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

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)
- 30	0.012 at V_{GS} = - 10 V	- 8.8
	0.019 at V_{GS} = - 4.5 V	- 7.0

FEATURES
- **Halogen-free**
- TrenchFET[®] Power MOSFET

APPLICATIONS
- Battery Switch
- Load Switch

RoHS COMPLIANT

TSSOP-8

D	1		8	D
S	2	**Si6443DQ**	7	S
S	3		6	S
G	4		5	D

Top View

Ordering Information: Si6443DQ-T1-GE3 (Lead (Pb)-free and Halogen-free)
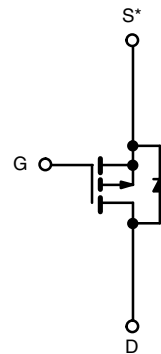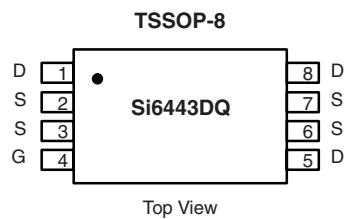
* Source Pins 2, 3, 6 and 7 must be tied common.

P-Channel MOSFET

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

Parameter		Symbol	10 s	Steady State	Unit
Drain-Source Voltage		V_{DS}	- 30		V
Gate-Source Voltage		V_{GS}	± 20		
Continuous Drain Current (T_J = 150 °C)[a]	T_A = 25 °C	I_D	- 8.8	- 7.3	A
	T_A = 70 °C		- 7.2	- 5.9	
Pulsed Drain Current (10 µs Pulse Width)		I_{DM}	- 30		
Continuous Source Current (Diode Conduction)[a]		I_S	- 1.35	- 0.95	
Maximum Power Dissipation[a]	T_A = 25 °C	P_D	1.50	1.05	W
	T_A = 70 °C		1.0	0.67	
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 ≤ 10 s	R_{thJA}	60	83	°C/W
	Steady State		100	120	
Maximum Junction-to-Foot	Steady State	R_{thJF}	35	45	

Notes:
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	- 1		- 3	V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = - 30 V, V_{GS} = 0 V			- 1	µA
		V_{DS} = - 30 V, V_{GS} = 0 V, T_J = 55 °C			- 10	
On-State Drain Current[a]	$I_{D(on)}$	V_{DS} - 5 V, V_{GS} = - 10 V	- 20			A
Drain-Source On-State Resistance[a]	$R_{DS(on)}$	V_{GS} = - 10 V, I_D = - 8.8 A		0.0095	0.012	Ω
		V_{GS} = - 4.5 V, I_D = - 7.2 A		0.0145	0.019	
Forward Transconductance[a]	g_{fs}	V_{DS} = - 15 V, I_D = - 8.8 A		30		S
Diode Forward Voltage[a]	V_{SD}	I_S = - 1.5 A, V_{GS} = 0 V		- 0.71	- 1.1	V
Dynamic[b]						
Total Gate Charge	Q_g	V_{DS} = - 15 V, V_{GS} = - 5 V, I_D = - 8.8 A		38	60	nC
Gate-Source Charge	Q_{gs}			9.3		
Gate-Drain Charge	Q_{gd}			17.7		
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = - 15 V, R_L = 15 Ω $I_D \cong$ - 1 A, V_{GEN} = - 10 V, R_G = 6 Ω		25	40	ns
Rise Time	t_r			21	35	
Turn-Off Delay Time	$t_{d(off)}$			115	180	
Fall Time	t_f			68	110	
Source-Drain Reverse Recovery Time	t_{rr}	I_F = - 1.5 A, di/dt = 100 A/µs		65	100	

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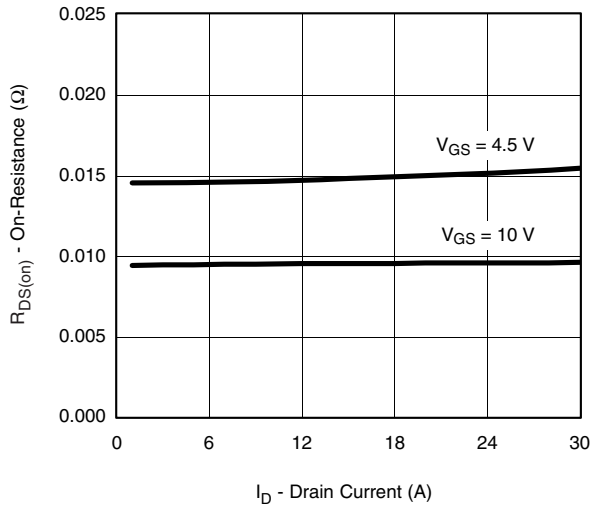a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.

