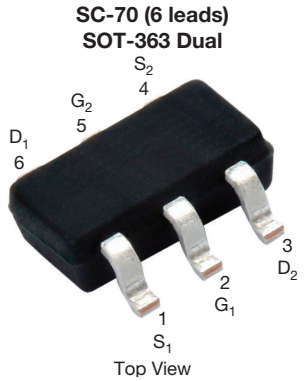
Dual N-Channel 20 V (D-S) MOSFET

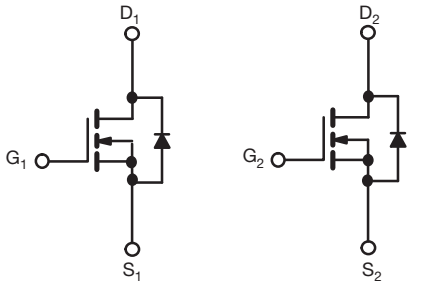


Marking Code: PA

FEATURES

- TrenchFET® power MOSFETs: 2.5 V rated
- 100% R_g tested
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free
RoHS COMPLIANT
HALOGEN FREE Available



PRODUCT SUMMARY	
V_{DS} (V)	20
$R_{DS(on)}$ max. (Ω) at V_{GS} = 4.5 V	0.385
$R_{DS(on)}$ max. (Ω) at V_{GS} = 2.5 V	0.630
Q_g typ. (nC)	0.8
I_D (A) [f]	0.70
Configuration	Dual

ORDERING INFORMATION	
Package	SC-70
Lead (Pb)-free with Tape and Reel	Si1902DL-T1-E3
Lead (Pb)-free and halogen-free	Si1902DL-T1-GE3

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

PARAMETER		SYMBOL	LIMIT	UNIT
Drain-source voltage		V_{DS}	20	V
Gate-source voltage		V_{GS}	± 12	
Continuous drain current (T_J = 150 °C) [a]	T_A = 25 °C	I_D	0.66	A
	T_A = 85 °C		0.48	
Pulsed drain current		I_{DM}	1	
Continuous source current (diode conduction) [a]		I_S	0.23	
Maximum power dissipation [a]	T_A = 25 °C	P_D	0.27	W
	T_A = 85 °C		0.14	
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]	t ≤ 5 s	R_{thJA}	360	415	°C/W
	Steady state		400	460	
Maximum junction-to-foot (drain)	Steady state	R_{thJF}	300	350	

Note

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						
Gate threshold voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA	0.6	-	1.5	V
Gate-body leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±12 V	-	-	±100	nA
Zero gate voltage drain current	I_{DSS}	V_{DS} = 16 V, V_{GS} = 0 V	-	-	1	µA
		V_{DS} = 16 V_{GS} = 0 V, T_J = 85°C	-	-	5	
On-state drain current [a]	$I_{D(on)}$	V_{DS} ³ 5 V, V_{GS} = 4.5 V	1	-	-	A
Drain-source on-state resistance [a]	$R_{DS(on)}$	V_{GS} = 4.5 V, I_D = 0.66 A	-	0.320	0.385	Ω
		V_{GS} = 2.5 V, I_D = 0.40 A	-	0.560	0.630	
Forward transconductance [a]	g_{fs}	V_{DS} = 10 V, I_D = 0.66 A	-	1.5	-	S
Diode forward voltage [a]	V_{SD}	I_S = 0.23 A, V_{GS} = 0 V	-	0.8	1.2	V
Dynamic [b]						
Total gate charge	Q_g	V_{DS} = 10 V, V_{GS} = 4.5 V, I_D = 0.66 A	-	0.8	1.2	nC
Gate-source charge	Q_{gs}		-	0.06	-	
Gate-drain charge	Q_{gd}		-	0.30	-	
Gate resistance	R_g	f = 1 MHz	0.2	1	1.7	Ω
Turn-on delay time	$t_{d(on)}$	V_{DD} = 10 V, R_L = 20 Ω I_D ≅ 0.5 A, V_{GEN} = 4.5 V, R_g = 6 Ω	-	10	20	ns
Rise time	t_r		-	16	30	
Turn-off delay time	$t_{d(off)}$		-	10	20	
Fall time	t_f		-	10	20	
Source-drain reverse recovery time	t_{rr}	I_F = 0.23 A, dI/dt = 100 A/µs	-	20	40	

