

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

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)
- 20	0.185 at $V_{GS} = - 4.5$ V	- 1.9
	0.260 at $V_{GS} = - 2.5$ V	- 1.6
	0.385 at $V_{GS} = - 1.8$ V	- 0.7

FEATURES

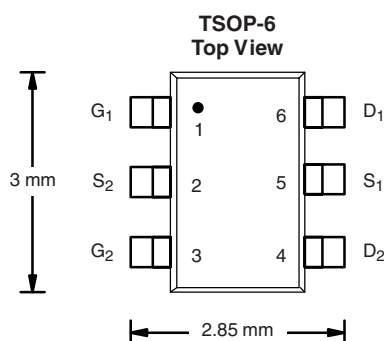
- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET® Power MOSFET
- Compliant to RoHS Directive 2002/95/EC



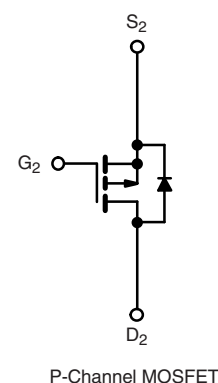
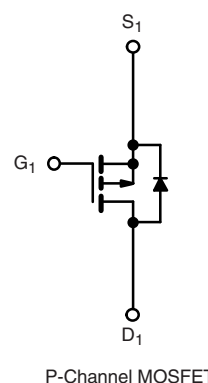
RoHS
COMPLIANT
HALOGEN
FREE
Available

APPLICATIONS

- Battery Switch for Portable Devices
- Computers
 - Bus Switch
 - Load Switch



Ordering Information: Si3981DV-T1-E3 (Lead (Pb)-free)
Si3981DV-T1-GE3 (Lead (Pb)-free and Halogen-free)
Marking Code: MCxxx



ABSOLUTE MAXIMUM RATINGS $T_A = 25^\circ\text{C}$, unless otherwise noted

Parameter		Symbol	5 s	Steady State	Unit
Drain-Source Voltage		V_{DS}	- 20		V
Gate-Source Voltage		V_{GS}	± 8		
Continuous Drain Current ($T_J = 150\text{ }^{\circ}\text{C}$) ^a	$T_A = 25\text{ }^{\circ}\text{C}$	I_D	- 1.9	- 1.6	A
	$T_A = 70\text{ }^{\circ}\text{C}$		- 1.5	- 1.3	
Pulsed Drain Current		I_{DM}	- 8		
Continuous Source Current (Diode Conduction) ^a		I_S	- 1.0	- 0.72	W
Maximum Power Dissipation ^a	$T_A = 25\text{ }^{\circ}\text{C}$	P_D	1.08	0.80	
	$T_A = 70\text{ }^{\circ}\text{C}$		0.69	0.51	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 150		$^{\circ}\text{C}$

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^a	R_{thJA}	97	115	$^\circ\text{C/W}$
		132	155	
Maximum Junction-to-Foot (Drain)	R_{thJF}	78	95	

Notes:

