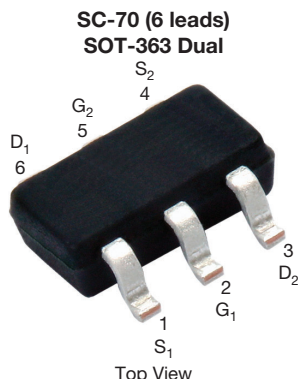


Dual N-Channel 20 V (D-S) MOSFET



Marking Code: PA

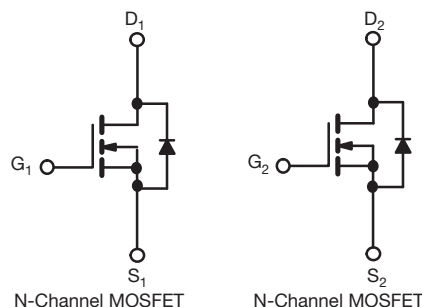
PRODUCT SUMMARY	
V_{DS} (V)	20
$R_{DS(on)}$ max. (Ω) at $V_{GS} = 4.5$ V	0.385
$R_{DS(on)}$ max. (Ω) at $V_{GS} = 2.5$ V	0.630
Q_g typ. (nC)	0.8
I_D (A) ^f	0.70
Configuration	Dual

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



RoHS
COMPLIANT
HALOGEN
FREE
Available



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	W
Maximum power dissipation ^a	$T_A = 25$ °C	P_D	0.27	
	$T_A = 85$ °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	$t \leq 5$ s	R_{thJA}	360	415	°C/W
	Steady state		400	460	
Maximum junction-to-foot (drain)		R_{thJF}	300	350	

Note

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



SPECIFICATIONS ($T_J = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static						
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\text{ }\mu\text{A}$	0.6	-	1.5	V
Gate-body leakage	I_{GSS}	$V_{DS} = 0\text{ V}$, $V_{GS} = \pm 12\text{ V}$	-	-	± 100	nA
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 16\text{ V}$, $V_{GS} = 0\text{ V}$	-	-	1	μA
		$V_{DS} = 16\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 85^{\circ}\text{C}$	-	-	5	
On-state drain current ^a	$I_{D(on)}$	$V_{DS} = 5\text{ V}$, $V_{GS} = 4.5\text{ V}$	1	-	-	A
Drain-source on-state resistance ^a	$R_{DS(on)}$	$V_{GS} = 4.5\text{ V}$, $I_D = 0.66\text{ A}$	-	0.320	0.385	Ω
		$V_{GS} = 2.5\text{ V}$, $I_D = 0.40\text{ A}$	-	0.560	0.630	
Forward transconductance ^a	g_{fs}	$V_{DS} = 10\text{ V}$, $I_D = 0.66\text{ A}$	-	1.5	-	S
Diode forward voltage ^a	V_{SD}	$I_S = 0.23\text{ A}$, $V_{GS} = 0\text{ V}$	-	0.8	1.2	V
Dynamic ^b						
Total gate charge	Q_g	$V_{DS} = 10\text{ V}$, $V_{GS} = 4.5\text{ V}$, $I_D = 0.66\text{ A}$	-	0.8	1.2	nC
Gate-source charge	Q_{gs}		-	0.06	-	
Gate-drain charge	Q_{gd}		-	0.30	-	
Gate resistance	R_g	$f = 1\text{ MHz}$	0.2	1	1.7	Ω
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 10\text{ V}$, $R_L = 20\text{ }\Omega$ $I_D \cong 0.5\text{ A}$, $V_{GEN} = 4.5\text{ V}$, $R_g = 6\text{ }\Omega$	-	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}	$I_F = 0.23\text{ A}$, $dI/dt = 100\text{ A}/\mu\text{s}$	-	20	40	

