

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

PRODUCT SUMMARY

V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
20	0.065 @ $V_{GS} = 4.5$ V	3.9
	0.075 @ $V_{GS} = 2.5$ V	3.6
	0.096 @ $V_{GS} = 1.8$ V	3.2

FEATURES

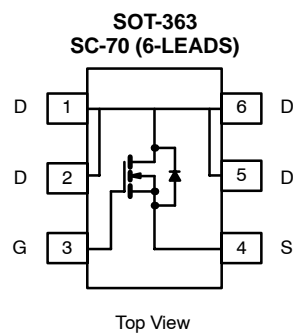
- TrenchFET® Power MOSFETS
- 1.8-V Rated
- Thermally Enhanced SC-70 Package



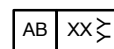
Pb-free
Available

APPLICATIONS

- Load Switching
- PA Switch
- Level Switch



Marking Code



Lot Traceability
and Date Code

Part # Code

Ordering Information: Si1406DH-T1
Si1406DH-T1—E3 (Lead (Pb)-Free)

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

Parameter	Symbol	5 secs	Steady State	Unit	
Drain-Source Voltage	V_{DS}	20		V	
Gate-Source Voltage	V_{GS}	± 8			
Continuous Drain Current ($T_J = 150^\circ\text{C}$) ^a	I_D	$T_A = 25^\circ\text{C}$	3.9	3.1	A
		$T_A = 85^\circ\text{C}$	2.8	2.2	
Pulsed Drain Current	I_{DM}	10			
Continuous Diode Current (Diode Conduction) ^a	I_S	1.4	0.9		
Maximum Power Dissipation ^a	P_D	$T_A = 25^\circ\text{C}$	1.56	1.0	W
		$T_A = 85^\circ\text{C}$	0.81	0.52	
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}	$t \leq 5$ sec	60	80	$^\circ\text{C}/\text{W}$
		Steady State	100	125	
Maximum Junction-to-Foot (Drain)	R_{thJF}	34	45		

Notes

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

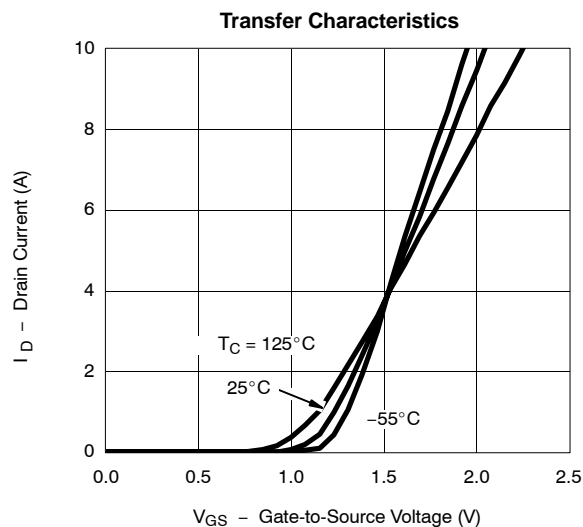
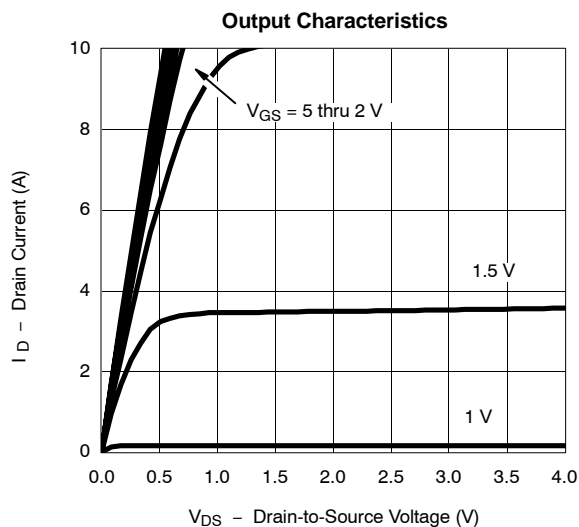
SPECIFICATIONS (T_J = 25 °C UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	0.45		1.2	V
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±8 V			±100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 20 V, V _{GS} = 0 V			1	μA
		V _{DS} = 20 V, V _{GS} = 0 V, T _J = 85 °C			5	
On-State Drain Current ^a	I _{D(on)}	V _{DS} = 5 V, V _{GS} = 4.5 V	8			A
Drain-Source On-State Resistance ^a	r _{DS(on)}	V _{GS} = 4.5 V, I _D = 3.9 A		0.053	0.065	Ω
		V _{GS} = 2.5 V, I _D = 3.6 A		0.062	0.075	
		V _{GS} = 1.8 V, I _D = 2 A		0.079	0.096	
Forward Transconductance ^a	g _{fs}	V _{DS} = 10 V, I _D = 3.9 A		11		S
Diode Forward Voltage ^a	V _{SD}	I _S = 1.4 A, V _{GS} = 0 V		0.75	1.1	V
Dynamic^b						
Total Gate Charge	Q _g	V _{DS} = 10 V, V _{GS} = 4.5 V, I _D = 3.9 A		4.9	7.5	nC
Gate-Source Charge	Q _{gs}			1.0		
Gate-Drain Charge	Q _{gd}			0.95		
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		27	41	ns
Rise Time	t _r			47	71	
Turn-Off Delay Time	t _{d(off)}			54	81	
Fall Time	t _f			29	44	
Source-Drain Reverse Recovery	t _{rr}	I _F = 1.4 A, di/dt = 100/μs		35	60	