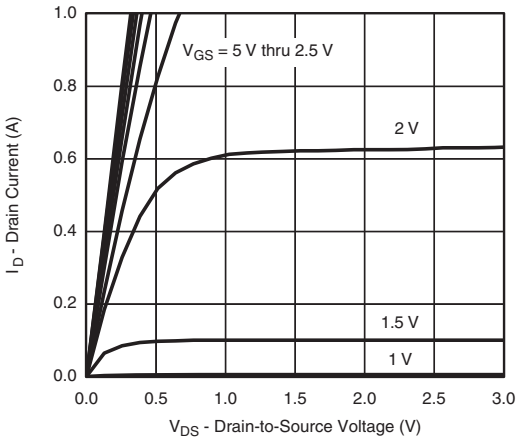
Notes

a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2%

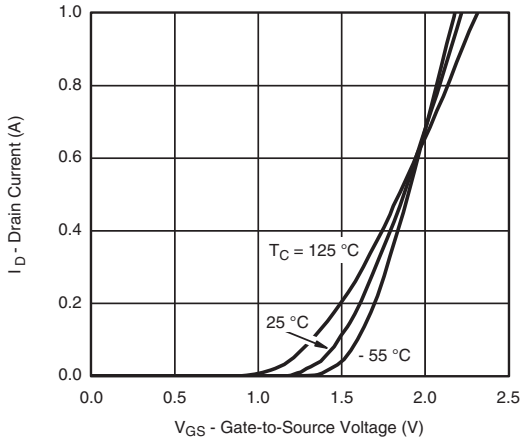
b. Guaranteed by design, not subject to production testing

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.

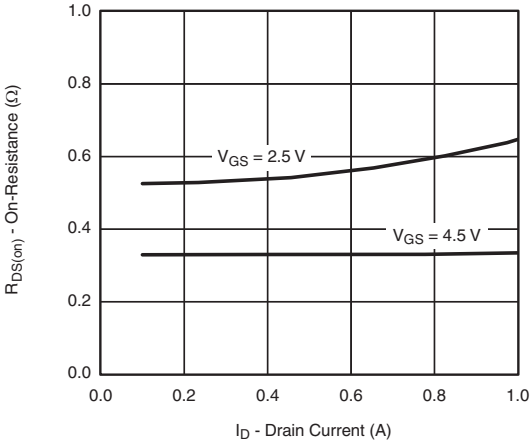
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



