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

Product Summary

V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
30	0.045 @ V_{GS} = 10 V	± 4.4
	0.070 @ V_{GS} = 4.5 V	± 3.5

TSSOP-8

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

Si6436DQ

Top View

*Source Pins 2, 3, 6 and 7 must be tied common.
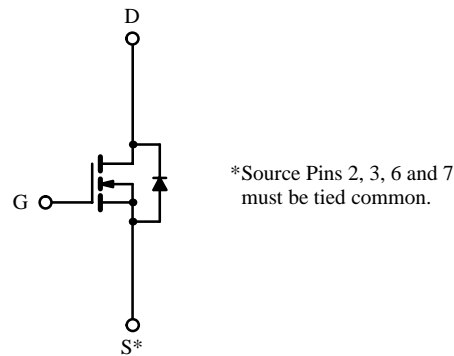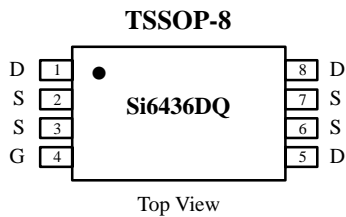
N-Channel MOSFET

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]	T_A = 25°C	I_D	± 4.4	A
	T_A = 70°C		± 3.5	
Pulsed Drain Current		I_{DM}	± 30	
Continuous Source Current (Diode Conduction)[a]		I_S	1.7	
Maximum Power Dissipation[a]	T_A = 25°C	P_D	1.5	W
	T_A = 70°C		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 ≤ 10 sec.

Updates to this data sheet may be obtained via facsimile by calling Siliconix FaxBack, 1-408-970-5600. Please request FaxBack document #70169. A SPICE Model data sheet is available for this product (FaxBack document #70535).
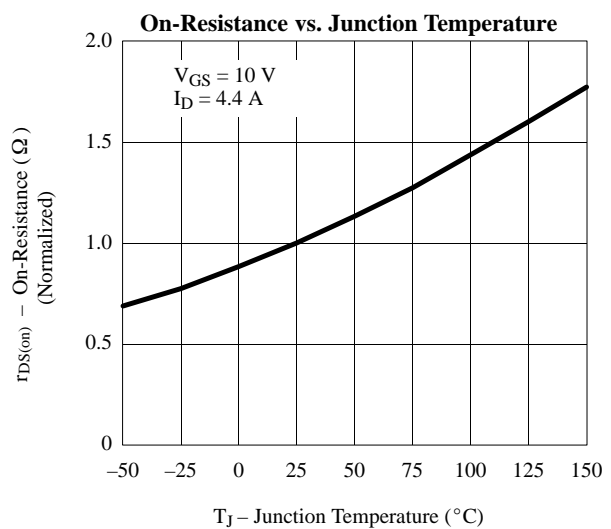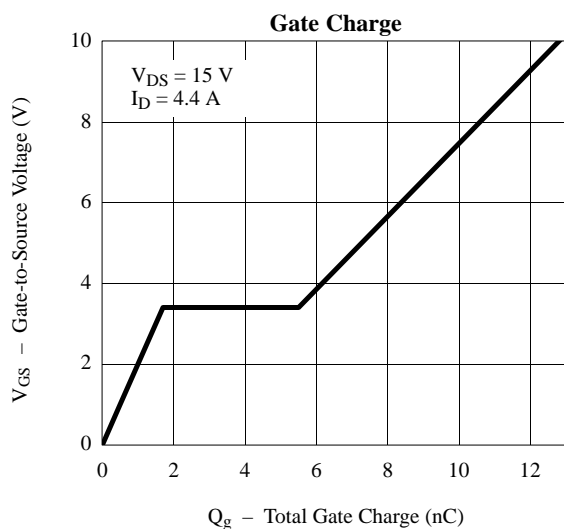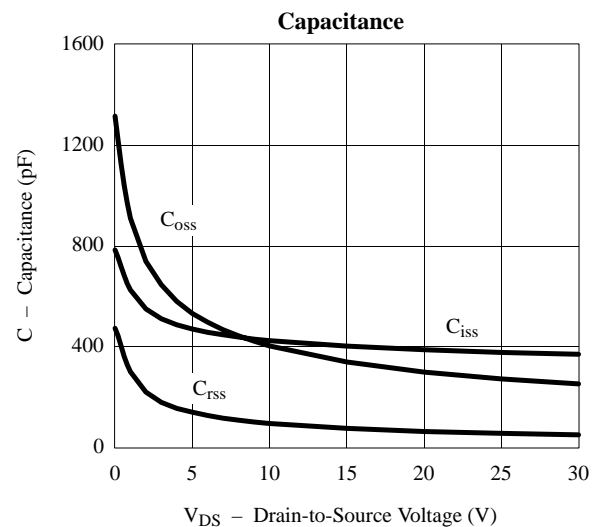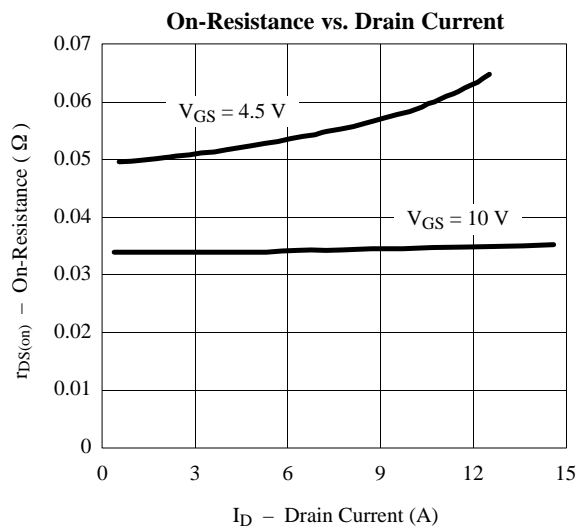
Si6436DQ

