

N-Channel 60 V (D-S) MOSFET



FEATURES

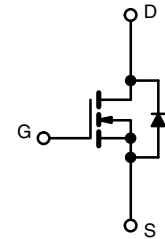
- TrenchFET® Gen IV power MOSFET
- Very low $R_{DS(on)}$ - Q_g figure-of-merit (FOM)
- Tuned for the lowest $R_{DS(on)}$ - Q_{oss} FOM
- 100 % R_g and UIS tested
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE

APPLICATIONS

- Synchronous rectification
- Primary side switch
- DC/DC converter
- Solar micro inverter
- Motor drive switch
- Battery and load switch
- Industrial



N-Channel MOSFET

PRODUCT SUMMARY

V_{DS} (V)	60
$R_{DS(on)}$ max. (Ω) at $V_{GS} = 10$ V	0.00175
$R_{DS(on)}$ max. (Ω) at $V_{GS} = 7.5$ V	0.00240
$R_{DS(on)}$ max. (Ω) at $V_{GS} = 6$ V	0.00340
Q_g typ. (nC)	42.5
I_D (A)	165
Configuration	Single

ORDERING INFORMATION

Package	PowerPAK SO-8
Lead (Pb)-free and halogen-free	SiR626ADP-T1-RE3

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

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-source voltage	V_{DS}	60	V
Gate-source voltage	V_{GS}	± 20	
Continuous drain current ($T_J = 150$ °C)	I_D	$T_C = 25$ °C	A
		$T_C = 70$ °C	
		$T_A = 25$ °C	
		$T_A = 70$ °C	
Pulsed drain current ($t = 100$ μ s)	I_{DM}	300	A
Continuous source-drain diode current	I_S	$T_C = 25$ °C	
		$T_A = 25$ °C	5.6 ^{b, c}
Single pulse avalanche current	I_{AS}	50	mJ
Single pulse avalanche energy	E_{AS}	125	
Maximum power dissipation	P_D	$T_C = 25$ °C	W
		$T_C = 70$ °C	
		$T_A = 25$ °C	
		$T_A = 70$ °C	
Operating junction and storage temperature range	T_J, T_{stg}	-55 to +150	°C
Soldering recommendations (peak temperature) ^c		260	

Notes

- Package limited
- Surface mounted on 1" x 1" FR4 board
- $t = 10$ s



THERMAL RESISTANCE RATINGS						
PARAMETER		SYMBOL	TYPICAL	MAXIMUM	UNIT	
Maximum junction-to-ambient ^a	$t \leq 10$ s	R_{thJA}	15	20	°C/W	
Maximum junction-to-case (drain)	Steady state	R_{thJC}	0.9	1.2		

