{ V}_{GS} = 0 \text{ V}$			- 1			
Zero Gate Voltage Drain Current	I _{DSS}	$V_{DS} = -30 \text{ V}, \text{ V}_{GS} = 0 \text{ V}, \text{ T}_{J} = 55 \text{ °C}$			- 5	μA		
On-State Drain Current ^a	I _{D(on)}	$V_{DS} \le$ - 5 V, V_{GS} = - 10 V	- 2.5			А		
		V _{GS} =- 10 V, I _D = - 4.4 A		0.046				
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} =- 6 V, I _D = - 4 A		0.049		Ω		
		V _{GS} =- 4.5 V, I _D = - 3.6 A		0.054				
Forward Transconductance ^a	g _{fs}	V _{DS} = - 15 V, I _D = - 3.4 A		18		S		
Dynamic ^b		•						
Input Capacitance	C _{iss}			1295		pF		
Output Capacitance	C _{oss}	V _{DS} = - 15 V, V _{GS} = 0 V, f = 1 MHz		150				
Reverse Transfer Capacitance	C _{rss}	1		130				
Total Cata Charge	0	V _{DS} = - 15 V, V _{GS} = - 10 V, I _D = - 5.4 A		24	36	20		
Total Gate Charge	Qg			11.4	17			
Gate-Source Charge	Q _{gs}	V_{DS} = - 15 V, V_{GS} = - 4.5 V, I_{D} = - 5.4 A		3.4		nC		
Gate-Drain Charge	Q _{gd}			3.8				
Gate Resistance	R _g	f = 1 MHz	1.5	7.7	15.4	Ω		
Turn-On Delay Time	t _{d(on)}			13	20			
Rise Time	t _r	V_{DD} = - 15 V, R_L = 3.5 Ω		4	8			
Turn-Off Delay Time	t _{d(off)}	$I_D\cong$ - 4.3 A, V_{GEN} = - 10 V, R_g = 1 Ω		38	57			
Fall Time	t _f			6	12	ns		
Turn-On Delay Time	t _{d(on)}			28	42	115		
Rise Time	t _r	V_{DD} = - 15 V, R_L = 3.5 Ω		16	24			
Turn-Off Delay Time	t _{d(off)}	$I_{D}\cong$ - 4.3 A, V_{GEN} = - 4.5 V, R_{g} = 1 Ω		30	45			
Fall Time	t _f			10	20			
Drain-Source Body Diode Characteristic				1				
Continuous Source-Drain Diode Current	۱ _S	T _C = 25 °C			- 2.1	A		
Pulse Diode Forward Current (t = $100 \mu s$)	I _{SM}				- 80			
Body Diode Voltage	V _{SD}	$I_{S} = -4.3 \text{ A}, V_{GS} = 0 \text{ V}$		- 0.8	- 1.2	V		
Body Diode Reverse Recovery Time	t _{rr}			15	23	ns		
Body Diode Reverse Recovery Charge	Q _{rr}	I _F = - 4.3 A, dl/dt = 100 A/µs, T _{.1} = 25 °C		7	14	nC		
Reverse Recovery Fall Time	t _a	· ····································		8		ns		
Reverse Recovery Rise Time	t _b			7				

Notes:

a. Pulse test; pulse width \leq 300 µs, duty cycle \leq 2 %.

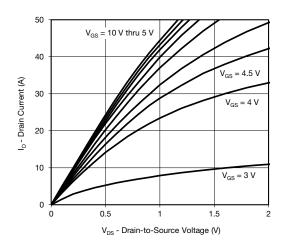
b. Guaranteed by design, not subject to production testing.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

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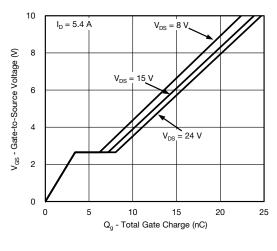




