

N-Channel 30-V (D-S) MOSFET

PRODUCT SUMMARY

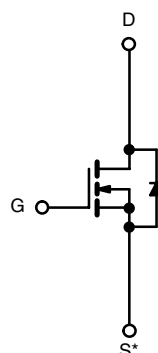
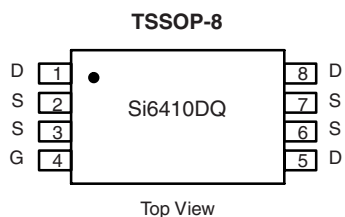
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)
30	0.014 at $V_{GS} = 10$ V	± 7.8
	0.021 at $V_{GS} = 4.5$ V	± 6.3

FEATURES

- Halogen-free
- TrenchFET® Power MOSFETs



RoHS
COMPLIANT



* Source Pins 2, 3, 6 and 7 must be tied common.

Ordering Information: Si6410DQ-T1-GE3 (Lead (Pb)-free and Halogen-free)

N-Channel MOSFET

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current ($T_J = 150$ °C) ^a	I_D	± 7.8	A
		± 6.2	
Pulsed Drain Current	I_{DM}	± 30	
Continuous Source Current (Diode Conduction) ^a	I_S	1.5	W
Maximum Power Dissipation ^a	P_D	1.5	
		1.0	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to 150	°C

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Limit	Unit
Maximum Junction-to-Ambient ^a	R_{thJA}	83	°C/W

Notes:

a. Surface Mounted on FR4 board, $t \leq 10$ s.

For SPICE model information via the Worldwide Web: <http://www.vishay.com/www/product/spice.htm>.

SPECIFICATIONS $T_J = 25\text{ }^{\circ}\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\text{ }\mu\text{A}$	1			V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}$, $V_{GS} = \pm 20\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 30\text{ V}$, $V_{GS} = 0\text{ V}$			1	μA
		$V_{DS} = 30\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 55\text{ }^{\circ}\text{C}$			25	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} = 5\text{ V}$, $V_{GS} = 10\text{ V}$	20			A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = 10\text{ V}$, $I_D = 7.8\text{ A}$		0.011	0.014	Ω
		$V_{GS} = 4.5\text{ V}$, $I_D = 5\text{ A}$		0.015	0.021	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15\text{ V}$, $I_D = 7.8\text{ A}$		27		S
Diode Forward Voltage ^a	V_{SD}	$I_S = 1.5\text{ A}$, $V_{GS} = 0\text{ V}$		0.7	1.1	V
Dynamic^b						
Gate Charge	Q_g	$V_{DS} = 15\text{ V}$, $V_{GS} = 5\text{ V}$, $I_D = 7.8\text{ A}$		22	33	nC
Total Gate Charge	Q_{gt}	$V_{DS} = 15\text{ V}$, $V_{GS} = 10\text{ V}$, $I_D = 7.8\text{ A}$		43	60	
Gate-Source Charge	Q_{gs}			9.0		
Gate-Drain Charge	Q_{gd}			7.0		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 15\text{ V}$, $R_L = 15\text{ }\Omega$ $I_D \cong 1\text{ A}$, $V_{GEN} = 10\text{ V}$, $R_G = 6\text{ }\Omega$		15	30	ns
Rise Time	t_r			10	20	
Turn-Off Delay Time	$t_{d(off)}$			70	120	
Fall Time	t_f			20	50	
Source-Drain Reverse Recovery Time	t_{rr}	$I_F = 1.5\text{ A}$, $di/dt = 100\text{ A}/\mu\text{s}$		50	80	

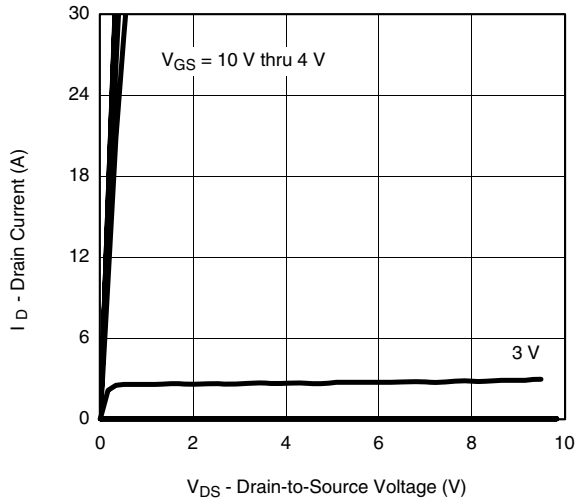
Notes:

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

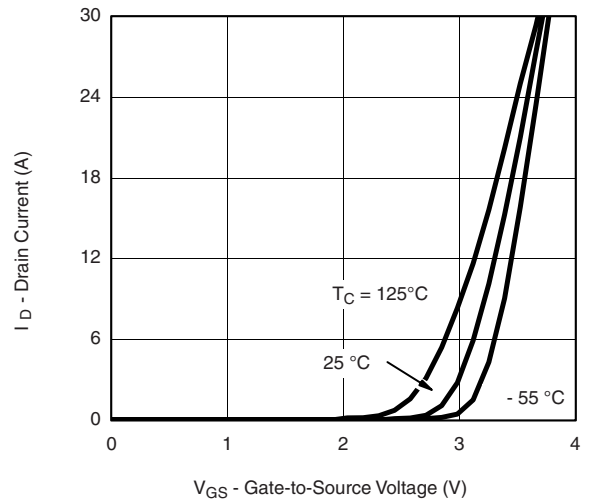
b. Guaranteed by design, not subject to production testing.

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.

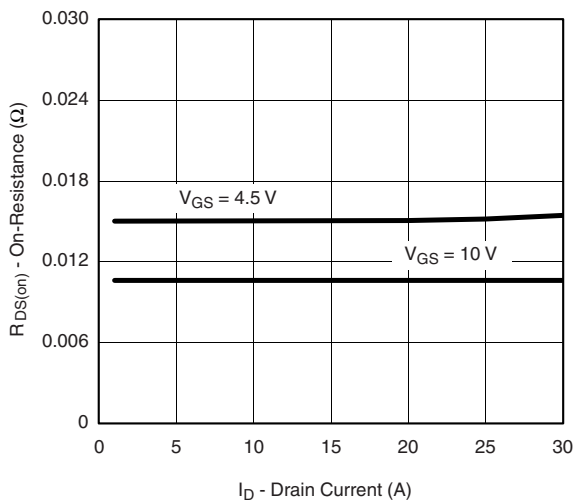
TYPICAL CHARACTERISTICS 25 °C unless noted