Notes

a. Surface mounted on 1" x 1" FR4 board

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, $I_D = 250$ μ A	60	-	-	V	
V_{DS} temperature coefficient	$\Delta V_{DS}/T_J$	$I_D = 1$ mA	-	32	-	mV/°C	
$V_{GS(th)}$ temperature coefficient	$\Delta V_{GS(th)}/T_J$	$I_D = 250$ μ A	-	-7.8	-		
Gate-source threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250$ μ A	2	-	3.5	V	
Gate-source leakage	I_{GSS}	$V_{DS} = 0$ V, $V_{GS} = \pm 20$ V	-	-	100	nA	
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 60$ V, $V_{GS} = 0$ V	-	-	1	μ A	
		$V_{DS} = 60$ V, $V_{GS} = 0$ V, $T_J = 70$ °C	-	-	15		
On-state drain current ^a	$I_{D(on)}$	$V_{DS} \geq 10$ V, $V_{GS} = 10$ V	40	-	-	A	
Drain-source on-state resistance ^a	$R_{DS(on)}$	$V_{GS} = 10$ V, $I_D = 20$ A	-	0.00145	0.00175	Ω	
		$V_{GS} = 7.5$ V, $I_D = 20$ A	-	0.00190	0.00240		
		$V_{GS} = 6$ V, $I_D = 20$ A	-	0.00260	0.00340		
Forward transconductance ^a	g_{fs}	$V_{DS} = 15$ V, $I_D = 20$ A	-	84	-	S	
Dynamic ^b							
Input capacitance	C_{iss}	$V_{DS} = 30$ V, $V_{GS} = 0$ V, $f = 1$ MHz	-	3770	-	pF	
Output capacitance	C_{oss}		-	1370	-		
Reverse transfer capacitance	C_{rss}		-	40	-		
Total gate charge	Q_g	$V_{DS} = 30$ V, $V_{GS} = 10$ V, $I_D = 20$ A	-	55	83	nC	
Gate-source charge	Q_{gs}	$V_{DS} = 30$ V, $V_{GS} = 7.5$ V, $I_D = 20$ A	-	42.5	64		
Gate-drain charge	Q_{gd}		-	16.7	-		
Output charge	Q_{oss}		$V_{DS} = 30$ V, $V_{GS} = 0$ V	-	88.5		-
Gate resistance	R_g		$f = 1$ MHz	0.3	0.9		1.6
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 30$ V, $R_L = 1.5$ Ω , $I_D \cong 20$ A, $V_{GEN} = 10$ V, $R_g = 1$ Ω	-	16	32	ns	
Rise time	t_r		-	10	20		
Turn-off delay time	$t_{d(off)}$		-	30	60		
Fall time	t_f		-	10	20		
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 30$ V, $R_L = 1.5$ Ω , $I_D \cong 20$ A, $V_{GEN} = 7.5$ V, $R_g = 1$ Ω	-	20	40		
Rise time	t_r		-	20	40		
Turn-off delay time	$t_{d(off)}$		-	27	54		
Fall time	t_f		-	12	24		
Drain-Source Body Diode Characteristics							
Continuous source-drain diode current	I_S	$T_C = 25$ °C	-	-	100	A	
Pulse diode forward current	I_{SM}		-	-	300		
Body diode voltage	V_{SD}	$I_S = 5$ A, $V_{GS} = 0$ V	-	0.7	1.1	V	
Body diode reverse recovery time	t_{rr}	$I_F = 20$ A, $di/dt = 100$ A/ μ s, $T_J = 25$ °C	-	52	104	ns	
Body diode reverse recovery charge	Q_{rr}		-	50	100	nC	
Reverse recovery fall time	t_a		-	25	-	ns	
Reverse recovery rise time	t_b		-	27	-		

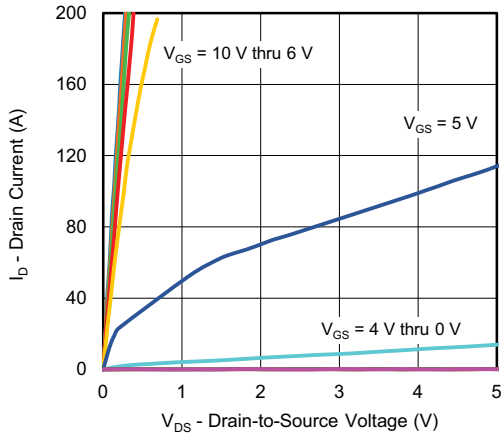
Notes

- a. Pulse test; pulse width ≤ 300 μ s, duty cycle ≤ 2 %
b. Guaranteed by design, not subject to production testing

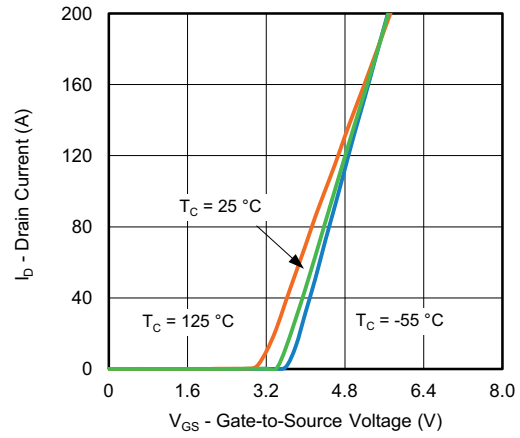
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.