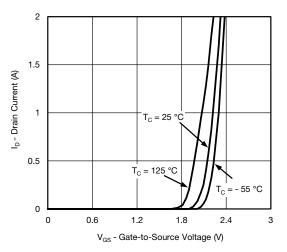
Output Characteristics



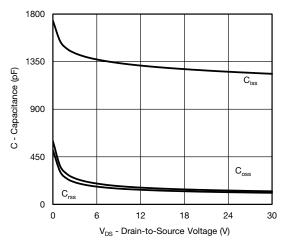
On-Resistance vs. Drain Current



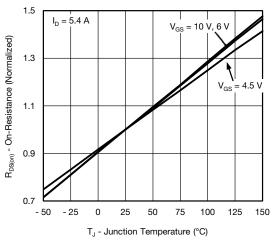
Gate Charge



Transfer Characteristics



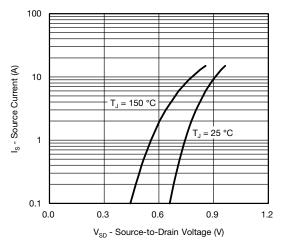




On-Resistance vs. Junction Temperature



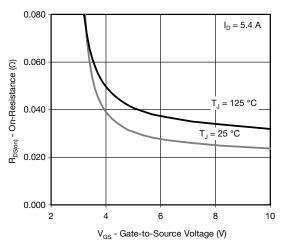




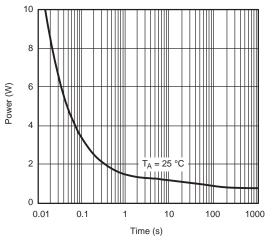
Source-Drain Diode Forward Voltage



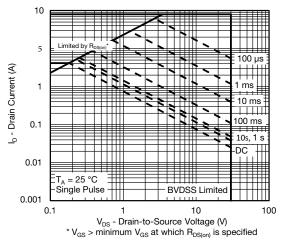




On-Resistance vs. Gate-to-Source Voltage



Single Pulse Power (Junction-to-Ambient)



Safe Operating Area, Junction-to-Ambient



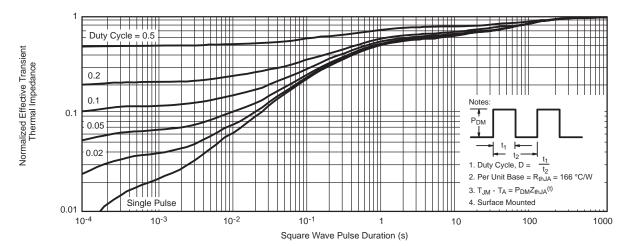
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



* The power dissipation P_D is based on $T_{J(max.)} = 150$ °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.



TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



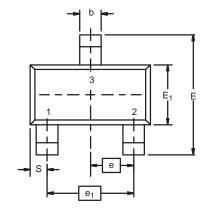
Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Foot



SOT-23 (TO-236): 3-LEAD



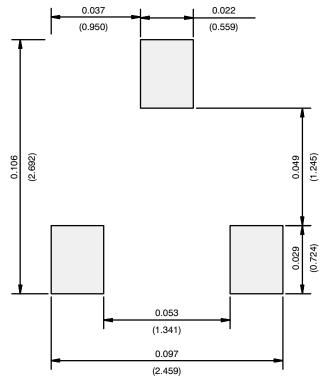




Dim -	MILLIMETERS		INCHES		
	Min	Max	Min	Мах	
Α	0.89	1.12	0.035	0.044	
A ₁	0.01	0.10	0.0004	0.004	
A ₂	0.88	1.02	0.0346	0.040	
b	0.35	0.50	0.014	0.020	
C	0.085	0.18	0.003	0.007	
D	2.80	3.04	0.110	0.120	
E	2.10	2.64	0.083	0.104	
E ₁	1.20	1.40	0.047	0.055	
е	0.95 BSC		0.0374 Ref		
e ₁	1.90 BSC		0.0748 Ref		
L	0.40	0.60	0.016	0.024	
L ₁	0.64 Ref		0.025 Ref		
S	0.50 Ref		0.020 Ref		
q	3°	8°	3°	8°	



RECOMMENDED MINIMUM PADS FOR SOT-23



Recommended Minimum Pads Dimensions in Inches/(mm)



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