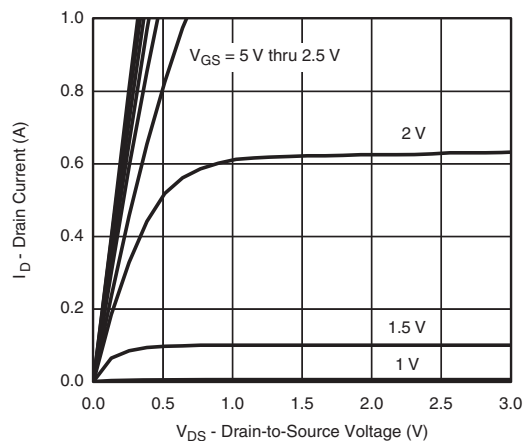
Notes

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

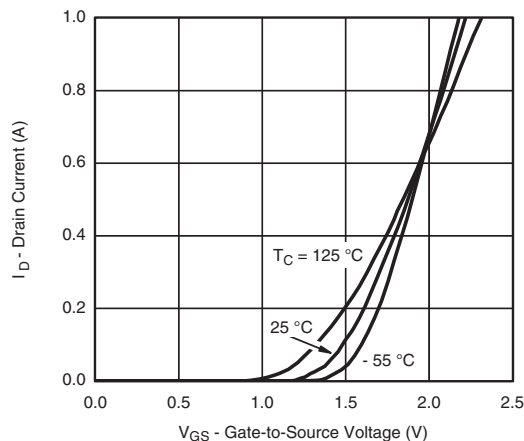
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



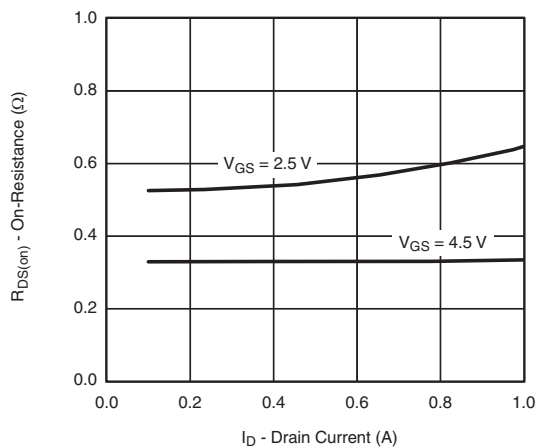
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