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.
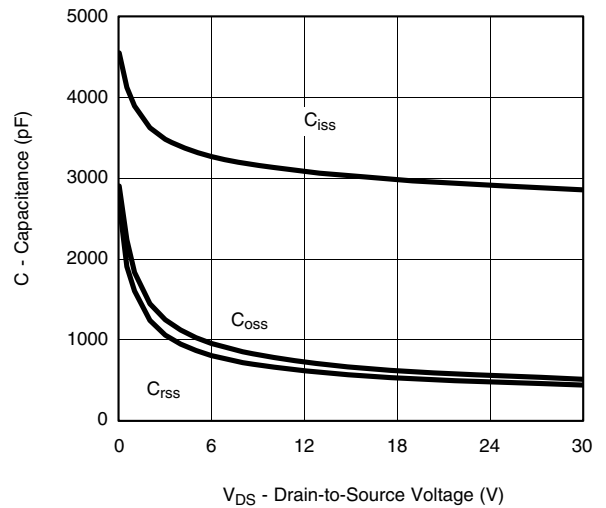
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted
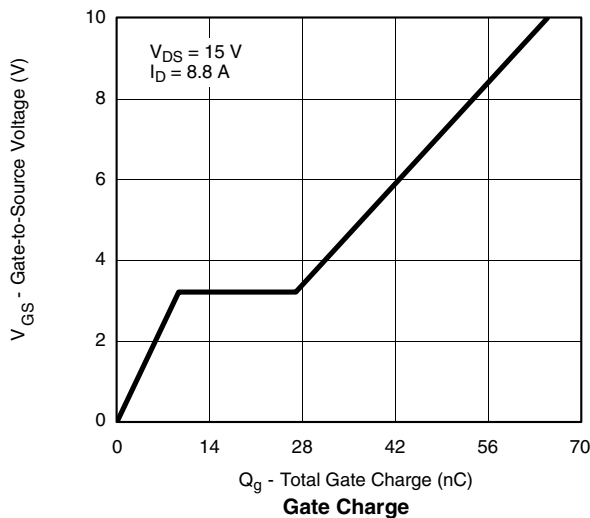

Output Characteristics

Transfer Characteristics
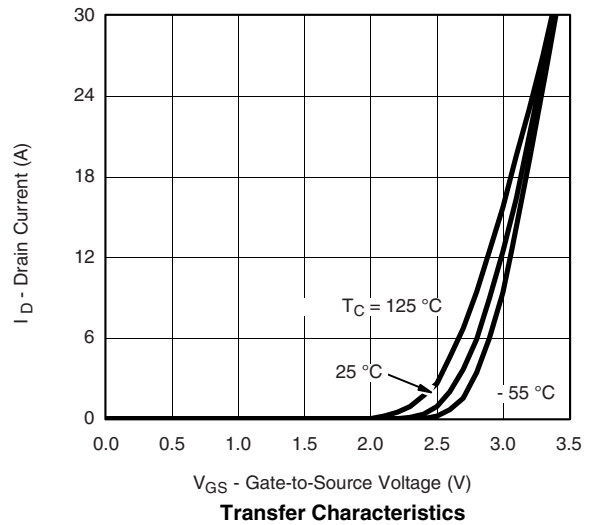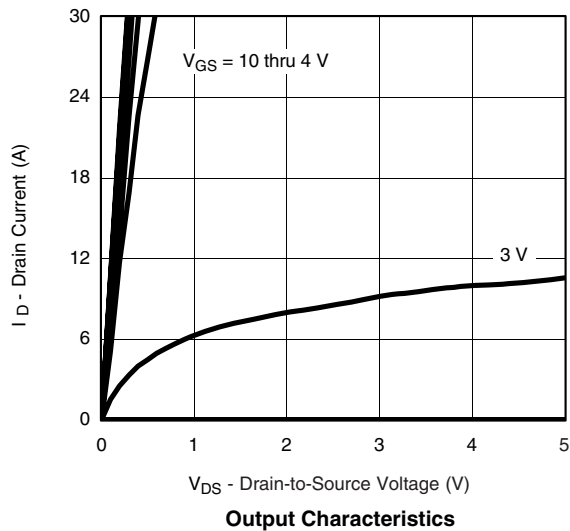
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

