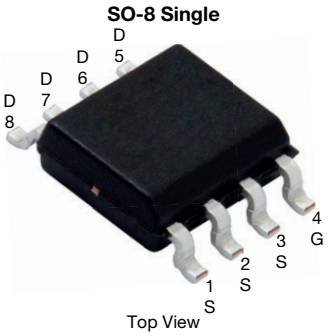
N-Channel 100 V (D-S) MOSFET



Top View

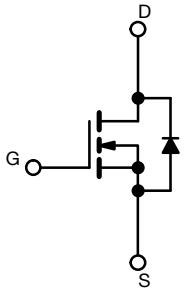
FEATURES

- TrenchFET® power MOSFET
- 100 % R_g and UIS tested
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

RoHS COMPLIANT
HALOGEN FREE

APPLICATIONS

- DC/DC primary side switch
- Telecom/server
- Industrial



N-Channel MOSFET

PRODUCT SUMMARY	
V_{DS} (V)	100
$R_{DS(on)}$ max. (Ω) at V_{GS} = 10 V	0.0088
$R_{DS(on)}$ max. (Ω) at V_{GS} = 7.5 V	0.0094
$R_{DS(on)}$ max. (Ω) at V_{GS} = 4.5 V	0.0120
Q_g typ. (nC)	20.7
I_D (A) [a]	18.4
Configuration	Single

ORDERING INFORMATION	
Package	SO-8
Lead (Pb)-free and halogen-free	Si4190ADY-T1-GE3

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C, unless otherwise noted)

PARAMETER		SYMBOL	LIMIT	UNIT
Drain-source voltage		V_{DS}	100	V
Gate-source voltage		V_{GS}	± 20	
Continuous drain current (T_J = 150 °C)	T_C = 25 °C	I_D	18.4	A
	T_C = 70 °C		14.6	
	T_A = 25 °C		13 [b, c]	
	T_A = 70 °C		10.3 [b, c]	
Pulsed drain current (t = 300 µs)		I_{DM}	70	
Continuous source-drain diode current	T_C = 25 °C	I_S	5.4	
	T_A = 25 °C		2.7 [b, c]	
Single pulse avalanche current	L = 0.1 mH	I_{AS}	30	
Avalanche energy		E_{AS}	45	mJ
Maximum power dissipation	T_C = 25 °C	P_D	6	W
	T_C = 70 °C		3.8	
	T_A = 25 °C		3 [b, c]	
	T_A = 70 °C		1.9 [b, c]	
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 [b, d]	t ≤ 10 s	R_{thJA}	33	42	°C/W
Maximum junction-to-foot (drain)	Steady state	R_{thJF}	16	21	

Notes

a. Based 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 °C, unless otherwise noted)						
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Static						
Drain-source breakdown voltage	V_{DS}	V_{GS} = 0 V, I_D = 250 µA	100	-	-	V
V_{DS} temperature coefficient	$\Delta V_{DS}/T_J$	I_D = 250 µA	-	64	-	mV/°C
$V_{GS(th)}$ temperature coefficient	$\Delta V_{GS(th)}/T_J$		-	-5.8	-	
Gate-source threshold voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA	1.5	-	2.8	V
Gate-source leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V	-	-	± 100	nA
Zero gate voltage drain current	I_{DSS}	V_{DS} = 100 V, V_{GS} = 0 V	-	-	1	µA
		V_{DS} = 100 V, V_{GS} = 0 V, T_J = 55 °C	-	-	10	
On-state drain current [a]	$I_{D(on)}$	$V_{DS} \geq$ 5 V, V_{GS} = 10 V	30	-	-	A
Drain-source on-state resistance [a]	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 15 A	-	0.0073	0.0088	Ω
		V_{GS} = 7.5 V, I_D = 12 A	-	0.0078	0.0094	
		V_{GS} = 4.5 V, I_D = 10 A	-	0.0096	0.0120	
Forward transconductance [a]	g_{fs}	V_{DS} = 15 V, I_D = 15 A	-	54	-	S
Dynamic [b]						
Input capacitance	C_{iss}	V_{DS} = 50 V, V_{GS} = 0 V, f = 1 MHz	-	1970	-	pF
Output capacitance	C_{oss}		-	695	-	
Reverse transfer capacitance	C_{rss}		-	62	-	
Total gate charge	Q_g	V_{DS} = 50 V, V_{GS} = 10 V, I_D = 10 A	-	44.4	67	nC
		V_{DS} = 50 V, V_{GS} = 4.5 V, I_D = 10 A	-	20.7	31	
Gate-source charge	Q_{gs}		-	6.1	-	
Gate-drain charge	Q_{gd}		-	9.1	-	
Output charge	Q_{oss}	V_{DS} = 50 V, V_{GS} = 0 V	-	56	85	
Gate resistance	R_g	f = 1 MHz	0.4	1.1	2.2	Ω
Turn-on delay time	$t_{d(on)}$	V_{DD} = 50 V, R_L = 5 Ω $I_D \cong$ 10 A, V_{GEN} = 7.5 V, R_g = 1 Ω	-	15	30	ns
Rise time	t_r		-	11	22	
Turn-off delay time	$t_{d(off)}$		-	31	60	
Fall time	t_f		-	10	20	
Turn-on delay time	$t_{d(on)}$	V_{DD} = 50 V, R_L = 5 Ω $I_D \cong$ 10 A, V_{GEN} = 10 V, R_g = 1 Ω	-	12	24	
Rise time	t_r		-	10	20	
Turn-off delay time	$t_{d(off)}$		-	34	65	
Fall time	t_f		-	10	20	
Drain-Source Body Diode Characteristics						
Continuous source-drain diode current	I_S	T_C = 25 °C	-	-	5.4	A
Pulse diode forward current [a]	I_{SM}		-	-	70	
Body diode voltage	V_{SD}	I_S = 5 A	-	0.76	1.1	V
Body diode reverse recovery time	t_{rr}	I_F = 10 A, di/dt = 100 A/µs, T_J = 25 °C	-	42	80	ns
Body diode reverse recovery charge	Q_{rr}		-	40	80	nC
Reverse recovery fall time	t_a		-	19	-	ns
Reverse recovery rise time	t_b		-	23	-	

Notes

a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 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.