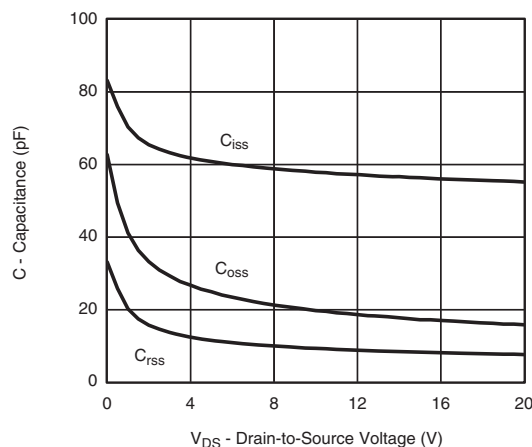
Output Characteristics



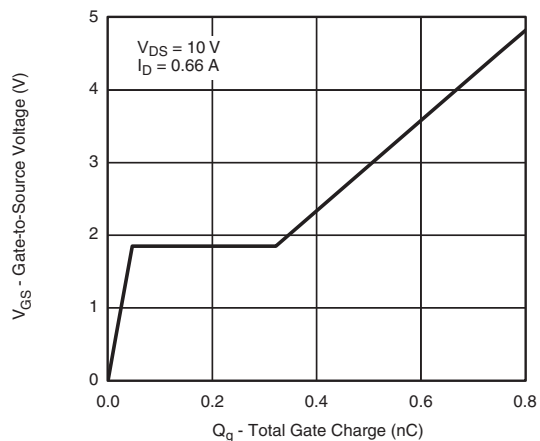
Transfer Characteristics



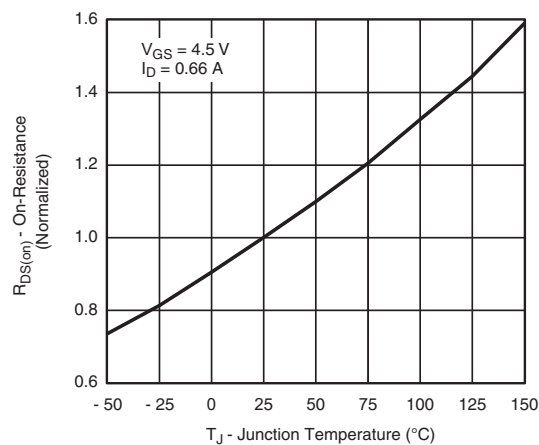
On-Resistance vs. Drain Current



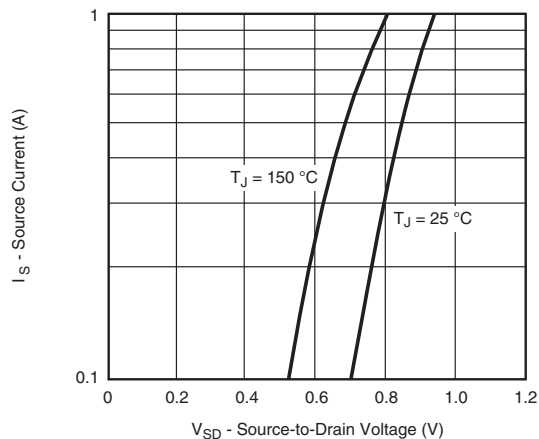
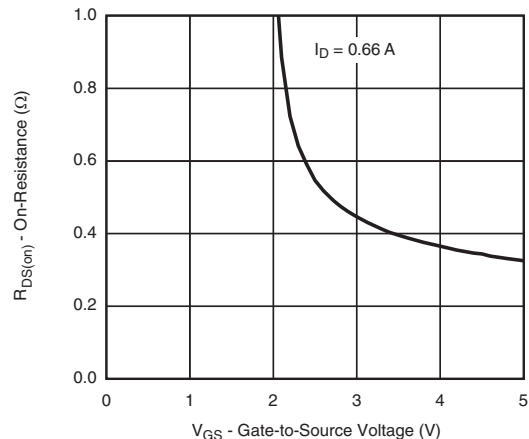
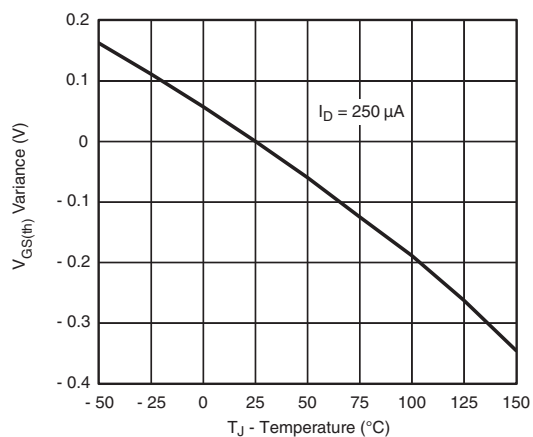
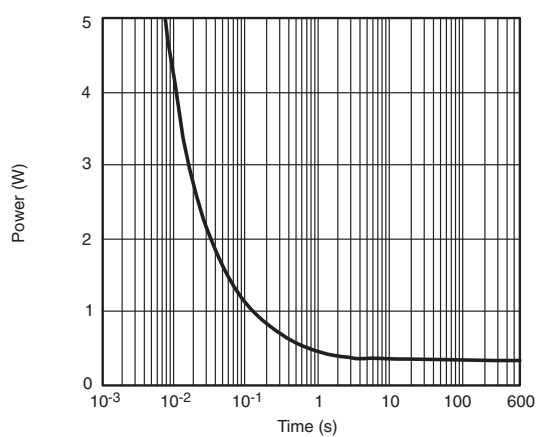
Capacitance



