

XP131A0232SR-VB Datasheet

N-Channel 30-V (D-S) MOSFET

PRODUCT SUMMARY					
V _{DS} (V)	$R_{DS(on)}$ (Ω)	I _D (A) ^a	Q _g (Typ.)		
30	0.008 at V _{GS} = 10 V	13	6.1 nC		
30	0.011 at V _{GS} = 4.5 V	11	0.1110		

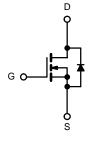
SO-8

FEATURES

- · Halogen-free
- Trench Power MOSFET
- Optimized for High-Side Synchronous Rectifier Operation
- 100 % R_g Tested
- 100 % UIS Tested

APPLICATIONS

- Notebook CPU Core
 - High-Side Switch



N-Channel MOSFET

3 1		8	D
S 2		7	D
S 3		6	D
G 4		5	D
_	Top View	,	

ABSOLUTE MAXIMUM RATINGS	S $T_A = 25 ^{\circ}C$, unles	s otherwise no	oted		
Parameter		Symbol	Limit	Unit	
Drain-Source Voltage		V_{DS}	30	V	
Gate-Source Voltage		V_{GS}	± 20		
	T _C = 25 °C		13		
Continuous Drain Current (T _{.1} = 150 °C)	T _C = 70 °C	ı_	10		
Continuous Diam Current (1) = 130 °C)	T _A = 25 °C	I _D	9 ^{b, c}		
	T _A = 70 °C	1	7 ^{b, c}		
Pulsed Drain Current		I _{DM}	45	A	
Ocationary Oceana Brain Binds Oceana	T _C = 25 °C	- I _S	3.7		
Continuous Source-Drain Diode Current	T _A = 25 °C		2.0 ^{b, c}		
Single Pulse Avalanche Current	L = 0.1 mH	I _{AS}	20		
Avalanche Energy	L = 0.1 IIII	E _{AS}	21	mJ	
	T _C = 25 °C		4.1		
Maximum Daylar Dissipation	T _C = 70 °C	D.	2.5	\	
Maximum Power Dissipation	T _A = 25 °C	P _D	2.2 ^{b, c}	W	
	T _A = 70 °C		1.3 ^{b, c}		
Operating Junction and Storage Temperature Ra	T _J , T _{stg}	- 55 to 150	°C		

THERMAL RESISTANCE RATINGS						
Parameter		Symbol	Typical	Maximum	Unit	
Maximum Junction-to-Ambient ^{b, d}	t ≤ 10 s	R _{thJA}	39	55	°C/W	
Maximum Junction-to-Foot (Drain)	Steady State	R _{thJF}	25	29	C/VV	

Notes:

- a. Base on $T_C = 25$ °C.
- b. Surface Mounted on 1" x 1" FR4 board.
- c. t = 10 s.
- d. Maximum under Steady State conditions is 85 °C/W.



