

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

PRODUCT SUMMARY		
V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A)
20	0.037 at V _{GS} = 4.5 V	7.3
	0.039 at V _{GS} = 2.5 V	7.1
	0.043 at V _{GS} = 1.8 V	6.8

FEATURES

- TrenchFET® Power MOSFET
- Additional Backside Coating

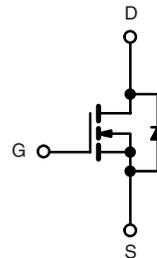
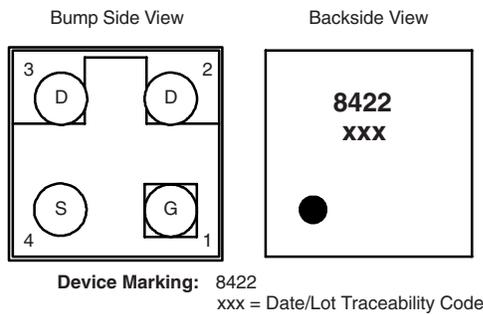


RoHS
COMPLIANT

APPLICATIONS

- PA, Battery and Load Switch for Portable Devices

MICRO FOOT



N-Channel MOSFET

Ordering Information: Si8422DB-T1-E1 (Lead (Pb)-free)

ABSOLUTE MAXIMUM RATINGS T _A = 25 °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 °C) ^a	I _D	T _A = 25 °C	7.3	5.3	A
		T _A = 70 °C	5.9	4.3	
Pulsed Drain Current	I _{DM}	30			
Continuous Source Current (Diode Conduction) ^a	I _S	2.3	1.2		
Maximum Power Dissipation ^a	P _D	T _A = 25 °C	2.77	1.47	W
		T _A = 70 °C	1.77	0.94	
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 55 to 150		°C	
Package Reflow Conditions ^b	IR/Convection	260			

THERMAL RESISTANCE RATINGS					
Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^a	t ≤ 5 s	R _{thJA}	35	45	°C/W
	Steady State		72	85	
Maximum Junction-to-Foot (Drain)	Steady State	R _{thJF}	16	20	

Notes:

- Surface Mounted on 1" x 1" FR4 board.
- Refer to IPC/JEDEC (J-STD-020C), no manual or hand soldering.
- In this document, any reference to case represents the body of the MICRO FOOT device and foot is the bump.