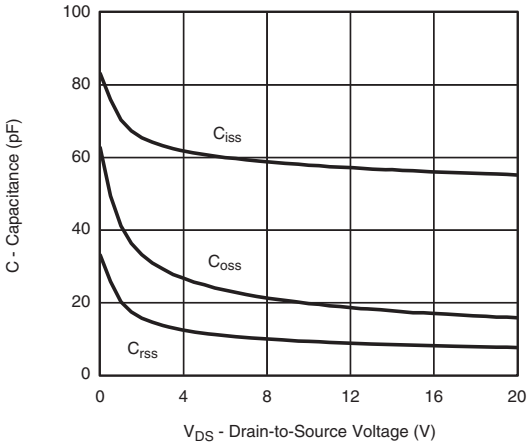
Output Characteristics



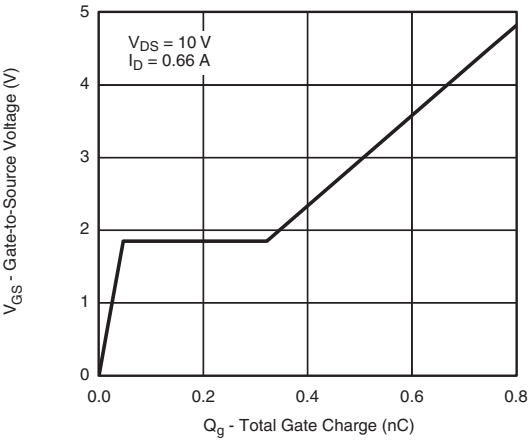
Transfer Characteristics



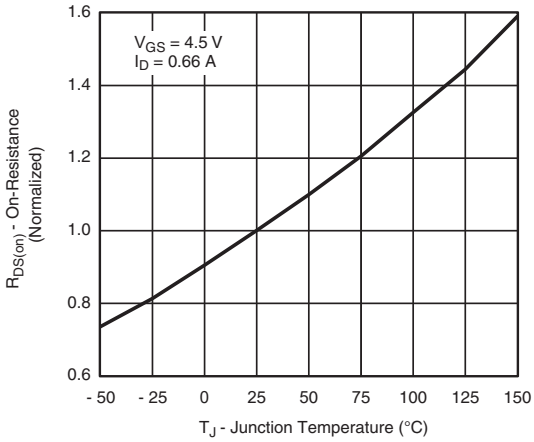
On-Resistance vs. Drain Current



Capacitance

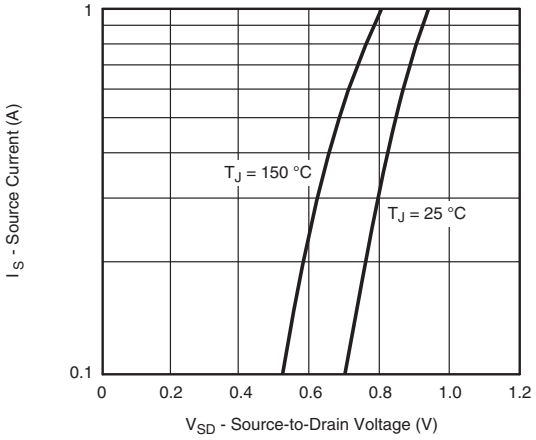


Gate Charge

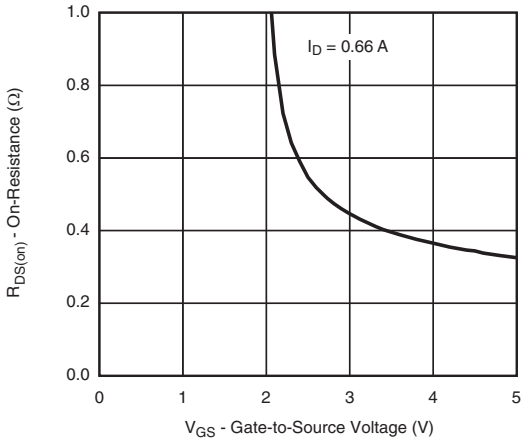


On-Resistance vs. Junction Temperature

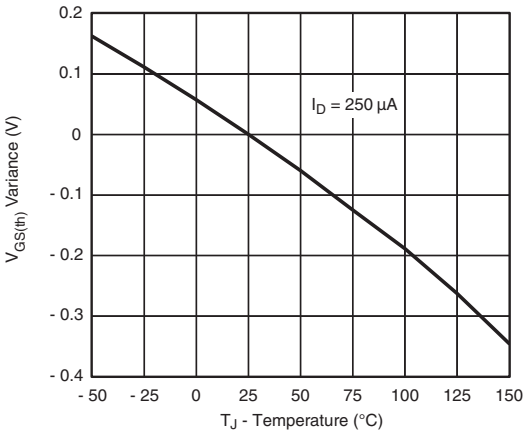
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



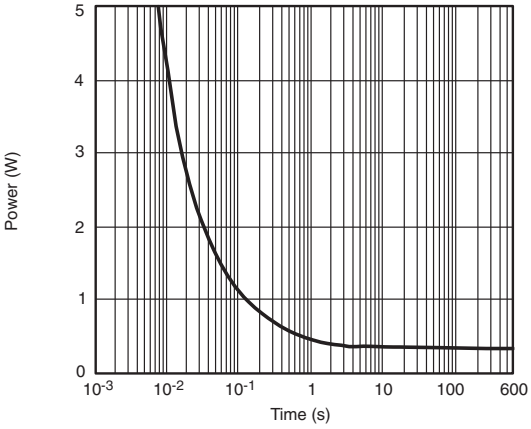
Surge-Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage