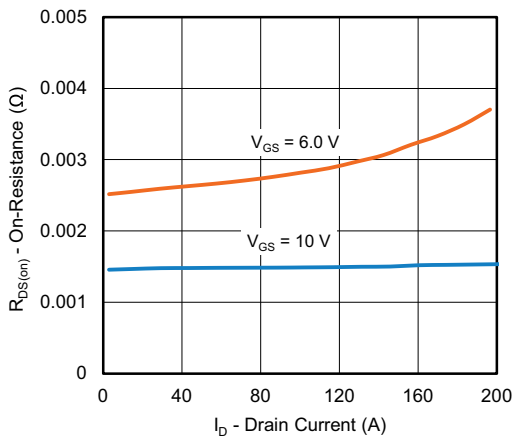
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



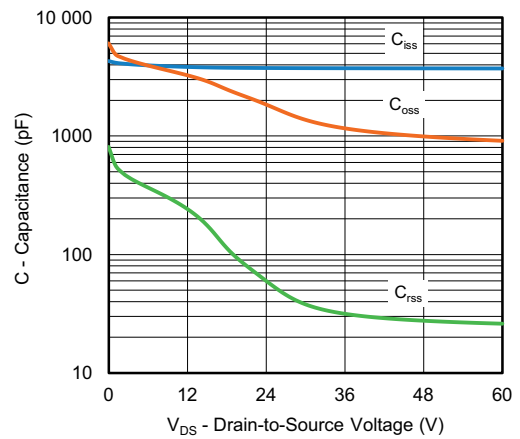
Output Characteristics



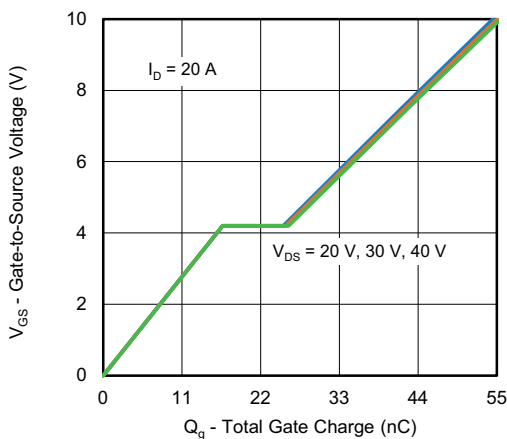
Transfer Characteristics



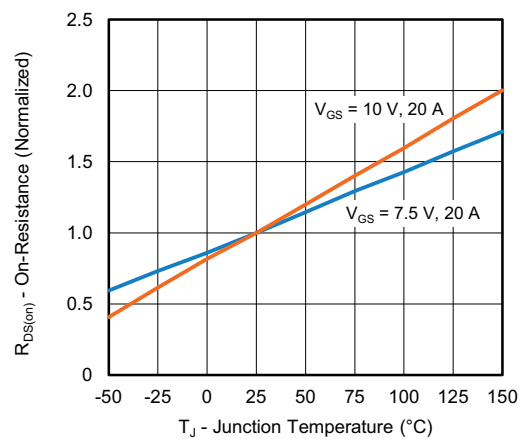
On-Resistance vs. Drain Current and Gate Voltage