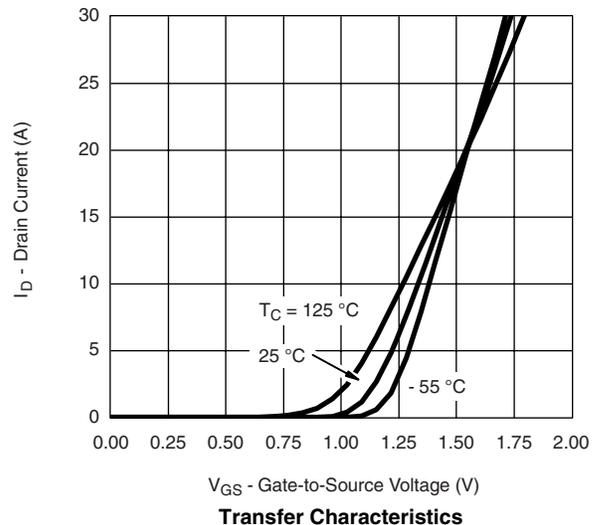
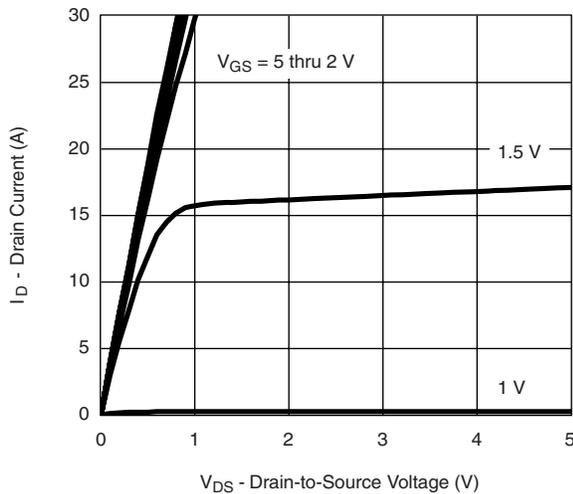
SPECIFICATIONS $T_J = 25^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250 \mu\text{A}$	0.4		1.0	V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 8 \text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 20 \text{ V}, V_{GS} = 0 \text{ V}$			1	μA
		$V_{DS} = 20 \text{ V}, V_{GS} = 0 \text{ V}, T_J = 70^\circ\text{C}$			5	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \leq 5 \text{ V}, V_{GS} = 4.5 \text{ V}$	5			A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = 4.5 \text{ V}, I_D = 1 \text{ A}$		0.031	0.037	Ω
		$V_{GS} = 2.5 \text{ V}, I_D = 1 \text{ A}$		0.033	0.039	
		$V_{GS} = 1.8 \text{ V}, I_D = 1 \text{ A}$		0.035	0.043	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 10 \text{ V}, I_D = 1 \text{ A}$		12		S
Diode Forward Voltage ^a	V_{SD}	$I_S = 1 \text{ A}, V_{GS} = 0 \text{ V}$		0.8	1.2	V
Dynamic^b						
Total Gate Charge	Q_g	$V_{DS} = 10 \text{ V}, V_{GS} = 4.5 \text{ V}, I_D = 1 \text{ A}$		17	26	nC
Gate-Source Charge	Q_{gs}			2		
Gate-Drain Charge	Q_{gd}			3.1		
Gate Resistance	R_g	$f = 1 \text{ MHz}$		15		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			45	70	
Turn-Off Delay Time	$t_{d(off)}$			145	220	
Fall Time	t_f			75	115	
Source-Drain Reverse Recovery Time	t_{rr}	$I_F = 1 \text{ A}, di/dt = 100 \text{ A}/\mu\text{s}$		30	60	

Notes:

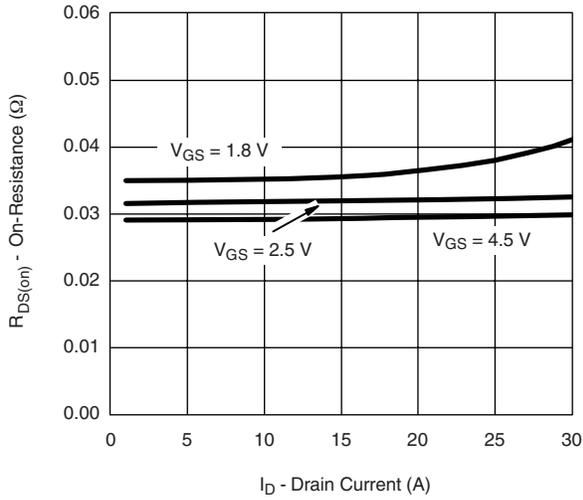
- a. Pulse test; pulse width $\leq 300 \mu\text{s}$, duty cycle $\leq 2\%$.
- b. Guaranteed by design, not subject to production testing.

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.

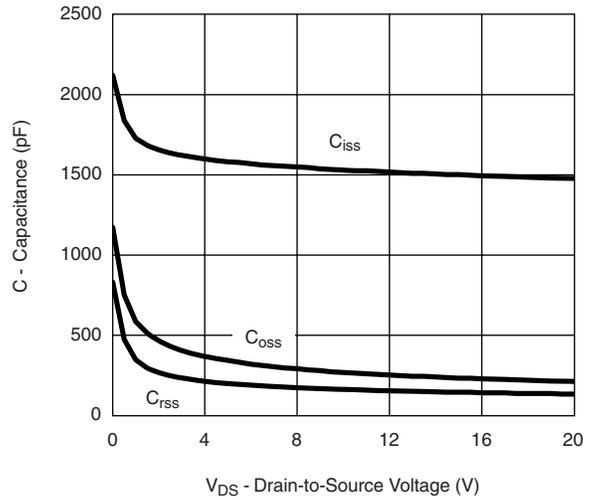
TYPICAL CHARACTERISTICS 25°C , unless otherwise noted



