

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

PRODUCT SUMMARY						
V _{DS} (V)	$R_{DS(on)}(\Omega)$	I _D (A) ^a	Q _g (Typ.)			
30	0.004 at V _{GS} = 10 V	18	6.8 nC			
30	0.005 at V _{GS} = 4.5 V	16	0.0110			

SO-8

Top View

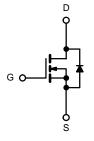
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FEATURES

- · Halogen-free
- TrenchFET® 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

ABSOLUTE MAXIMUM RATINGS	T _A = 25 °C, unles	s otherwise not	ted			
Parameter	Symbol	Limit	Unit			
Drain-Source Voltage	V _{DS}	30	V			
Gate-Source Voltage		V _{GS}	± 20	¬		
	T _C = 25 °C		18			
Continuous Drain Current (T _{.1} = 150 °C)	T _C = 70 °C		16			
Continuous Diain Current (1) = 150 °C)	T _A = 25 °C	I _D	15 ^{b, c}	1		
	T _A = 70 °C		13 ^{b, c}			
Pulsed Drain Current	I _{DM}	50	A			
Continuous Course Desir Die de Current	T _C = 25 °C		3.8	1		
Continuous Source-Drain Diode Current	T _A = 25 °C	l _S	2.1 ^{b, c}	1		
Single Pulse Avalanche Current	L = 0.1 mH	I _{AS}	22	1		
Avalanche Energy	L = 0.1 IIII	E _{AS}	24	mJ		
	T _C = 25 °C		4.5	10/		
Maximum Dawar Dissination	T _C = 70 °C	D	2.8			
Maximum Power Dissipation	T _A = 25 °C	P _D	2.5 ^{b, c}	- W		
	T _A = 70 °C		1.6 ^{b, c}	1		
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}	38	50	°C/W
Maximum Junction-to-Foot (Drain)	Steady State	R _{thJF}	22	28	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.