Capacitance



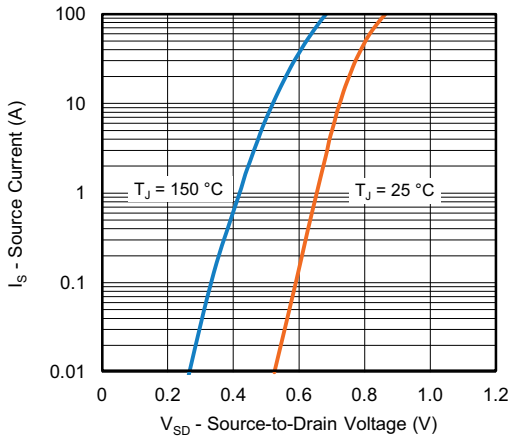
Gate Charge



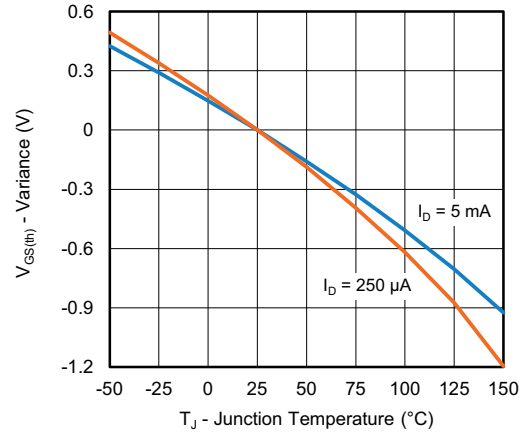
On-Resistance vs. Junction Temperature



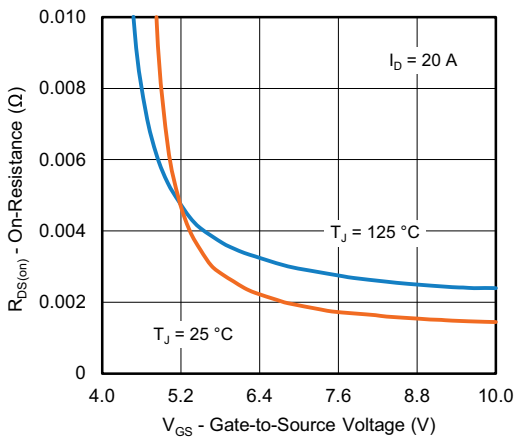
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



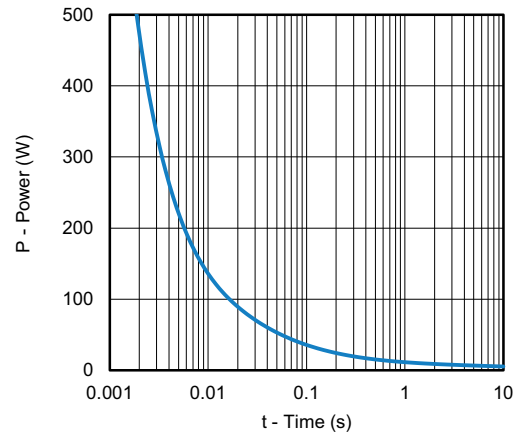
Source-Drain Diode Forward Voltage



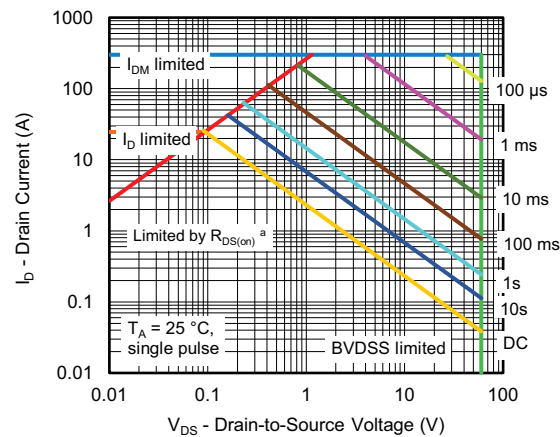
Threshold Voltage



On-Resistance vs. Gate-to-Source Voltage



Single Pulse Power, Junction-to-Ambient



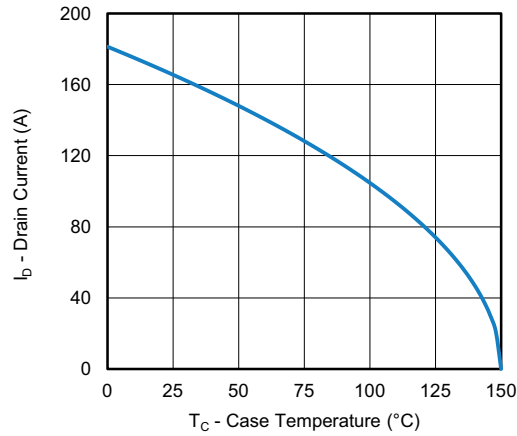
Safe Operating Area, Junction-to-Ambient