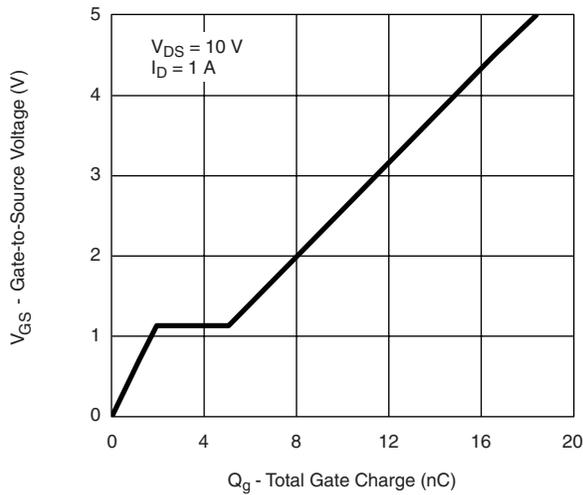
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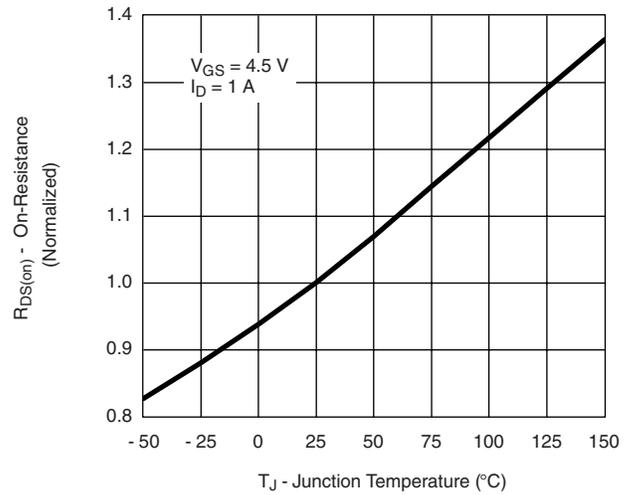
On-Resistance vs. Drain Current



