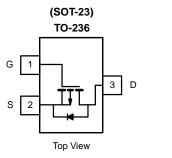


NCE3413-VB Datasheet

P-Channel 30 V (D-S) MOSFET

PRODUC	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	N/	
Gate-Source Voltage		V _{GS}	± 20	V	
	T _C = 25 °C		- 5.6		
Continuous Drain Content (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}		
	T _C = 25 °C		2.5		
Mauinum Daura Diasinatian	T _C = 70 °C		1.6	14/	
Maximum Power Dissipation	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 Maximum Junction-to-Ambient^{b,d} $t \le 5 s$ $\mathsf{R}_{\mathsf{thJA}}$ 75 100 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

°C/W

	3	® V	B	ser	ni
W١	ww.\	/Bs	sen	ni.co	om

Parameter	Symbol	Test Conditions	Min.	Тур.	Max.	Unit	
Static		·		•		•	
Drain-Source Breakdown Voltage	V _{DS}	$V_{GS} = 0 V, I_D = -250 \mu A$	- 30			V	
V_{DS} Temperature Coefficient ΔV_{DS}		- J I _D = - 250 μΑ		- 19			
V _{GS(th)} Temperature Coefficient	$\Delta V_{GS(th)}/T_J$	i _D = - 250 μA		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	
Zana Osta Malla na Daria Osmanl	I _{DSS}	$V_{DS} = -30 \text{ V}, \text{ V}_{GS} = 0 \text{ V}$			- 1	μA	
Zero Gate Voltage Drain Current		V _{DS} = - 30 V, V _{GS} = 0 V, T _J = 55 °C			- 5		
On-State Drain Current ^a	I _{D(on)}	$V_{DS} \le$ - 5 V, V_{GS} = - 10 V	- 2.5			Α	
		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	9 _{fs}	V _{DS} = - 15 V, I _D = - 3.4 A		18		S	
Dynamic ^b				Į	!	ļ	
Input Capacitance	C _{iss}			1295			
Output Capacitance	C _{oss}	V _{DS} = - 15 V, V _{GS} = 0 V, f = 1 MHz		150		pF	
Reverse Transfer Capacitance	C _{rss}			130			
	Q _g Q _{gs}	V _{DS} = - 15 V, V _{GS} = - 10 V, I _D = - 5.4 A		24	36		
Total Gate Charge				11.4	17	nC	
Gate-Source Charge		V _{DS} = - 15 V, V _{GS} = - 4.5 V, I _D = - 5.4 A		3.4			
Gate-Drain Charge	Q _{gd}			3.8			
Gate Resistance	Rg	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 _I = 3.5 Ω		4	8		
Turn-Off Delay Time	t _{d(off)}	$I_D \cong$ - 4.3 A, V_{GEN} = - 10 V, R_q = 1 Ω		38	57	-	
Fall Time	t _f			6	12		
Turn-On Delay Time	t _{d(on)}			28	42	ns	
Rise Time t _r		V _{DD} = - 15 V, R _I = 3.5 Ω		16	24	-	
Turn-Off Delay Time	t _{d(off)}	$I_D \cong -4.3 \text{ A}, \text{ V}_{\text{GEN}} = -4.5 \text{ V}, \text{ R}_{\text{q}} = 1 \Omega$		30	45		
Fall Time	t _f	Ť		10	20	1	
Drain-Source Body Diode Characteristic	•						
Continuous Source-Drain Diode Current	ا _S	T _C = 25 °C			- 2.1	Ι.	
Pulse Diode Forward Current (t = 100 µs)	I _{SM}				- 80	A	
Body Diode Voltage	V _{SD}	I _S = - 4.3 A, V _{GS} = 0 V		- 0.8	- 1.2	V	
Body Diode Reverse Recovery Time	t _{rr}			15	23	ns	
Body Diode Reverse Recovery Charge	Q _{rr}			7	14	nC	
Reverse Recovery Fall Time	ta	I _F = - 4.3 A, dl/dt = 100 A/µs, T _J = 25 °C		8			
Reverse Recovery Rise Time	t _b	1 F		7		ns	

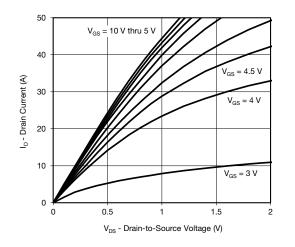
Notes:

a. Pulse test; pulse width \leq 300 $\mu s,$ duty cycle \leq 2 %.

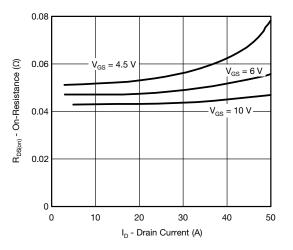
b. Guaranteed by design, not subject to production testing.

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.

