



P-Channel 20-V (D-S) MOSFET

PRODUCT SUMMARY						
V _{DS} (V)	$R_{DS(on)}\left(\Omega\right)$	I _D (A) ^d	Q _g (Typ.)			
- 20	0.0062 at V _{GS} = - 4.5 V	- 26.6	59 nC			
- 20	0.0105 at V _{GS} = - 2.5 V	- 20.6				

SO-8 S 1 8 D S 2 7 D S 3 6 D G 4 5 D

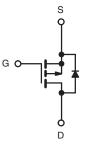
FEATURES

- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET® Power MOSFET
- 100 % R_g Tested
- 100 % UIS Tested
- Compliant to RoHS Directive 2002/95/EC

ROHS COMPLIANT HALOGEN FREE

APPLICATIONS

- Load Switch
- Adapter Switch
 - Notebook
 - Game Station



P-Channel MOSFET

Ordering Information: Si4477DY-T1-GE3 (Lead (Pb)-free and Halogen-free)

Top View

Parameter	Symbol	Limit	Unit		
Drain-Source Voltage	V _{DS}	- 20	V		
Gate-Source Voltage	V_{GS}	± 12	v		
	T _C = 25 °C		- 26.6		
Continuous Drain Current (T _J = 150 °C)	T _C = 70 °C		- 21.3		
Continuous Diain Curient (1) = 150 C)	T _A = 25 °C	l _D	- 18 ^{a, b}		
	T _A = 70 °C		- 14.5 ^{a, b}		
Pulsed Drain Current	I _{DM}	- 60	A		
	T _C = 25 °C		- 5.5		
Continuous Source-Drain Diode Current	T _A = 25 °C	ls —	- 2.5 ^{a, b}		
Avalanche Current	1 0.4 mal 1	I _{AS}	30		
Single-Pulse Avalanche Energy	L = 0.1 mH	E _{AS}	45	mJ	
	T _C = 25 °C		6.6		
Manipus Barres Biodestine	T _C = 70 °C	P _D	4.2		
Maximum Power Dissipation	T _A = 25 °C		3 ^{a, b}	W	
	T _A = 70 °C		1.95 ^{a, b}		
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 55 to 150	°C		

THERMAL RESISTANCE RATINGS						
Parameter		Symbol	Typical	Maximum	Unit	
Maximum Junction-to-Ambient ^{a, c}	t ≤ 10 s	R _{thJA}	34	41	°C/W	
Maximum Junction-to-Foot	Steady State	R_{thJF}	15	19	- C/W	

Notes

- a. Surface mounted on 1" x 1" FR4 board.
- b. t = 10 s.
- c. Maximum under Steady State conditions is 80 °C/W.
- d. Based on T_C = 25 °C.