SPECIFICATIONS $T_J = 25 ^{\circ}\text{C}$ Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit	
Static				.,,,,			
Drain-Source Breakdown Voltage	V _{DS}	$V_{GS} = 0 \text{ V}, I_{D} = 250 \mu\text{A}$	30			V	
V _{DS} Temperature Coefficient	$\Delta V_{DS}/T_{J}$			26		,	
V _{GS(th)} Temperature Coefficient	$\Delta V_{GS(th)}/T_J$	I _D = 250 μA		- 6		mV/°C	
Gate-Source Threshold Voltage	V _{GS(th)}	$V_{DS} = V_{GS}, I_{D} = 250 \mu\text{A}$	1.0		3.0	V	
Gate-Source Leakage	I _{GSS}	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 20 \text{ V}$			± 100	nA	
		V _{DS} = 30 V, V _{GS} = 0 V			1	_	
Zero Gate Voltage Drain Current	IDSS	V _{DS} = 30 V, V _{GS} = 0 V, T _J = 55 °C			10	μA	
On-State Drain Current ^a	I _{D(on)}	$V_{DS} \ge 5 \text{ V}, V_{GS} = 10 \text{ V}$	20			А	
_		V _{GS} = 10 V, I _D = 10 A		0.008		Ω	
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 4.5 V, I _D = 9 A		0.011			
Forward Transconductance ^a	9 _{fs}	V _{DS} = 15 V, I _D = 10 A		50		S	
Dynamic ^b				L		L	
Input Capacitance	C _{iss}			800			
Output Capacitance	C _{oss}	$V_{DS} = 15 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$		165		pF	
Reverse Transfer Capacitance	C _{rss}			73			
Total Cata Charms		V _{DS} = 15 V, V _{GS} = 10 V, I _D = 10 A		15	23	nC	
Total Gate Charge	Qg			6.8	10.2		
Gate-Source Charge	Q_{gs}	$V_{DS} = 15 \text{ V}, V_{GS} = 5 \text{ V}, I_{D} = 10 \text{ A}$		2.5			
Gate-Drain Charge	Q_{gd}			2.3			
Gate Resistance	R_g	f = 1 MHz	0.36	1.8	3.6	Ω	
Turn-On Delay Time	t _{d(on)}			16	23		
Rise Time	t _r	V_{DD} = 15 V, R_L = 1.4 Ω		12	16	1	
Turn-Off Delay Time	t _{d(off)}	$I_D \cong 9 \text{ A}, V_{GEN} = 4.5 \text{ V}, R_g = 1 \Omega$		16	22		
Fall Time	t _f			10	18]	
Turn-On Delay Time	t _{d(on)}			8	16	ns	
Rise Time	t _r	V_{DD} = 15 V, R_L = 1.4 Ω		10	20		
Turn-Off Delay Time	t _{d(off)}	$I_D\cong 9$ A, $V_{GEN}=10$ V, $R_g=1$ Ω		16	22		
Fall Time	t _f			8	15		
Drain-Source Body Diode Characterist	ics						
Continuous Source-Drain Diode Current	I _S	$T_C = 25 ^{\circ}C$			10		
Pulse Diode Forward Current ^a	I _{SM}				50	A	
Body Diode Voltage	V_{SD}	I _S = 9 A		0.8	1.2	V	
Body Diode Reverse Recovery Time	t _{rr}			15	30	ns	
Body Diode Reverse Recovery Charge	Q _{rr}	I _F = 9 A, dI/dt = 100 A/µs, T _{.I} = 25 °C		6	12	nC	
Reverse Recovery Fall Time	t _a	$i_F = 9 \text{ A}$, $ui/ui = 100 \text{ A/}\mu\text{s}$, $i_J = 25 \text{ °C}$		8			
Reverse Recovery Rise Time	t _b			7		ns	

Notes:

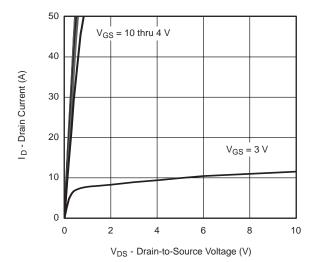
- a. Pulse test; pulse width $\leq 300~\mu s,$ duty cycle $\leq 2~\%.$
- b. Guaranteed by design, not subject to production testing.

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.

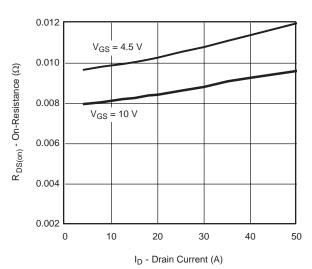


3.0

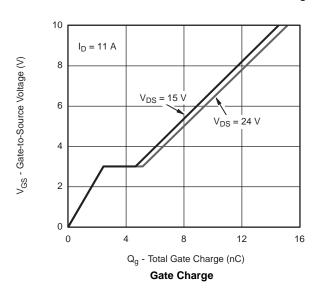
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Output Characteristics



On-Resistance vs. Drain Current and Gate Voltage



 $\begin{array}{c} 5 \\ 4 \\ \hline \\ T_{C} = -55 \, ^{\circ}\text{C} \\ \end{array}$

1.0

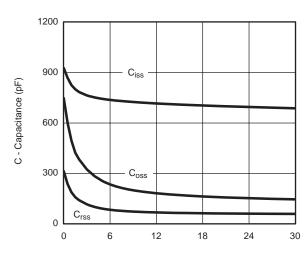
0.5

0.0

V_{GS} - Gate-to-Source Voltage (V)

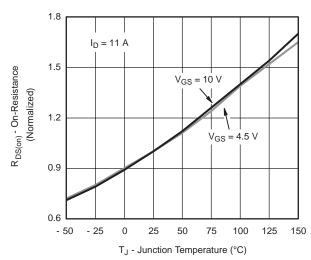
1.5

Transfer Characteristics



V_{DS} - Drain-to-Source Voltage (V)