On-Resistance vs. Drain Current

$R_{DS(on)}$ - On-Resistance (Ω) vs I_D - Drain Current (A), V_{GS} = 4.5 V, V_{GS} = 10 V

Capacitance

C - Capacitance (pF) vs V_{DS} - Drain-to-Source Voltage (V), C_{iss}, C_{oss}, C_{rss}

Gate Charge

V_{GS} - Gate-to-Source Voltage (V) vs Q_g - Total Gate Charge (nC), V_{DS} = 15 V, I_D = 8.8 A
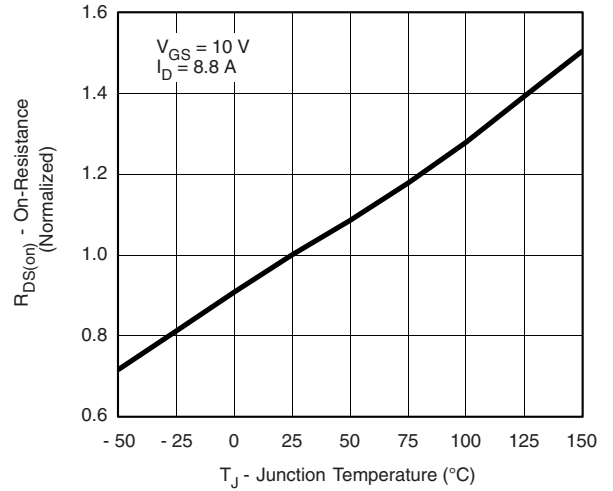
On-Resistance vs. Junction Temperature

$R_{DS(on)}$ - On-Resistance (Normalized) vs T_J - Junction Temperature (°C), V_{GS} = 10 V, I_D = 8.8 A
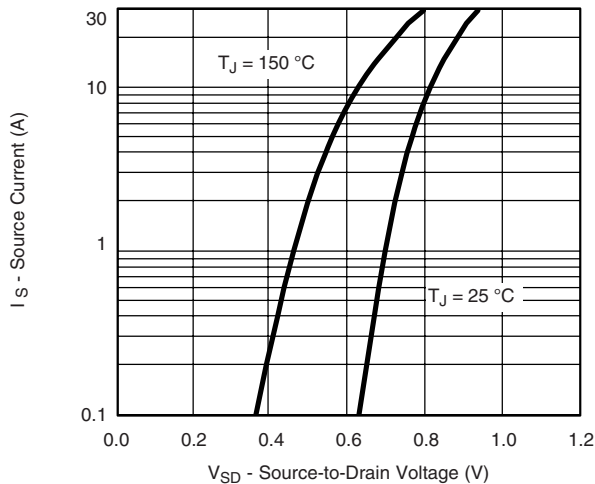
Source-Drain Diode Forward Voltage

I_S - Source Current (A) vs V_{SD} - Source-to-Drain Voltage (V), T_J = 150 °C, T_J = 25 °C
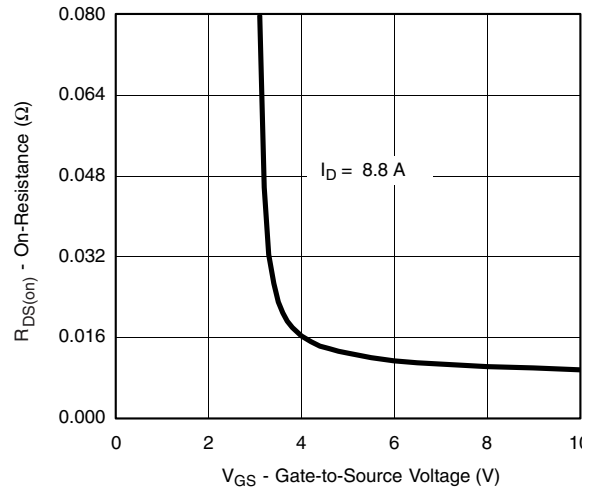
On-Resistance vs. Gate-to-Source Voltage