Parameter	Symbol	Test Conditions	Min.	Тур.	Max.	Unit	
Static							
Drain-Source Breakdown Voltage	V _{DS}	$V_{GS} = 0 \text{ V}, I_D = -250 \mu\text{A}$	- 20			V	
V _{DS} Temperature Coefficient	$\Delta V_{DS}/T_{J}$	I _D = - 250 μA		- 13		m\//°C	
V _{GS(th)} Temperature Coefficient	$\Delta V_{GS(th)}/T_J$	I _D = - 250 μA		4.1		mV/°C	
Gate-Source Threshold Voltage	V _{GS(th)}	$V_{DS} = V_{GS}, I_{D} = -250 \mu A$	- 0.6		- 1.5	V	
Gate-Source Leakage	I _{GSS}	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 12 \text{ V}$			± 100	nA	
Zava Cata Valtaga Dvain Current	1	V _{DS} = - 20 V, V _{GS} = 0 V			- 1		
Zero Gate Voltage Drain Current	I _{DSS}	$V_{DS} = -20 \text{ V}, V_{GS} = 0 \text{ V}, T_{J} = 55 ^{\circ}\text{C}$			- 10	μΑ	
On-State Drain Current ^a	I _{D(on)}	$V_{DS} \ge -10 \text{ V}, V_{GS} = -4.5 \text{ V}$	- 30			Α	
	В	V _{GS} = - 4.5 V, I _D = - 18 A		0.0051	0.0062	Ω	
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = - 2.5 V, I _D = - 14 A		0.0085	0.0105		
Forward Transconductance ^a	9 _{fs}	V _{DS} = - 10 V, I _D = - 3.5 A		10		S	
Dynamic ^b				•			
Input Capacitance	C _{iss}			4600			
Output Capacitance	C _{oss}	V _{DS} = - 10 V, V _{GS} = 0 V, f = 1 MHz		980		pF	
Reverse Transfer Capacitance	C _{rss}	1		175			
Total Cata Chausa	0	$V_{DS} = -10 \text{ V}, V_{GS} = -10 \text{ V}, I_{D} = -18 \text{ A}$		125	190		
Total Gate Charge	Q_g		59	90			
Gate-Source Charge	Q_{gs}	$V_{DS} = -10 \text{ V}, V_{GS} = -4.5 \text{ V}, I_{D} = -18 \text{ A}$		10		nC	
Gate-Drain Charge	Q_{gd}]		19			
Gate Resistance	R_{g}	f = 1 MHz		1.3	2.6	Ω	
Turn-On Delay Time	t _{d(on)}			13	20		
Rise Time	t _r	V_{DD} = - 10 V, R_L = 10 Ω		10	20		
Turn-Off DelayTime	t _{d(off)}	$I_D \cong$ - 1 A, V_{GEN} = - 10 V, R_g = 1 Ω		100	150		
Fall Time	t _f	1		25	40		
Turn-On Delay Time	t _{d(on)}			42	60	ns	
Rise Time	t _r	V_{DD} = - 10 V, R_L = 10 Ω		42	60		
Turn-Off DelayTime	t _{d(off)}	$I_D \cong$ - 1 A, V_{GEN} = - 4.5 V, R_g = 1 Ω		100	150		
Fall Time	t _f			42	60		
Drain-Source Body Diode Characterist	tics						
Continous Source-Drain Diode Current	I _S	T _C = 25 °C			- 5.5	^	
Pulse Diode Forward Current	I _{SM}	-			- 60	Α	
Body Diode Voltage	V _{SD}	I _S = - 5 A, V _{GS} = 0 V		- 0.75	- 1.2	V	
Body Diode Reverse Recovery Time	t _{rr}	5 7 d3		42	60	ns	
Body Diode Reverse Recovery Charge	Q _{rr}]		40	60	nC	
Reverse Recovery Fall Time	t _a	$I_F = -3.5 \text{ A}, \text{ dI/dt} = 100 \text{ A/}\mu\text{s}, T_J = 25 ^{\circ}\text{C}$		20			
Reverse Recovery Rise Time	t _b			22		ns	

Notes:

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.

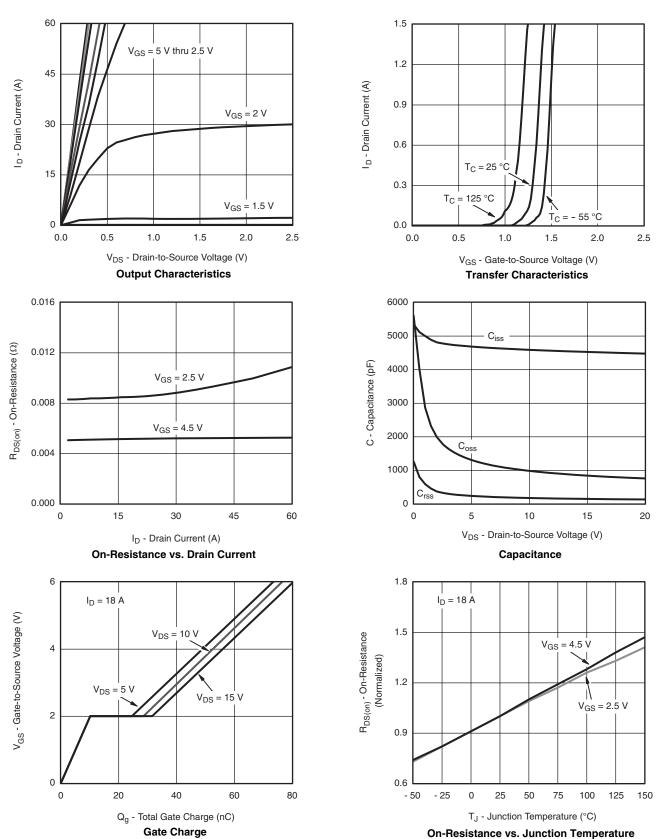
a. Pulse test; pulse width $\leq 300~\mu s,$ duty cycle $\leq 2~\%.$

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

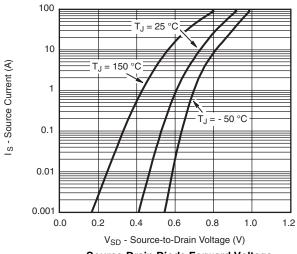




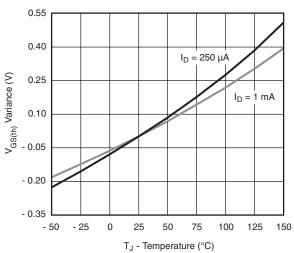
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