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

SPECIFICATIONS $T_J = 25^\circ\text{C}$, unless otherwise noted

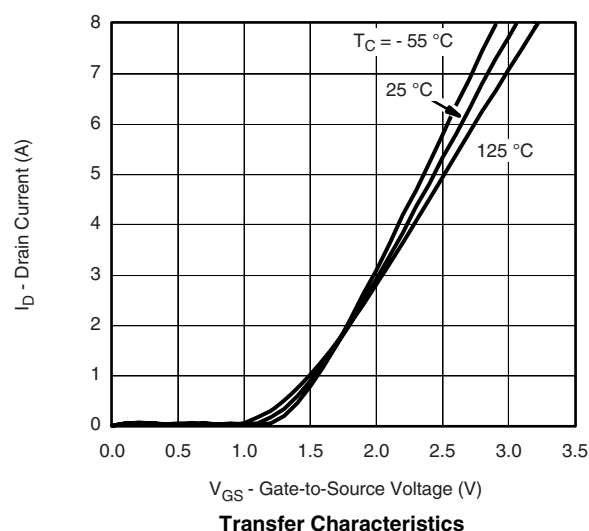
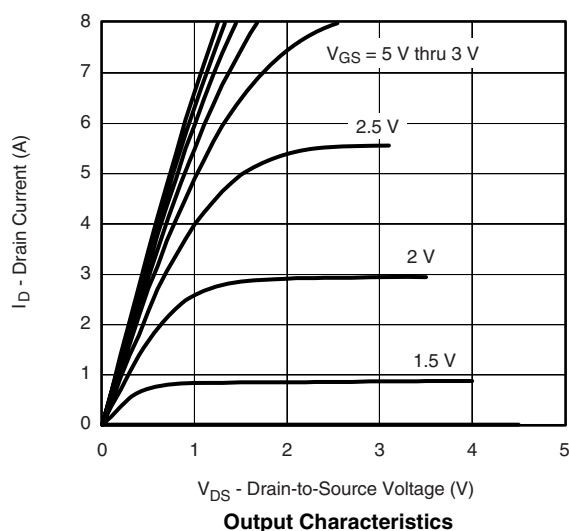
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = -250\ \mu\text{A}$	-0.40		-1.1	V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\ \text{V}$, $V_{GS} = \pm 8\ \text{V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -20\ \text{V}$, $V_{GS} = 0\ \text{V}$			-1	μA
		$V_{DS} = -20\ \text{V}$, $V_{GS} = 0\ \text{V}$, $T_J = 85^\circ\text{C}$			-10	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} = -5\ \text{V}$, $V_{GS} = -4.5\ \text{V}$	-5			A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = -4.5\ \text{V}$, $I_D = -1.9\ \text{A}$		0.146	0.185	Ω
		$V_{GS} = -2.5\ \text{V}$, $I_D = -1.6\ \text{A}$		0.210	0.260	
		$V_{GS} = -1.8\ \text{V}$, $I_D = -0.7\ \text{A}$		0.306	0.385	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -5\ \text{V}$, $I_D = -1.9\ \text{A}$		4		S
Diode Forward Voltage ^a	V_{SD}	$I_S = -1.0\ \text{A}$, $V_{GS} = 0\ \text{V}$		-0.84	-1.1	V
Dynamic^b						
Total Gate Charge	Q_g	$V_{DS} = -10\ \text{V}$, $V_{GS} = -4.5\ \text{V}$, $I_D = -1.9\ \text{A}$		3.2	5	nC
Gate-Source Charge	Q_{gs}			0.42		
Gate-Drain Charge	Q_{gd}			0.84		
Gate Resistance	R_g	$f = 1\ \text{MHz}$		6		Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -10\ \text{V}$, $R_L = 10\ \Omega$ $I_D \cong -1\ \text{A}$, $V_{GEN} = -4.5\ \text{V}$, $R_g = 6\ \Omega$		30	45	ns
Rise Time	t_r			50	85	
Turn-Off Delay Time	$t_{d(off)}$			45	85	
Fall Time	t_f			21	50	
Source-Drain Reverse Recovery Time	t_{rr}	$I_F = -1.00\ \text{A}$, $dI/dt = 100\ \text{A}/\mu\text{s}$		20	40	

Notes:

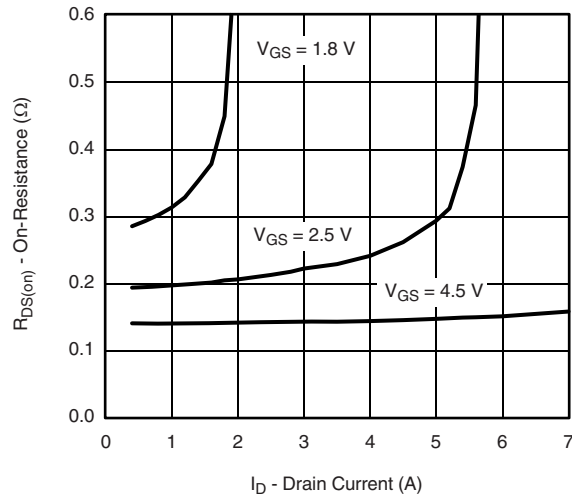
a. Pulse test; pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$.