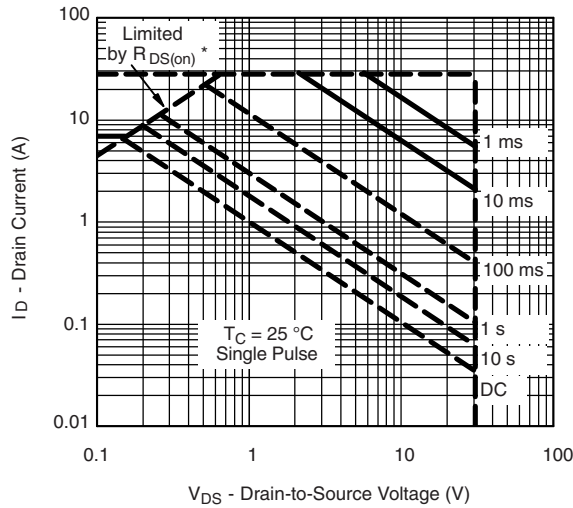$R_{DS(on)}$ - On-Resistance (Ω) vs V_{GS} - Gate-to-Source Voltage (V), I_D = 8.8 A

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted
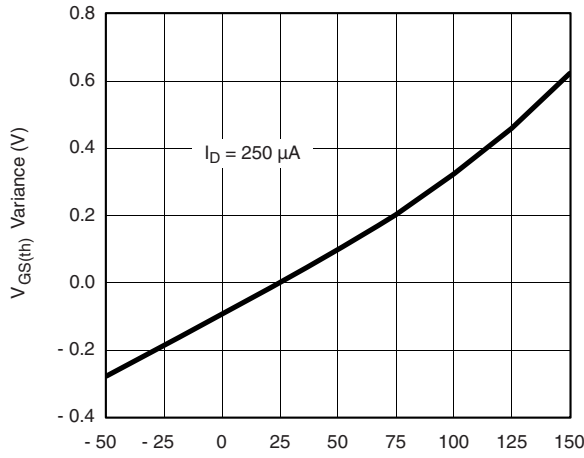
Threshold Voltage
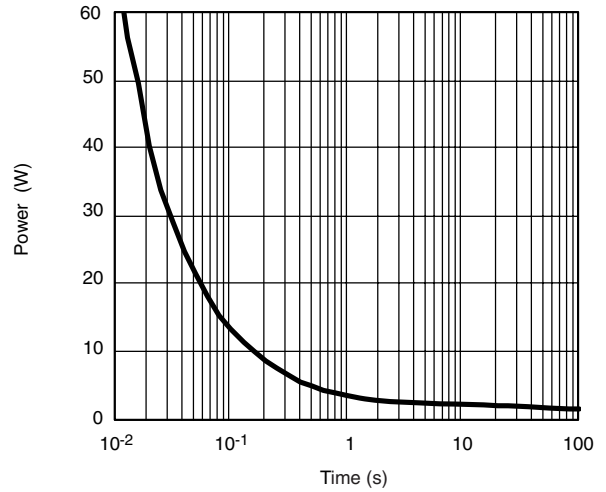
Single Pulse Power, Junction-to-Ambient

V_{DS} - Drain-to-Source Voltage (V)