Note

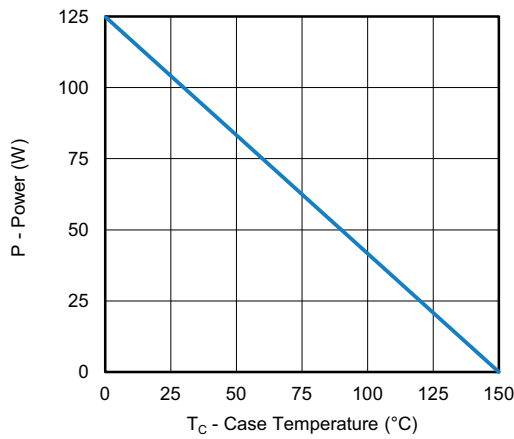
a. $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified



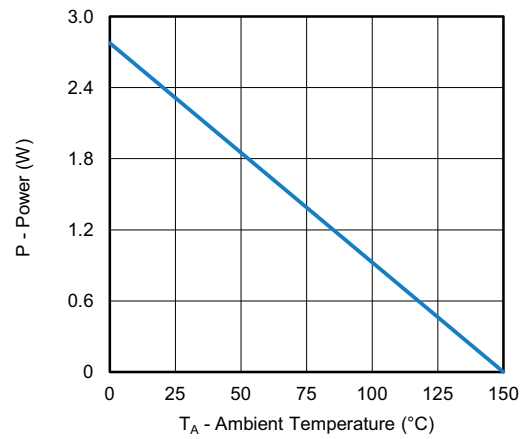
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Current Derating ^a