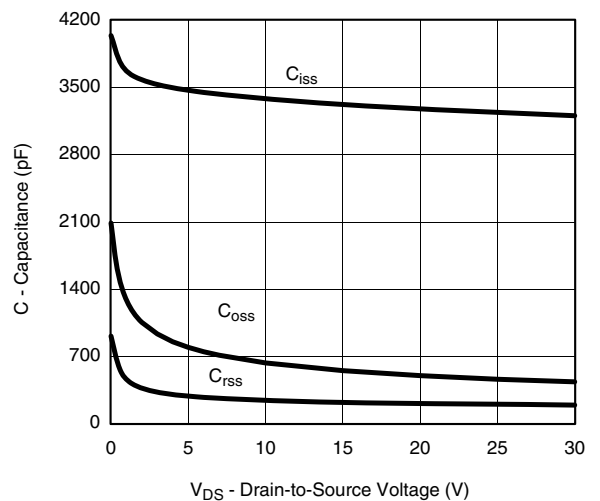
Output Characteristics



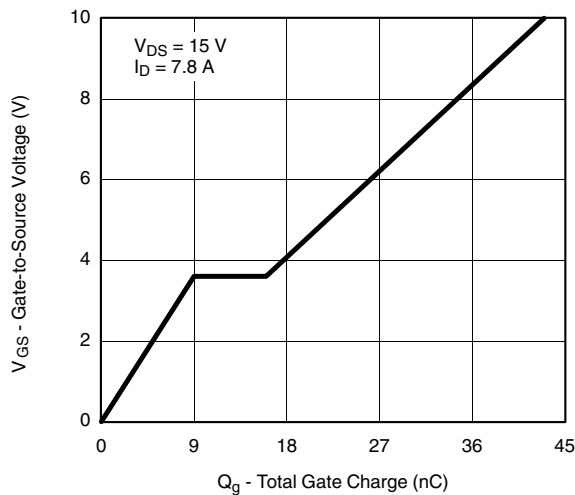
Transfer Characteristics



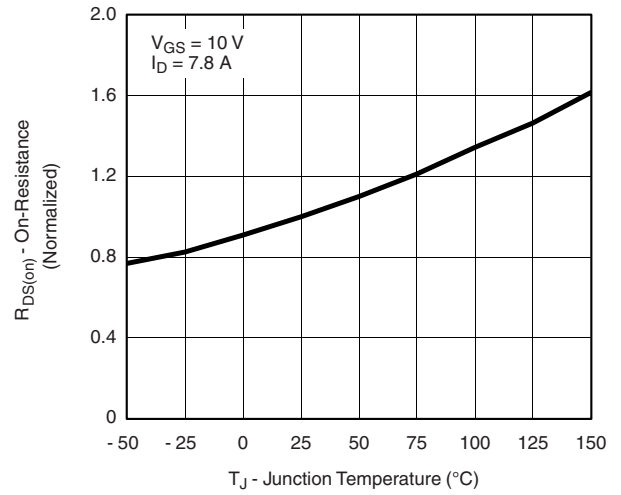
On-Resistance vs. Drain Current



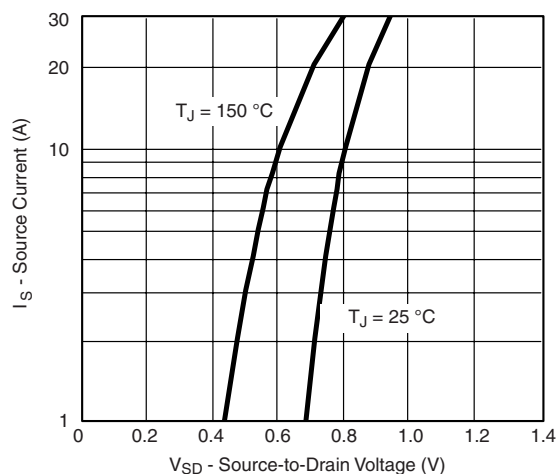
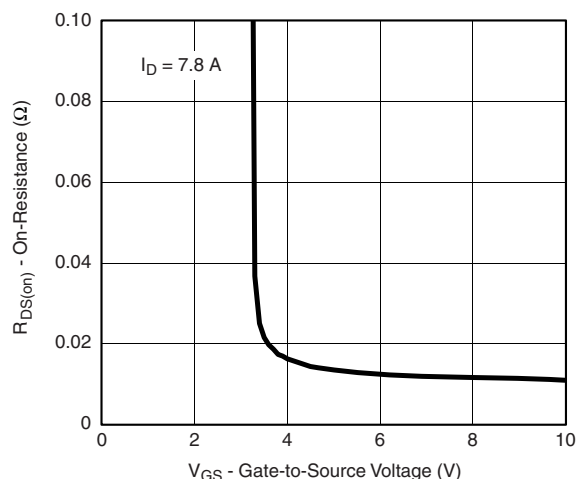
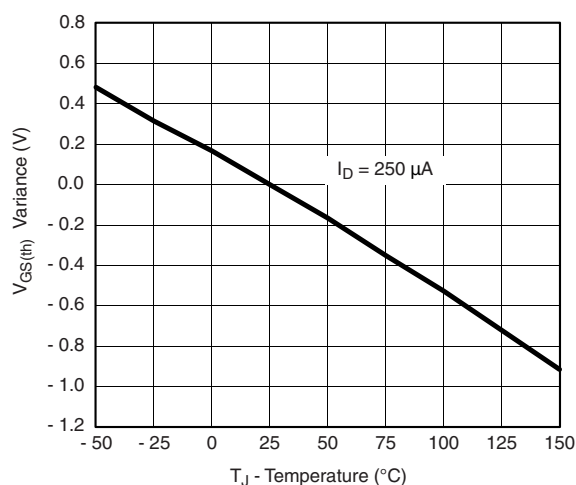
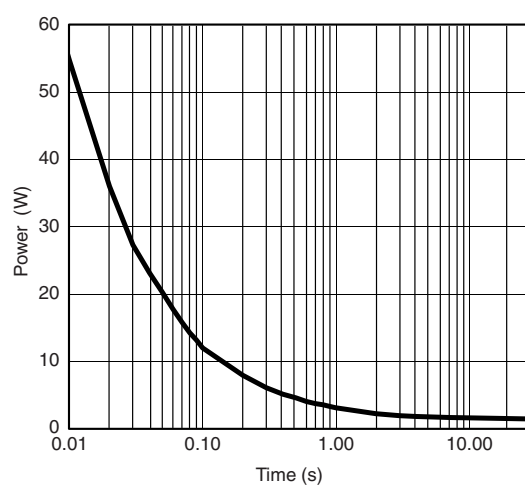
Capacitance



Gate Charge



On-Resistance vs. Junction Temperature

TYPICAL CHARACTERISTICS 25 °C unless noted**Source-Drain Diode Forward Voltage****On-Resistance vs. Gate-to-Source Voltage****Threshold Voltage****Single Pulse Power****Normalized Thermal Transient Impedance, Junction-to-Ambient**

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