Notes

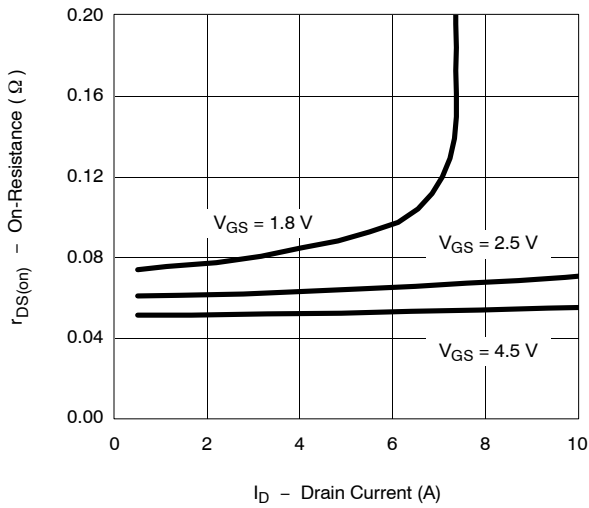
- a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
b. Guaranteed by design, not subject to production testing.

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.

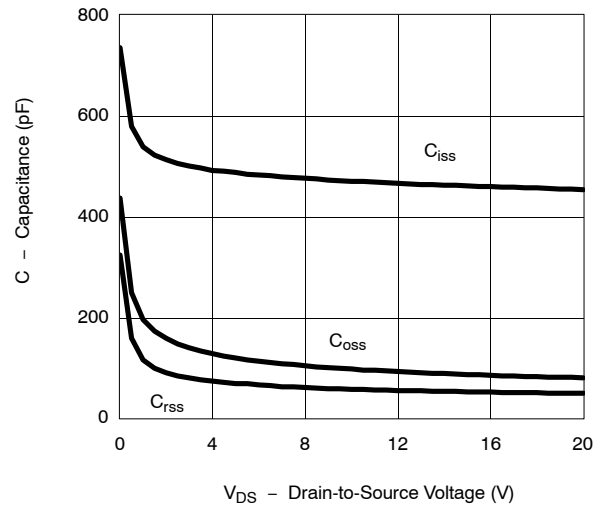
TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)


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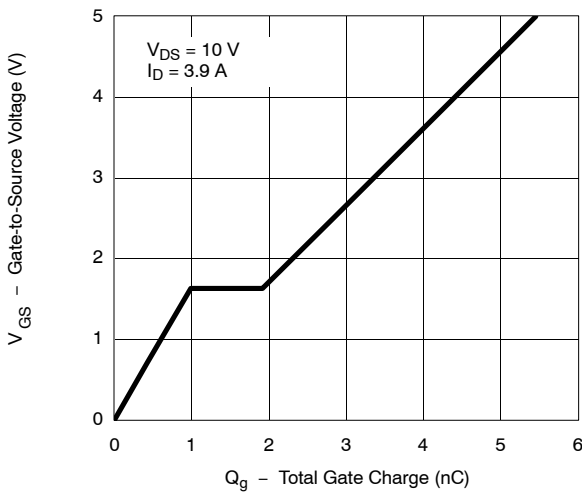
On-Resistance vs. Drain Current