Capacitance

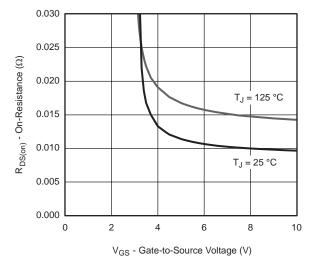


On-Resistance vs. Junction Temperature

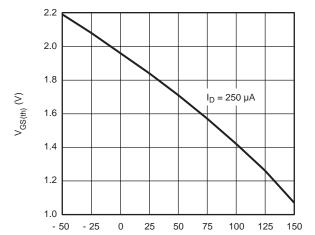


TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

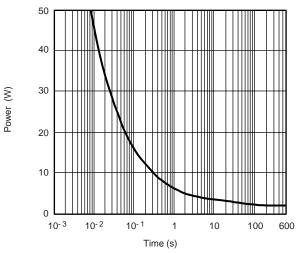




Source-Drain Diode Forward Voltage

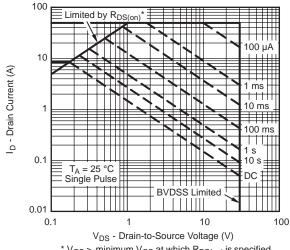


On-Resistance vs. Gate-to-Source Voltage



T_J - Temperature (°C) **Threshold Voltage**

Single Pulse Power, Junction-to-Ambient

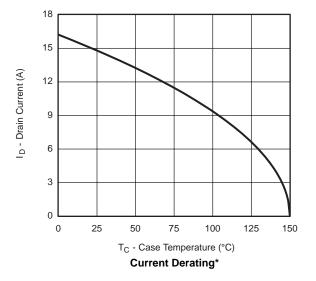


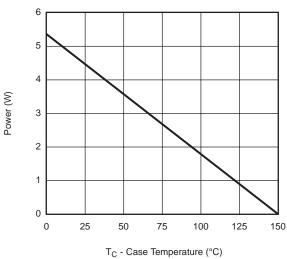
* V_{GS} > minimum V_{GS} at which $R_{DS(on)}$ is specified

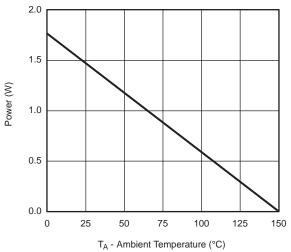
Safe Operating Area, Junction-to-Ambient



TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted







Power Derating, Junction-to-Foot Power Derating, Junction-to-Ambient

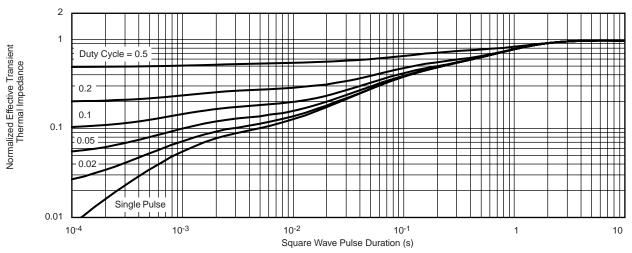
^{*} The power dissipation P_D is based on $T_{J(max)}$ = 150 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package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



TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



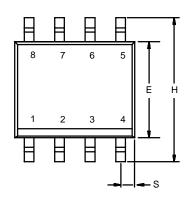
Normalized Thermal Transient Impedance, Junction-to-Ambient



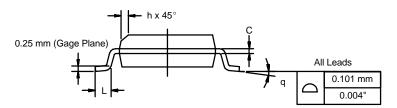
Normalized Thermal Transient Impedance, Junction-to-Foot



SOIC (NARROW): 8-LEAD





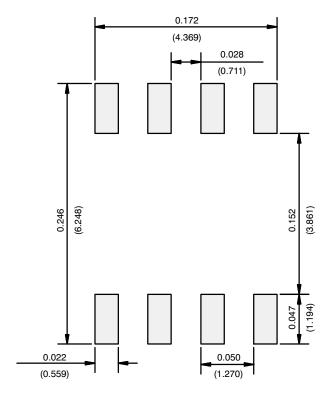


	MILLIMETERS		INC	HES	
DIM	Min	Max	Min	Max	
Α	1.35	1.75	0.053	0.069	
A ₁	0.10	0.20	0.004	0.008	
В	0.35	0.51	0.014	0.020	
С	0.19	0.25	0.0075	0.010	
D	4.80	5.00	0.189	0.196	
E	3.80	4.00	0.150	0.157	
е	1.27	1.27 BSC		BSC	
Н	5.80	6.20	0.228	0.244	
h	0.25	0.50	0.010	0.020	
L	0.50	0.93	0.020	0.037	
q	0°	8°	0°	8°	
S	0.44	0.64	0.018	0.026	
FCN: C-06527-Rev L 11-Sep-06					

ECN: C-06527-Rev. I, 11-Sep-06 DWG: 5498



RECOMMENDED MINIMUM PADS FOR SO-8



Recommended Minimum Pads Dimensions in Inches/(mm)



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