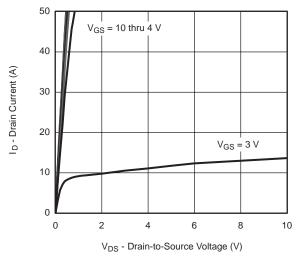
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Static Vps Vps Vps (Semperature Coefficient) Δ/ps (Fundamental Coefficient)	SPECIFICATIONS $T_J = 25 ^{\circ}\text{C}$ Parameter	Symbol	Test Conditions	Min.	Тур.	Max.	Unit	
Drain-Source Breakdown Voltage V _{DS} V _{GS} = 0 V, I _D = 250 μA 30 V V _{DS} Temperature Coefficient ΔV _{DS} (T) I _D = 250 μA 28 mV/r ^O C _{S(DI)} Temperature Coefficient ΛV _{DS} (T) I _D = 250 μA 1.0 3.0 V Gate-Source Threshold Voltage V _{OS} (T) V _{DS} = V _{OS} , I _D = 250 μA 1.0 3.0 V Gate-Source Leakage I _{GSS} V _{DS} = V _{OS} , I _D = 250 μA 1.0 3.0 V Zero Gate Voltage Drain Current I _{DSS} V _{DS} = 0V, V _{GS} = 20 V 1 μA On-State Drain Current ^a I-D(I _D) V _{DS} = 30 V, V _{GS} = 0 V 2 1.0 A On-State Drain Current ^a I-D(I _D) V _{DS} = 5V, V _{GS} = 10 V 20 A A On-State Brain Current ^a I-D(I _D) V _{DS} = 15 V, V _{DS} = 10 A 0.004 Ω Ω Or-State Brain Current ^a I-D(I _D) V _{DS} = 15 V, V _{DS} = 10 A 0.004 Ω Ω Ω Ω Ω S S S S S S S S S		Cymbol	rest conditions	141111.	l igh.	IVIGA.	Oint	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		V _{DS}	V _{GS} = 0 V, I _D = 250 μA	30			V	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$					28		mV/°C	
Gate-Source Threshold Voltage V _{GS} (th) V _{DS} = V _{GS} , I _D = 250 μA 1.0 3.0 V V _{DS} = Source Leakage I _{GSS} V _{DS} = 0 V, V _{GS} = 2 0 V ± 100 nA V _{DS} = Source Leakage I _{GSS} V _{DS} = 0 V, V _{GS} = 2 0 V ± 100 nA V _{DS} = 30 V, V _{GS} = 0 V V _{DS} = 30 V, V _{GS} = 0 V V _{DS} = 30 V, V _{GS} = 0 V V _{DS} = 30 V, V _{GS} = 0 V V _{DS} = 30 V, V _{GS} = 0 V V _{DS} = 30 V, V _{GS} = 0 V V _{DS} = 30 V, V _{GS} = 10 V V _{DS} = 30 V, V _{GS} = 10 V V _{DS} = 30 V, V _{GS} = 10 V V _{DS} = 55 °C V _{GS} = 10 V V _{DS} = 10 V, V _{DS} = 10 V V _{DS} = 10 V, V _{DS} = 10 V V _{DS} = 10 V,			$I_D = 250 \mu\text{A}$					
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		1	$V_{DS} = V_{GS}, I_D = 250 \mu A$	1.0		3.0	V	
Vos = 30 V, Vos = 0 V						1	nA	
DSS V _{DS} = 30 V, V _{GS} = 0 V, T _J = 55 °C 10		000				1		
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Zero Gate Voltage Drain Current	I _{DSS}			μA		μA	
Drain-Source On-State Resistance ^a R _{DS(on)} V _{GS} = 10 V, I _D = 11 A V _{GS} = 10 A V _{GS} = 10 A V _{GS} = 10 A V _{GS} = 15 V, I _D = 10 A V _{GS} = 15 V, I _D = 11 A V _{GS} = 10 A V _{GS} = 15 V, I _D = 11 A V _{GS} = 15 V, I _D = 11 A V _{GS} = 15 V, I _D = 11 A V _{GS} = 15 V, I _D = 11 A V _{GS} = 15 V, I _D = 11 A V _{GS} = 15 V, I _{GS} = 10 V, I _D = 11 A V _{GS} = 15 V, I _D = 15 V, I	On-State Drain Current ^a	I _{D(on)}		20			А	
Forward Transconductance a 9fs V _{DS} = 15 V, I _D = 11 A 52 S S			V _{GS} = 10 V, I _D = 11 A					
Promard Transconductance Promard Transconductance Promard	Drain-Source On-State Resistance ^a	R _{DS(on)}	55 5		0.005		Ω	
Dynamic Dyn	Forward Transconductance ^a	9 _{fs}	V _{DS} = 15 V, I _D = 11 A		52		S	
Input Capacitance C C S C C C C C C C	Dynamic ^b							
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Input Capacitance	C _{iss}			820		pF	
Reverse Transfer Capacitance C r _{rss} 73 75 75 75 75 75 75 75	Output Capacitance	+	$V_{DS} = 15 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$		195			
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Reverse Transfer Capacitance				73			
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Total Oats Observe		V _{DS} = 15 V, V _{GS} = 10 V, I _D = 11 A		15	23	0.2	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Total Gate Charge	Q _g	Q_{g}		6.8	10.2		
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Gate-Source Charge	Q_{gs}	$V_{DS} = 15 \text{ V}, V_{GS} = 5 \text{ V}, I_{D} = 11 \text{ A}$		2.5			
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Gate-Drain Charge	Q _{gd}			2.3			
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Gate Resistance	R _g	f = 1 MHz	0.36	1.8	3.6	Ω	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Turn-On Delay Time	t _{d(on)}			16	24		
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Rise Time	t _r	V_{DD} = 15 V, R_L = 1.4 Ω		12	18		
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Turn-Off Delay Time	t _{d(off)}	$I_D \cong 9 \text{ A}, V_{GEN} = 4.5 \text{ V}, R_g = 1 \Omega$		16	24		
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Fall Time	t _f			10	20	no	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Turn-On Delay Time	t _{d(on)}			8	16	115	
Fall Time t_f 8 15 Drain-Source Body Diode Characteristics Continuous Source-Drain Diode Current l_S $T_C = 25 ^{\circ}\text{C}$ 25 Pulse Diode Forward Current ^a l_{SM} 50 Body Diode Voltage l_{SD} $l_S = 9 ^{\circ}\text{A}$ 0.8 1.2 V Body Diode Reverse Recovery Time l_{Tr} 15 30 ns Body Diode Reverse Recovery Charge l_{F} $l_{F} = 9 ^{\circ}\text{A}$, $l_{F} = 25 ^{\circ}\text{C}$ 8	Rise Time	t _r	V_{DD} = 15 V, R_L = 1.4 Ω		10	20	- - -	
	Turn-Off Delay Time	t _{d(off)}	$I_D \cong 9 \text{ A}, V_{GEN} = 10 \text{ V}, R_g = 1 \Omega$		16	24		
Continuous Source-Drain Diode Current I_S $T_C = 25 ^{\circ}\text{C}$ 25 A Pulse Diode Forward Current I_S I_{SM} 50 Body Diode Voltage $I_S = 9 ^{\circ}\text{A}$ $0.8 ^{\circ}\text{A}$ $1.2 ^{\circ}\text{C}$ $1.2 ^{\circ}\text{C}$ Body Diode Reverse Recovery Time I_{rr} I_{rr} Body Diode Reverse Recovery Charge I_{rr} I_{rr	Fall Time	t _f			8	15		
Pulse Diode Forward Current ^a I_{SM} 50 Body Diode Voltage V_{SD} $I_{S} = 9$ A 0.8 1.2 V_{SD} Body Diode Reverse Recovery Time t_{rr} Body Diode Reverse Recovery Charge Q_{rr} Reverse Recovery Fall Time t_{a} $I_{F} = 9$ A, $dI/dt = 100$ A/ μ s, $T_{J} = 25$ °C V_{SD} V	Drain-Source Body Diode Characteris	ics						
Pulse Diode Forward Currenta I_{SM} 50Body Diode Voltage V_{SD} $I_S = 9 A$ 0.81.2 V Body Diode Reverse Recovery Time t_{rr} 1530nsBody Diode Reverse Recovery Charge Q_{rr} $I_F = 9 A$, $dI/dt = 100 A/\mu s$, $T_J = 25 °C$ 612nCReverse Recovery Fall Time t_a t_a t_a t_a t_a	Continuous Source-Drain Diode Current	I _S	$T_C = 25 ^{\circ}C$			25		
Body Diode Reverse Recovery Time t_{rr} Body Diode Reverse Recovery Charge Q_{rr} Reverse Recovery Fall Time t_a $I_F = 9 \text{ A, dl/dt} = 100 \text{ A/µs, T}_J = 25 \text{ °C}$ $15 30 \text{ns}$ $6 12 \text{nC}$ 8ns	Pulse Diode Forward Current ^a					50	^	
Body Diode Reverse Recovery Charge Q_{rr} Reverse Recovery Fall Time t_a $I_F = 9 \text{ A, dI/dt} = 100 \text{ A/µs, T}_J = 25 \text{ °C}$ $6 \qquad 12 \qquad \text{nC}$ $8 \qquad \text{ns}$	Body Diode Voltage	V_{SD}	I _S = 9 A		0.8	1.2	V	
Reverse Recovery Fall Time t _a	Body Diode Reverse Recovery Time	t _{rr}			15	30	ns	
Reverse Recovery Fall Time t _a	Body Diode Reverse Recovery Charge	Q _{rr}	L = 0 A dl/dt = 100 A/va T = 25 °C		6	12	nC	
Reverse Recovery Rise Time t _b ns	Reverse Recovery Fall Time		$_{1F} = 9 \text{ A}, \text{ u//ut} = 100 \text{ A/}\mu\text{s}, 1_{J} = 25 ^{3}\text{C}$		8		ns	
	Reverse Recovery Rise Time	t _b			7			