Specifications ($T_J = 25°C$ Unless Otherwise Noted)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250 \mu A$	1			V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0$ V, $V_{GS} = \pm 20$ 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, $T_J = 55°C$			20	
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, $I_D = 4.4$ A		0.034	0.045	Ω
		$V_{GS} = 4.5$ V, $I_D = 3.0$ A		0.052	0.070	
Forward Transconductance[a]	g_{fs}	$V_{DS} = 15$ V, $I_D = 4.4$ A		8		S
Diode Forward Voltage[a]	V_{SD}	$I_S = 1.7$ A, $V_{GS} = 0$ V		0.75	1.2	V
Dynamic[b]						
Total Gate Charge	Q_g	$V_{DS} = 15$ V, $V_{GS} = 10$ V, $I_D = 4.4$ A		13	30	nC
Gate-Source Charge	Q_{gs}			1.7		
Gate-Drain Charge	Q_{gd}			3.7		
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		12	30	ns
Rise Time	t_r			10	25	
Turn-Off Delay Time	$t_{d(off)}$			25	30	
Fall Time	t_f			10	50	
Source-Drain Reverse Recovery Time	t_{rr}	$I_F = 1.7$ A, di/dt = 100 A/μs		120	160	

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

Si6436DQ

Typical Characteristics (25°C Unless Otherwise Noted)