* V_{GS} > minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Case
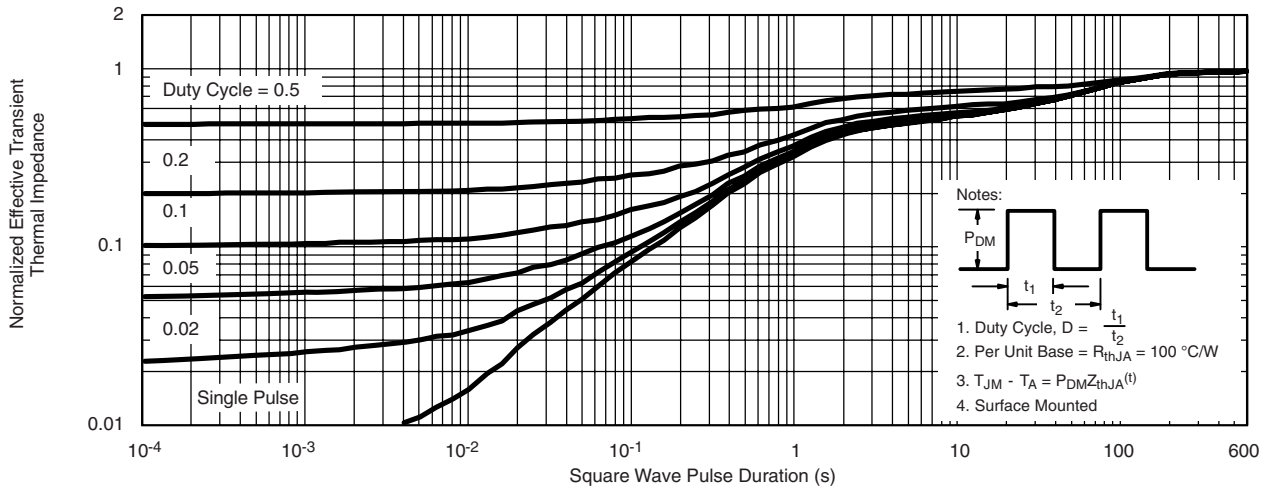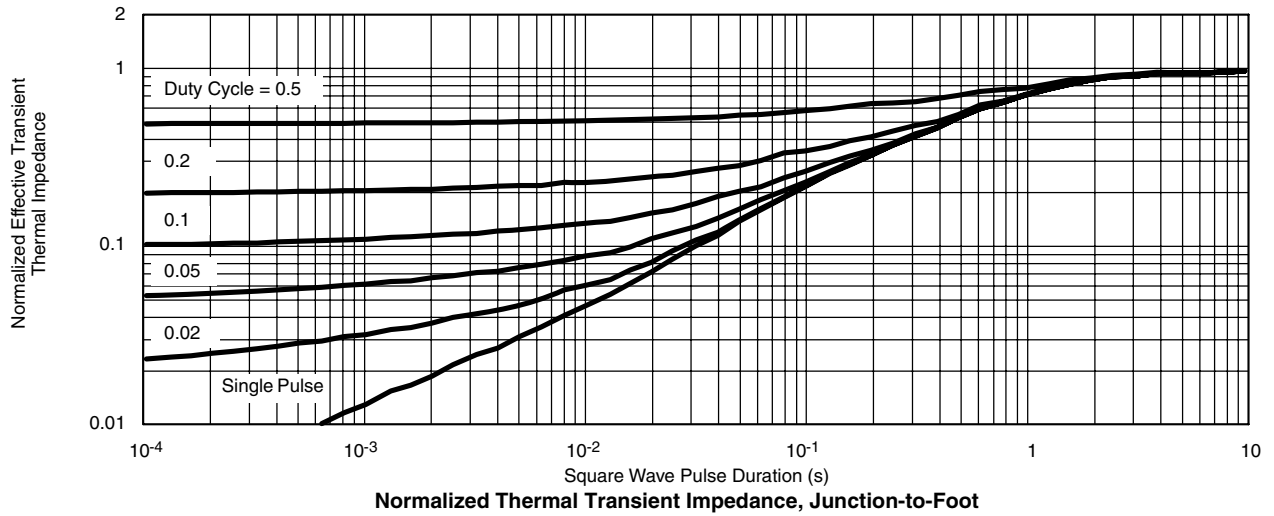

Notes:

1. Duty Cycle, D = $\frac{t_1}{t_2}$
2. Per Unit Base = R_{thJA} = 100 °C/W
3. $T_{JM} - T_A = P_{DM}Z_{thJA}(t)$
4. Surface Mounted

Normalized Thermal Transient Impedance, Junction-to-Ambient

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

Normalized Thermal Transient Impedance, Junction-to-Foot

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