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

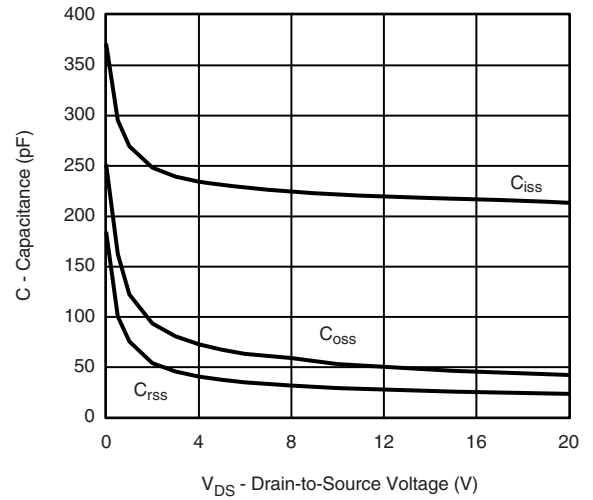
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

TYPICAL CHARACTERISTICS 25°C , unless otherwise noted

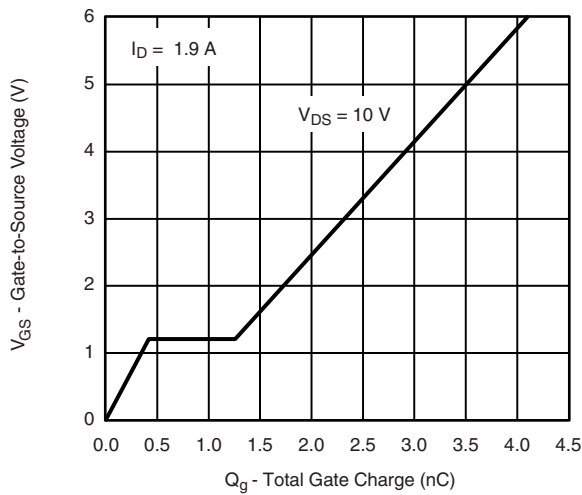
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