Output Characteristics

Transfer Characteristics

On-Resistance vs. Drain Current

Capacitance

Gate Charge

On-Resistance vs. Junction Temperature

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Typical Characteristics (25°C Unless Otherwise Noted)
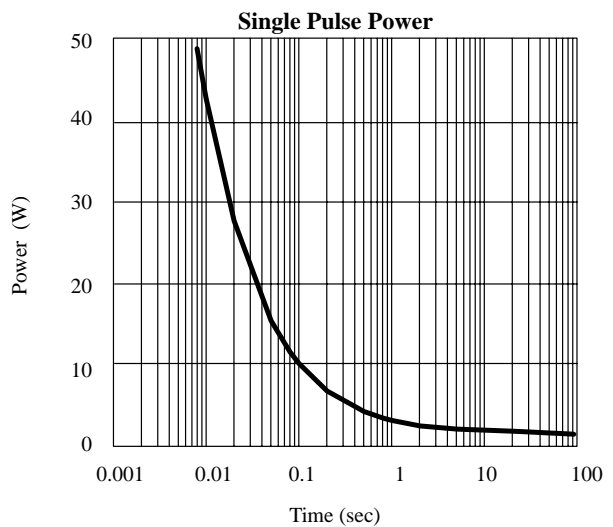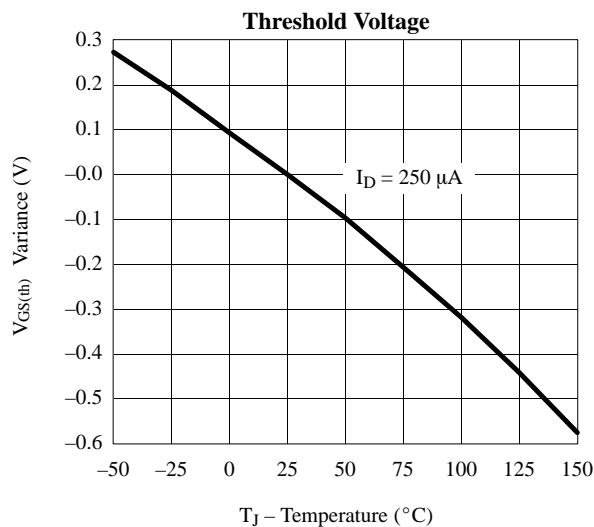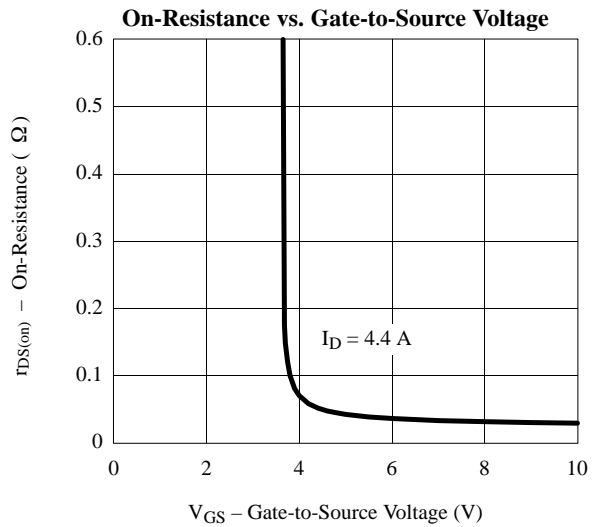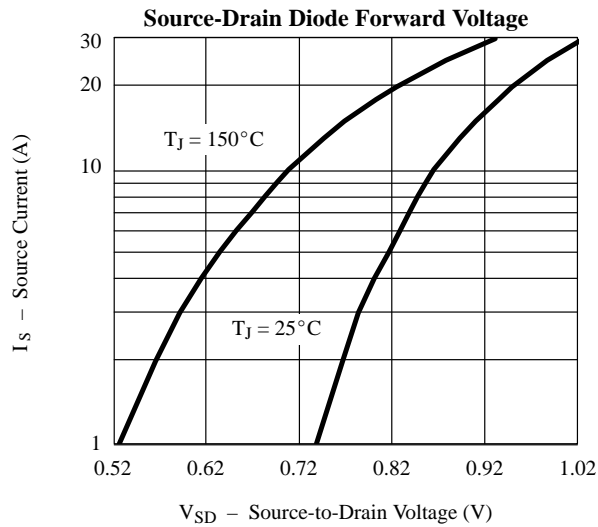
Source-Drain Diode Forward Voltage

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)

$I_D = 4.4$ A

Threshold Voltage

$V_{GS(th)}$ Variance (V) vs. T_J – Temperature (°C)

$I_D = 250$ μA

Single Pulse Power

Power (W) vs. Time (sec)

Normalized Thermal Transient Impedance, Junction-to-Ambient

Normalized Effective Transient Thermal Impedance vs. Square Wave Pulse Duration (sec)

Duty Cycle = 0.5

0.2

0.1

0.05

0.02

Single Pulse

Notes:

P_{DM}

t_1

t_2

1. Duty Cycle, D = $\dfrac{t_1}{t_2}$

2. Per Unit Base = R_{thJA} = 83°C/W

3. $T_{JM} - T_A = P_{DM}Z_{thJA}{}^{(t)}$

4. Surface Mounted

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