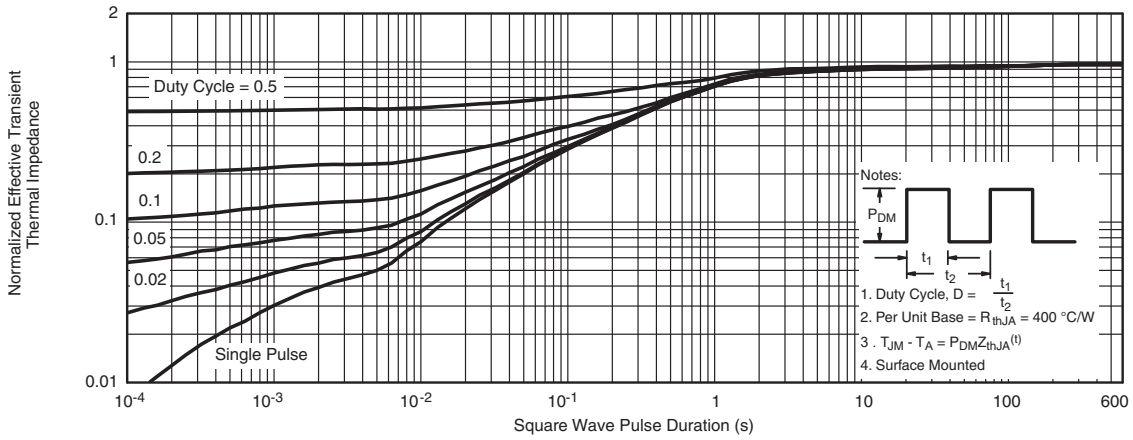


Threshold Voltage

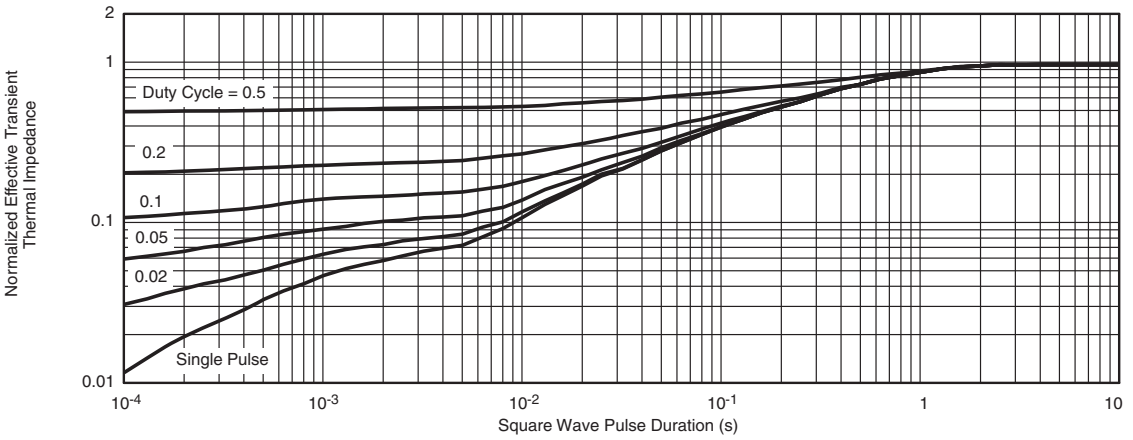


Single Pulse Power, Junction-to-Ambient

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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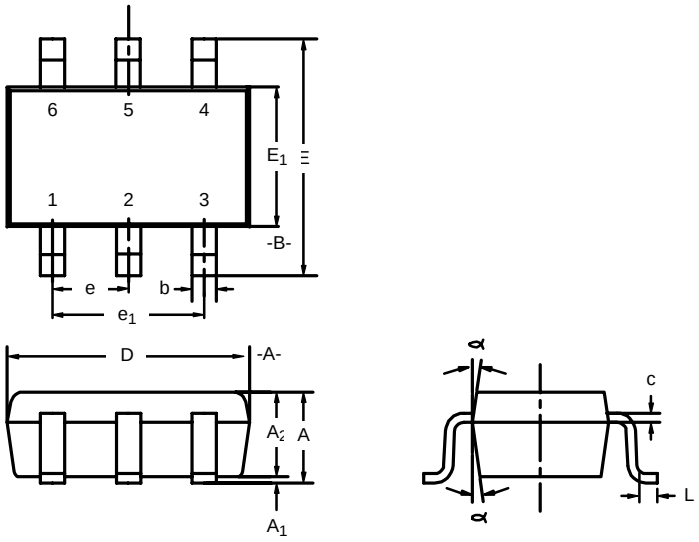
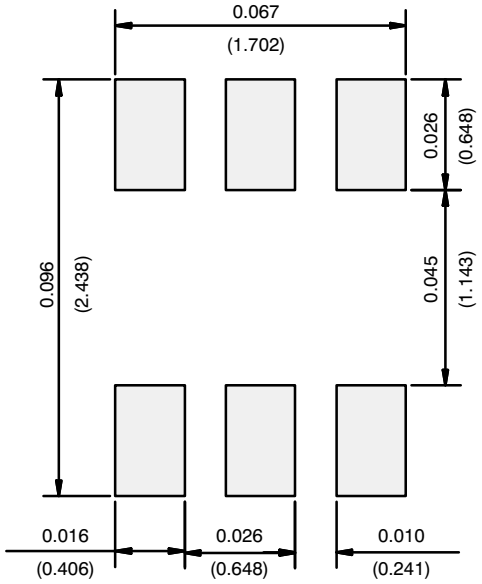
SC-70: 6-LEADS



Dim	MILLIMETERS			INCHES		
	Min	Nom	Max	Min	Nom	Max
A	0.90	–	1.10	0.035	–	0.043
A_1	–	–	0.10	–	–	0.004
A_2	0.80	–	1.00	0.031	–	0.039
b	0.15	–	0.30	0.006	–	0.012
c	0.10	–	0.25	0.004	–	0.010
D	1.80	2.00	2.20	0.071	0.079	0.087
E	1.80	2.10	2.40	0.071	0.083	0.094
E_1	1.15	1.25	1.35	0.045	0.049	0.053
e	0.65BSC			0.026BSC		
e_1	1.20	1.30	1.40	0.047	0.051	0.055
L	0.10	0.20	0.30	0.004	0.008	0.012
α	7°Nom			7°Nom		

ECN: S-03946—Rev. B, 09-Jul-01
DWG: 5550

RECOMMENDED MINIMUM PADS FOR SC-70: 6-Lead



Recommended Minimum Pads
Dimensions in Inches/(mm)

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