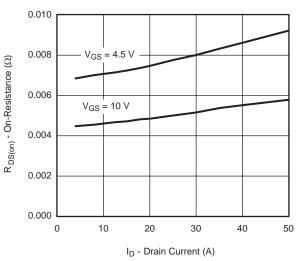
- a. Pulse test; pulse width $\leq 300~\mu s,$ duty cycle $\leq 2~\%.$ b. Guaranteed by design, not subject to production testing.

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.

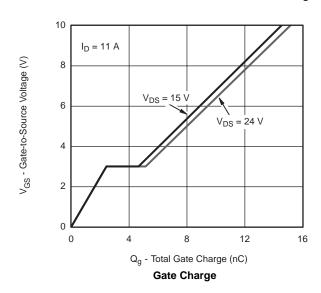




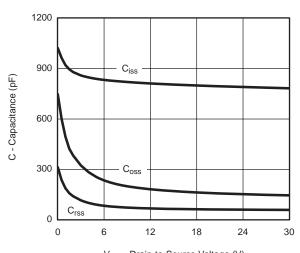
Output Characteristics



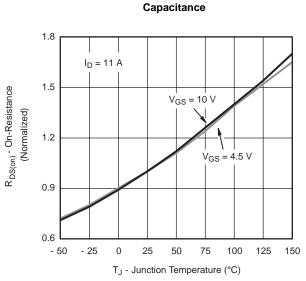
On-Resistance vs. Drain Current and Gate Voltage



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

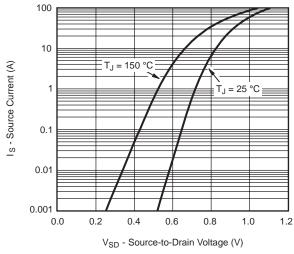


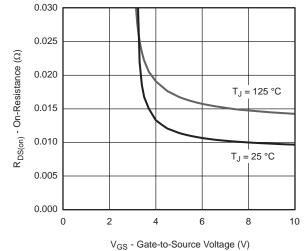
V_{DS} - Drain-to-Source Voltage (V)