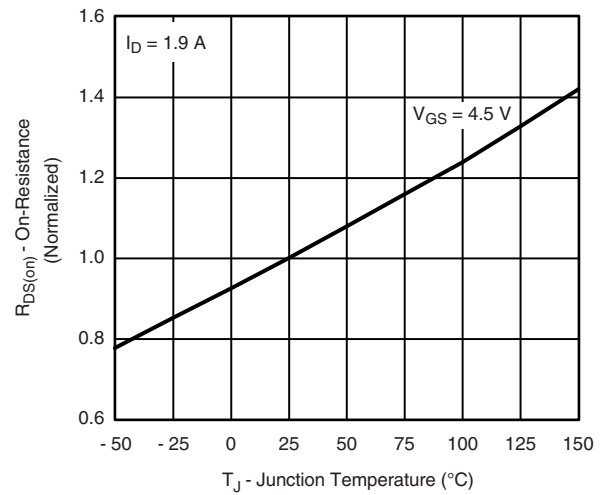
On-Resistance vs. Drain Current



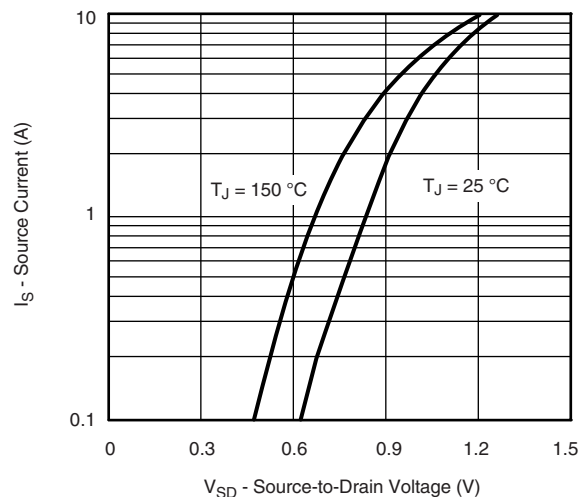
Capacitance



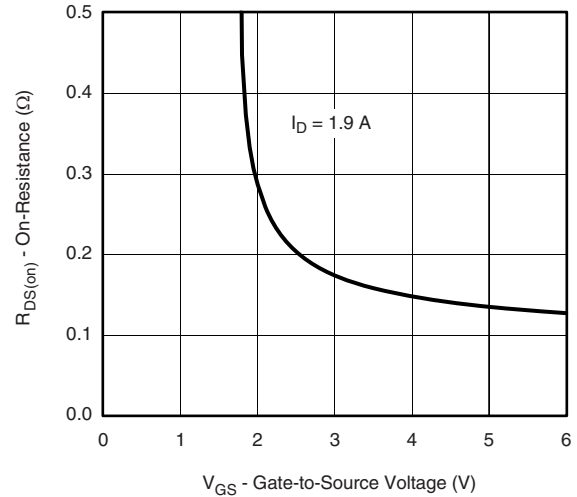
Gate Charge



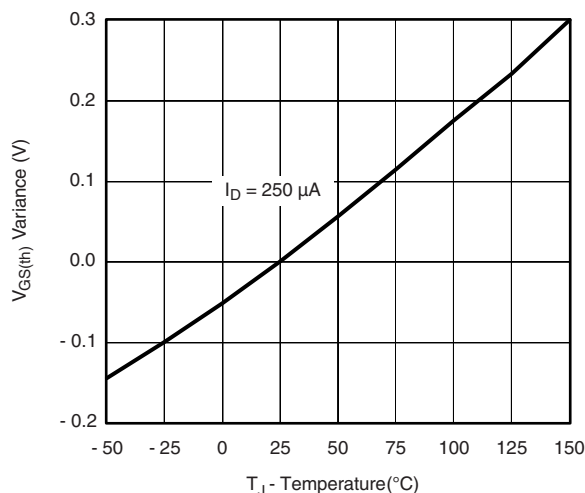
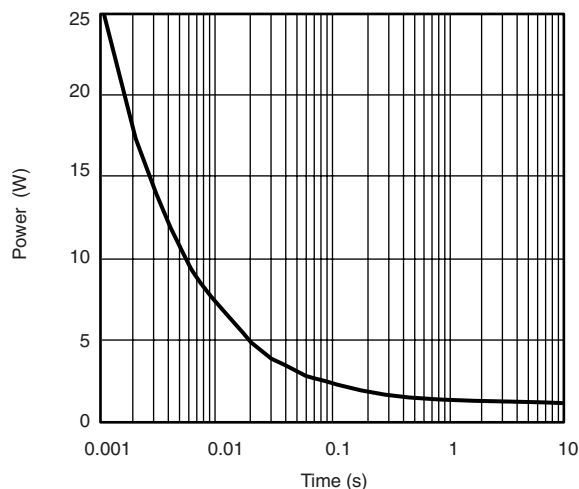
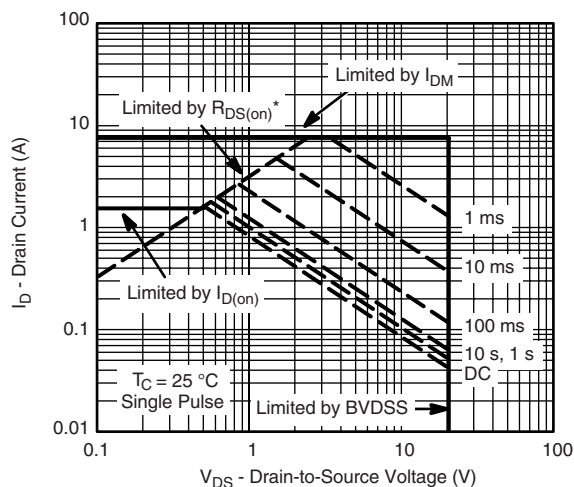
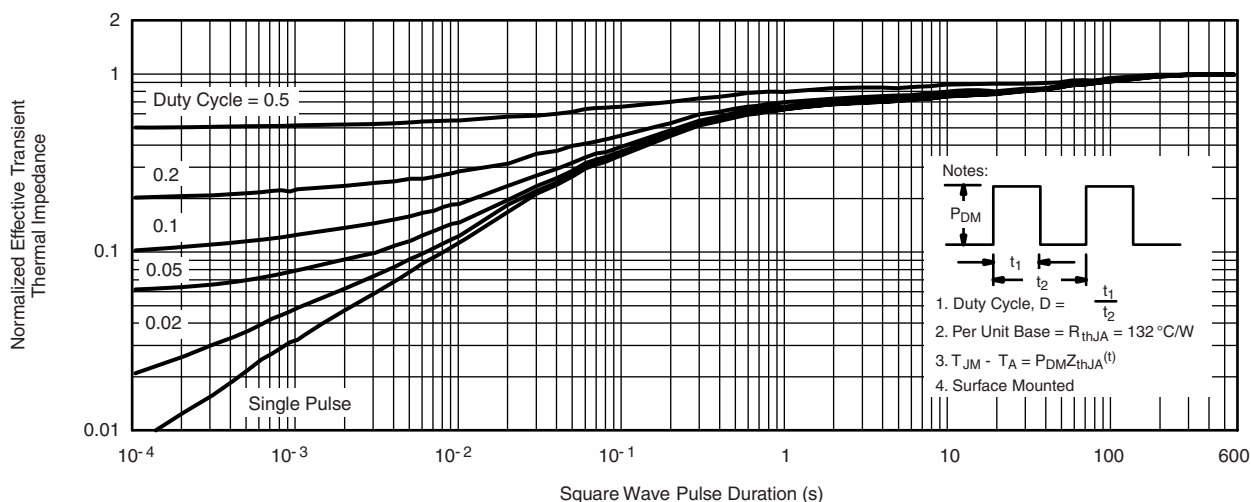
On-Resistance vs. Junction Temperature