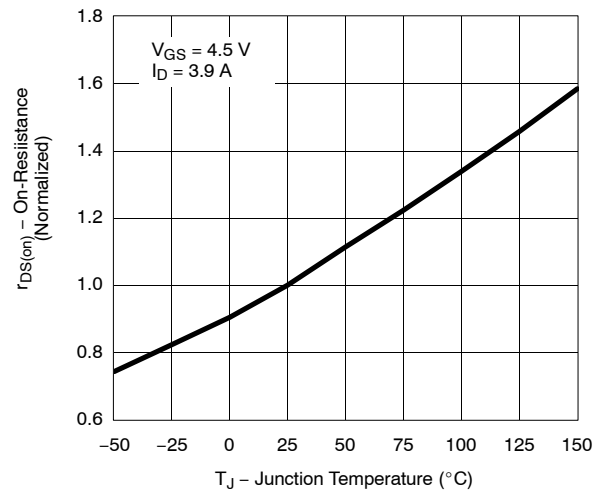
Capacitance



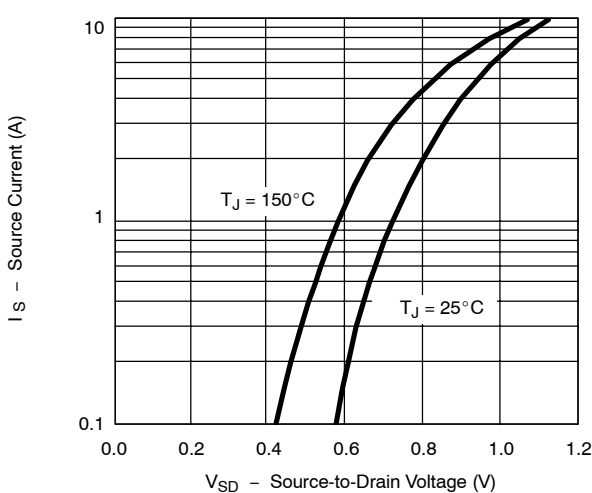
Gate Charge



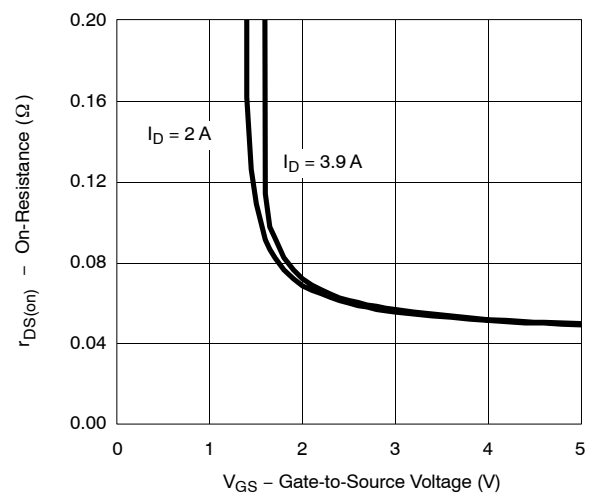
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage