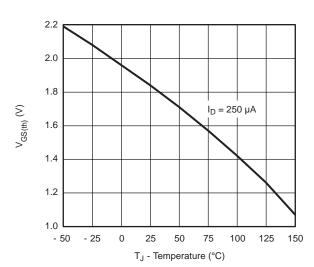
On-Resistance vs. Junction Temperature



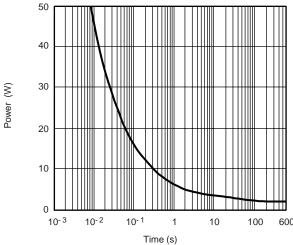




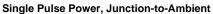
Source-Drain Diode Forward Voltage

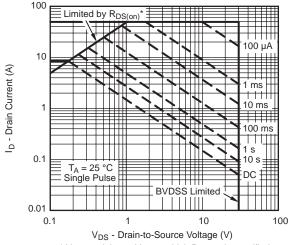


On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

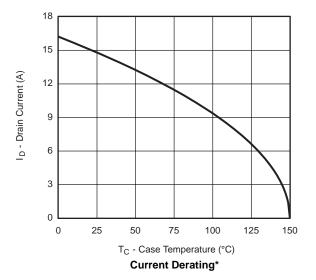


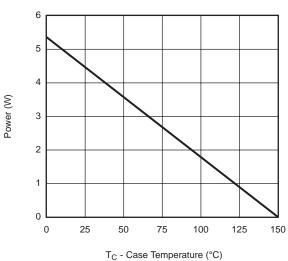


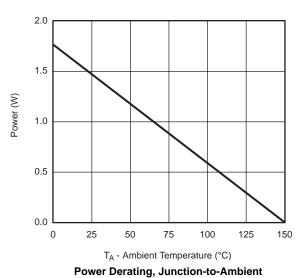
* V_{GS} > minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Ambient





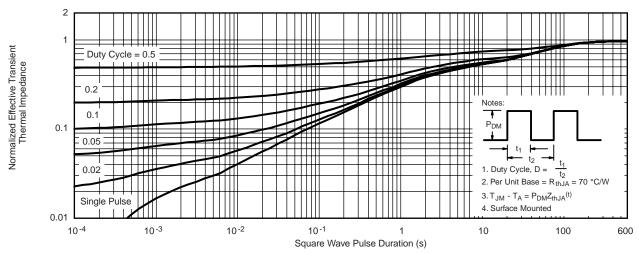




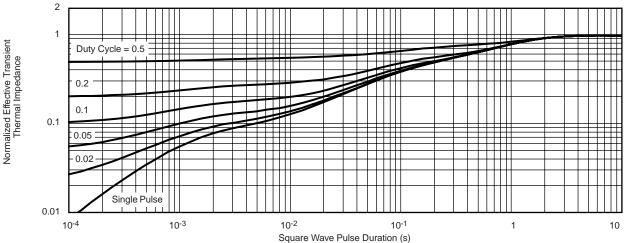
Power Derating, Junction-to-Foot

* 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

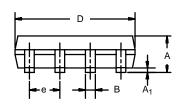


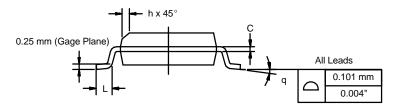
Normalized Thermal Transient Impedance, Junction-to-Foot



SOIC (NARROW): 8-LEADJEDEC Part Number: MS-012







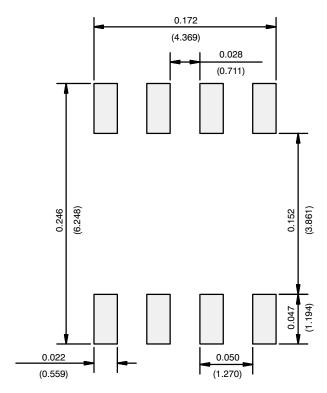
	MILLIM	IETERS	INCHES			
DIM	Min	Max	Min	Max		
Α	1.35	1.75	0.053	0.069		
A ₁	0.10	0.20	0.004	0.008		
В	0.35	0.51	0.014	0.020		
С	0.19	0.25	0.0075	0.010		
D	4.80	5.00	0.189	0.196		
E	3.80	4.00	0.150	0.157		
е	1.27 BSC		0.050	50 BSC		
Н	5.80	6.20	0.228	0.244		
h	0.25	0.50	0.010	0.020		
L	0.50	0.93	0.020	0.037		
q	0°	8°	0°	8°		
S	0.44	0.64	0.018	0.026		
ECN: C-06527-Rev I 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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