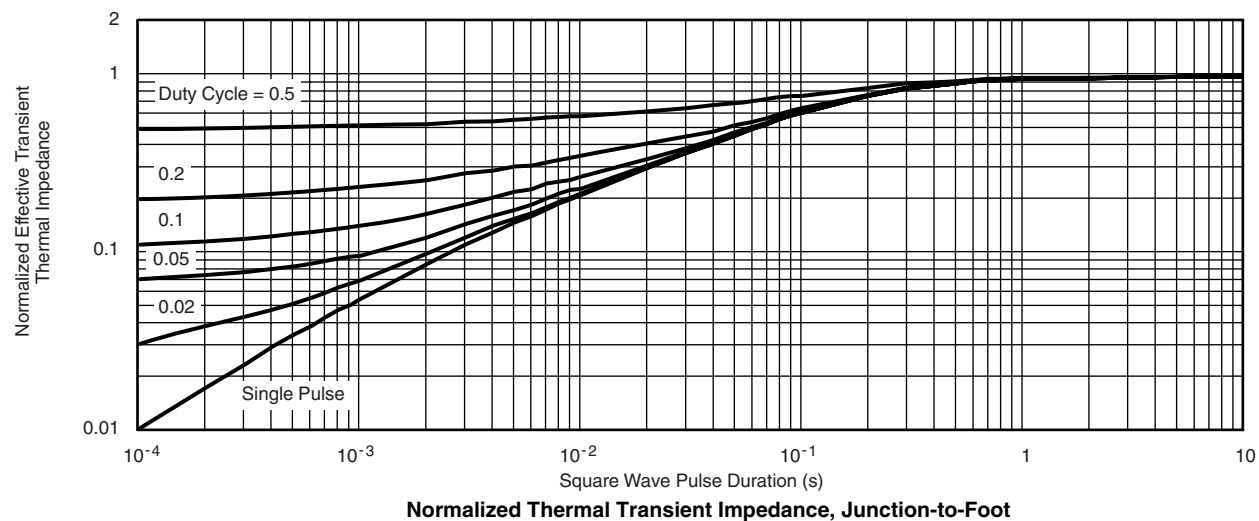
Source-Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted**Threshold Voltage****Single Pulse Power, Junction-to-Ambient*** $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified**Safe Operating Area, Junction-to-Case****Normalized Thermal Transient Impedance, Junction-to-Ambient**

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



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