Power, Junction-to-Case



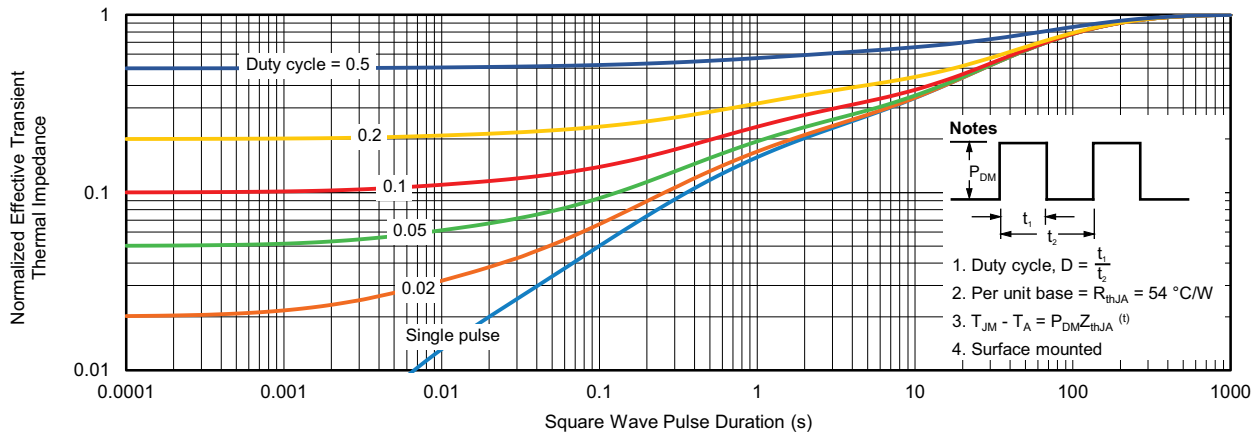
Power, Junction-to-Ambient

Note

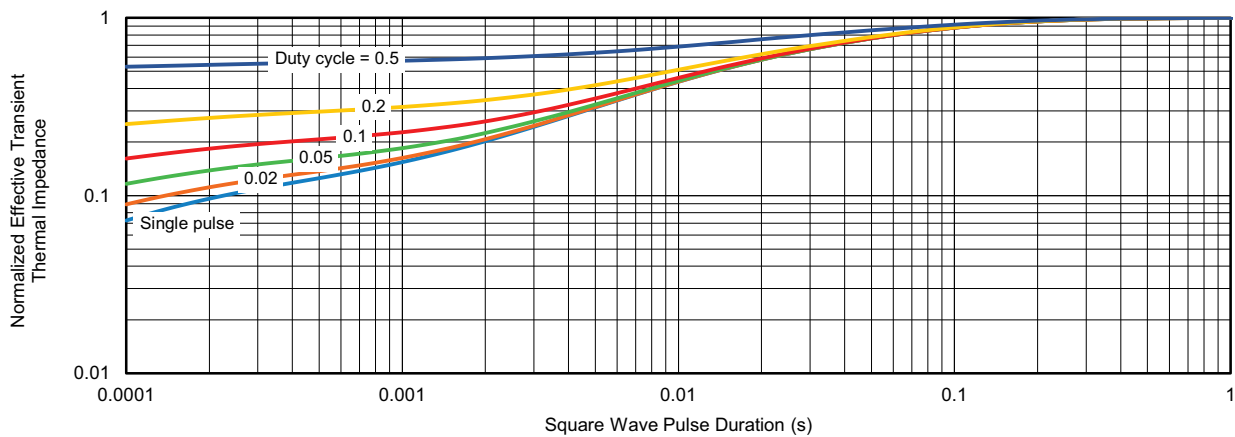
- a. The power dissipation P_D is based on T_J max. = 150 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit



TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

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PowerPAK[®] SO-8, (Single/Dual)



- Notes**
1. Inch will govern.
 2. Dimensions exclusive of mold gate burrs.
 3. Dimensions exclusive of mold flash and cutting burrs.

DIM.	MILLIMETERS			INCHES		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.97	1.04	1.12	0.038	0.041	0.044
A1		-	0.05	0	-	0.002
b	0.33	0.41	0.51	0.013	0.016	0.020
c	0.23	0.28	0.33	0.009	0.011	0.013
D	5.05	5.15	5.26	0.199	0.203	0.207
D1	4.80	4.90	5.00	0.189	0.193	0.197
D2	3.56	3.76	3.91	0.140	0.148	0.154
D3	1.32	1.50	1.68	0.052	0.059	0.066
D4	0.57 typ.			0.0225 typ.		
D5	3.98 typ.			0.157 typ.		
E	6.05	6.15	6.25	0.238	0.242	0.246
E1	5.79	5.89	5.99	0.228	0.232	0.236
E2	3.48	3.66	3.84	0.137	0.144	0.151
E3	3.68	3.78	3.91	0.145	0.149	0.154
E4	0.75 typ.			0.030 typ.		
e	1.27 BSC			0.050 BSC		
K	1.27 typ.			0.050 typ.		
K1	0.56	-	-	0.022	-	-
H	0.51	0.61	0.71	0.020	0.024	0.028
L	0.51	0.61	0.71	0.020	0.024	0.028
L1	0.06	0.13	0.20	0.002	0.005	0.008
θ	0°	-	12°	0°	-	12°
W	0.15	0.25	0.36	0.006	0.010	0.014
M	0.125 typ.			0.005 typ.		

ECN: S17-0173-Rev. L, 13-Feb-17
DWG: 5881

RECOMMENDED MINIMUM PADS FOR PowerPAK® SO-8 Single



Recommended Minimum Pads
Dimensions in Inches/(mm)

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