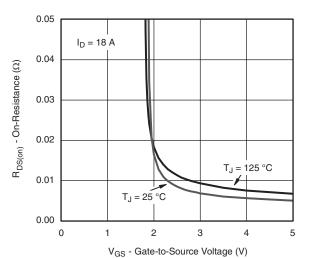
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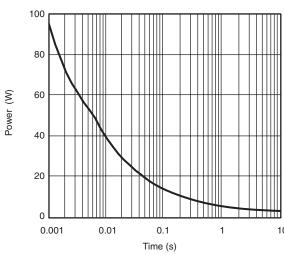
Source-Drain Diode Forward Voltage



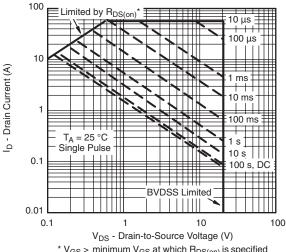
Threshold Voltage



On-Resistance vs. Gate-to-Source Voltage



Single Pulse Power, Junction-to-Ambient

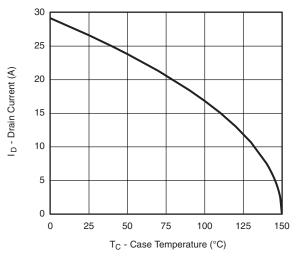


 * V_{GS} > minimum V_{GS} at which $R_{DS(on)}$ is specified

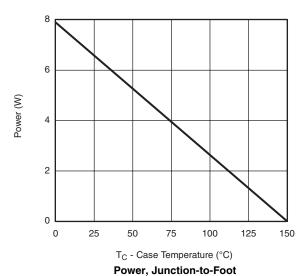
Safe Operating Area

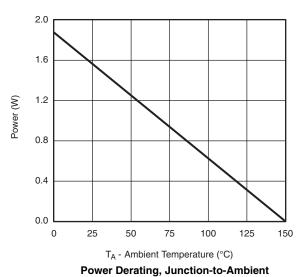


MOSFET TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Current Derating*

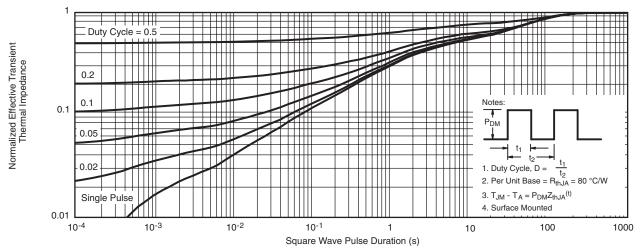




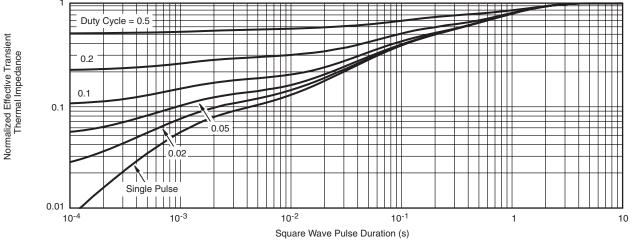
^{*} The power dissipation P_D is based on $T_{J(max)} = 150$ °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package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



TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Normalized Thermal Transient Impedance, Junction-to-Ambient

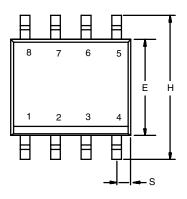


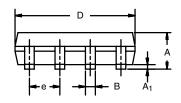
Normalized Thermal Transient Impedance, Junction-to-Foot

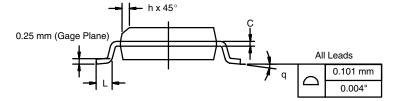
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SOIC (NARROW): 8-LEAD JEDEC Part Number: MS-012







	MILLIMETERS INCHES			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		
Е	3.80	4.00	0.150	0.157		
е	1.27	BSC	0.050 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						

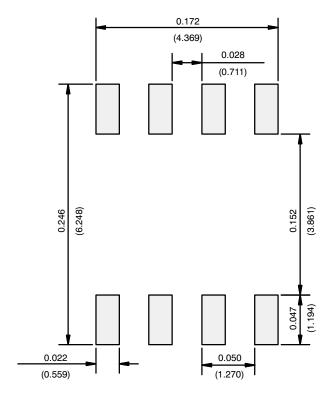
DWG: 5498

Document Number: 71192 www.vishay.com 11-Sep-06

APPLICATION NOTE



RECOMMENDED MINIMUM PADS FOR SO-8



Recommended Minimum Pads Dimensions in Inches/(mm)

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