Gate Charge

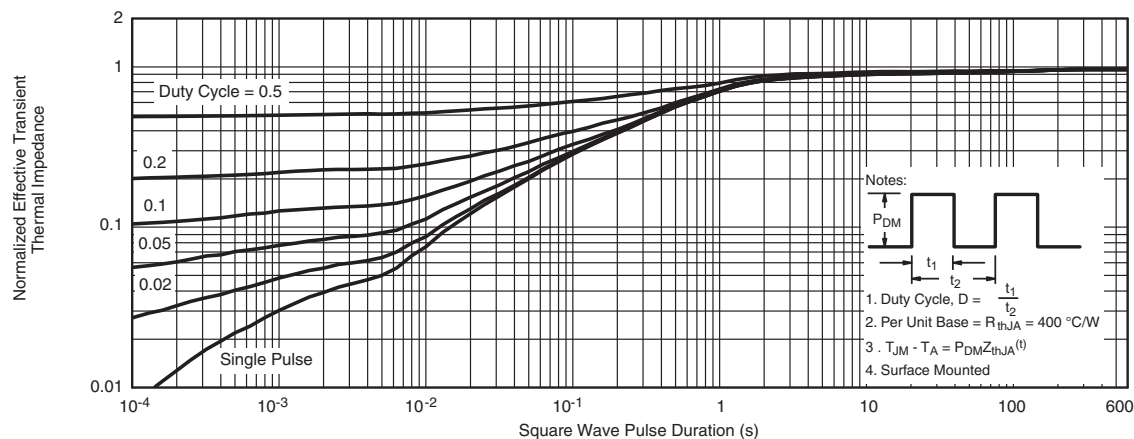


On-Resistance vs. Junction Temperature

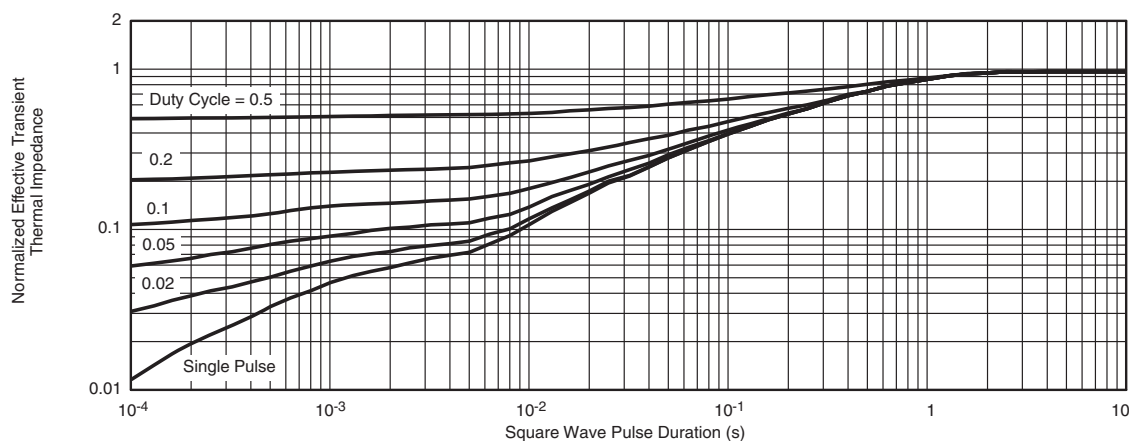
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

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

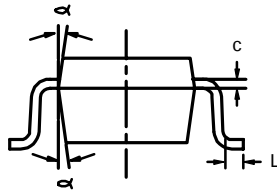
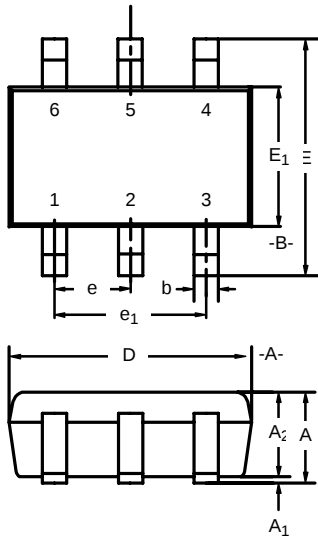


Normalized Thermal Transient Impedance, Junction-to-Foot

Vishay Siliconix maintains worldwide manufacturing capability. Products may be manufactured at one of several qualified locations. Reliability data for Silicon Technology and Package Reliability represent a composite of all qualified locations. For related documents such as package / tape drawings, part marking, and reliability data, see www.vishay.com/ppg?71080



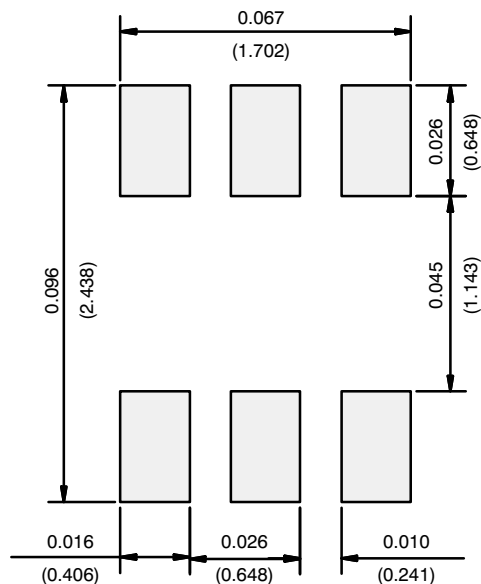
SC-70: 6-LEADS



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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