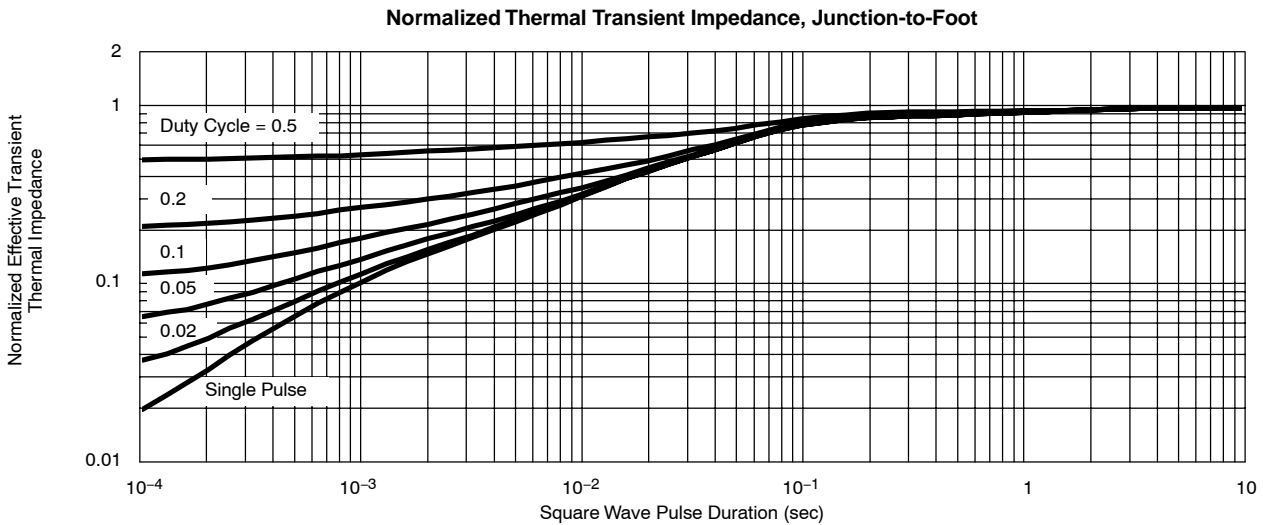
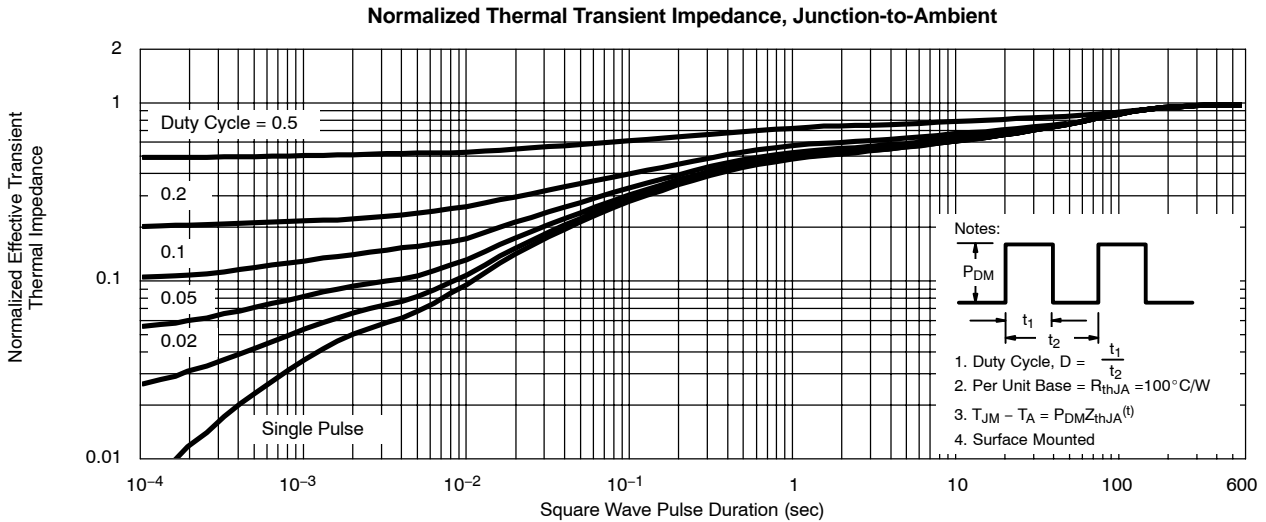
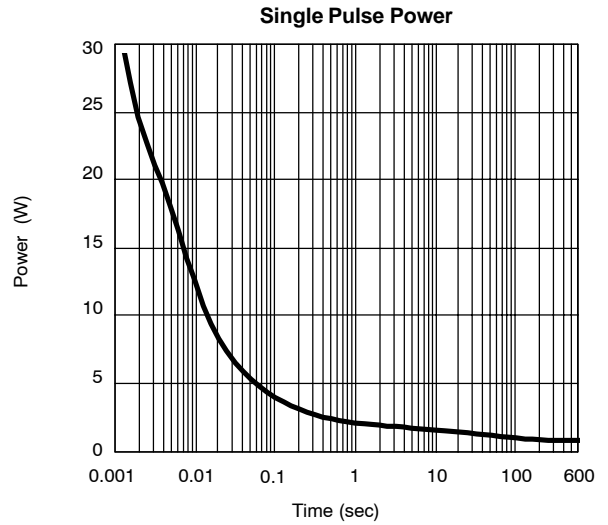
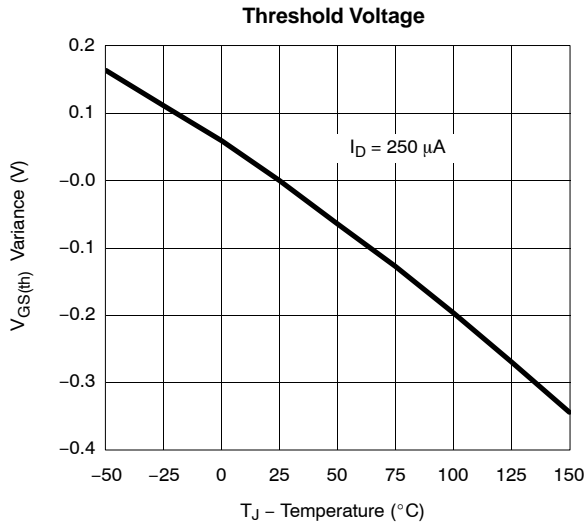


On-Resistance vs. Gate-to-Source Voltage





TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)



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