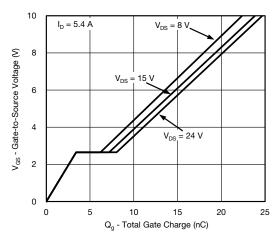




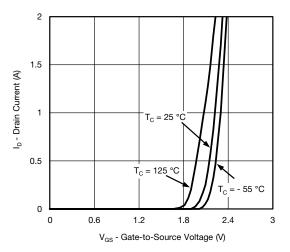




On-Resistance vs. Drain Current



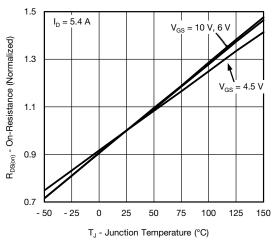
Gate Charge



Transfer Characteristics

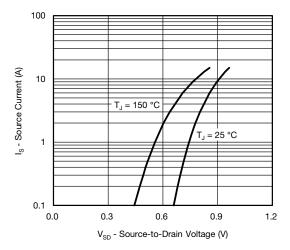


Capacitance

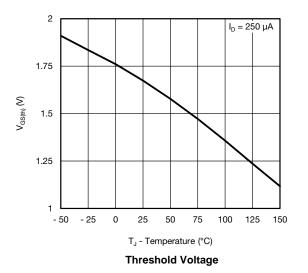


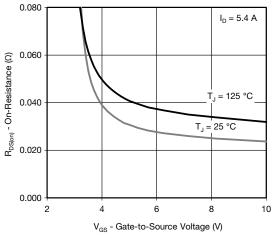
On-Resistance vs. Junction Temperature



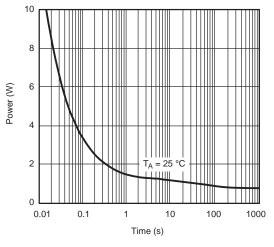




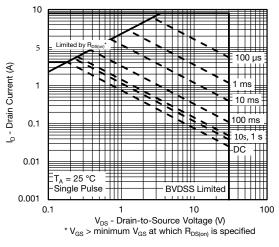




On-Resistance vs. Gate-to-Source Voltage

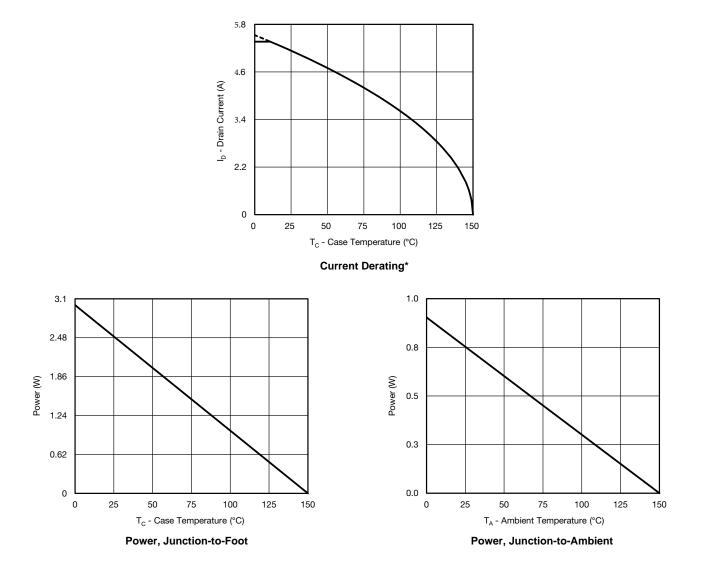


Single Pulse Power (Junction-to-Ambient)



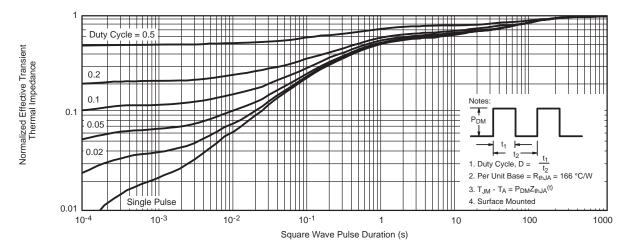
Safe Operating Area, Junction-to-Ambient





* 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.





Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Foot



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



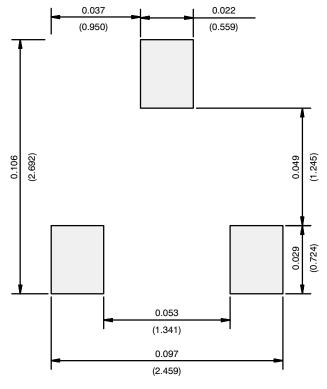




Dim	MILLIN	IETERS	INCHES		
	Min	Max	Min	Мах	
Α	0.89	1.12	0.035	0.044	
A ₁	0.01	0.10	0.0004	0.004	
A ₂	0.88	1.02	0.0346	0.040	
b	0.35	0.50	0.014	0.020	
C	0.085	0.18	0.003	0.007	
D	2.80	3.04	0.110	0.120	
E	2.10	2.64	0.083	0.104	
E ₁	1.20	1.40	0.047	0.055	
е	0.95 BSC		0.0374 Ref		
e ₁	1.90 BSC		0.0748 Ref		
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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