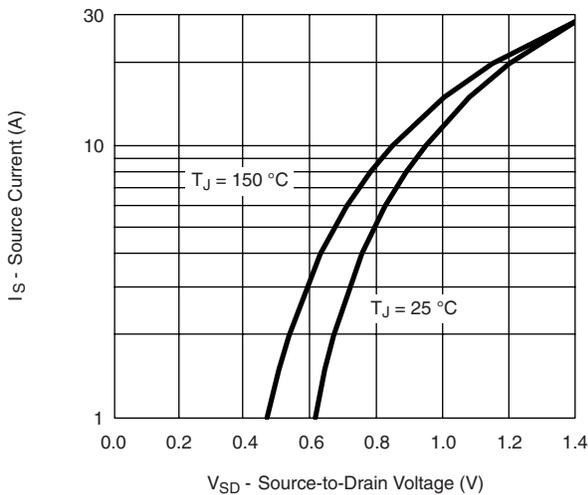
Capacitance



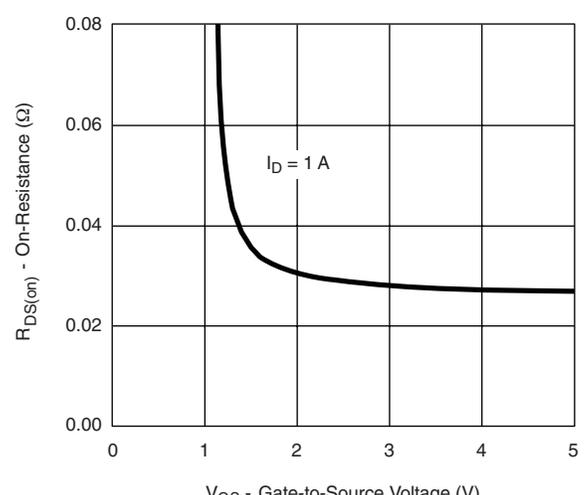
Gate Charge



On-Resistance vs. Junction Temperature

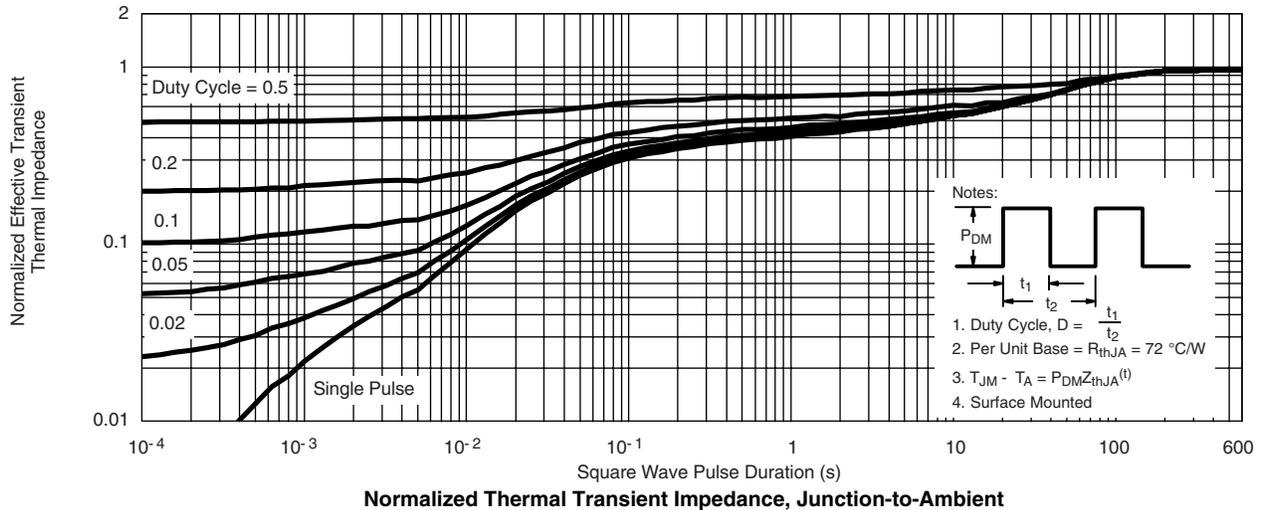
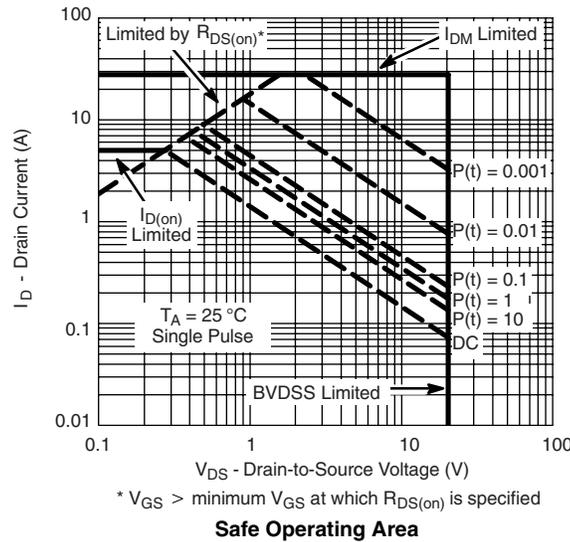
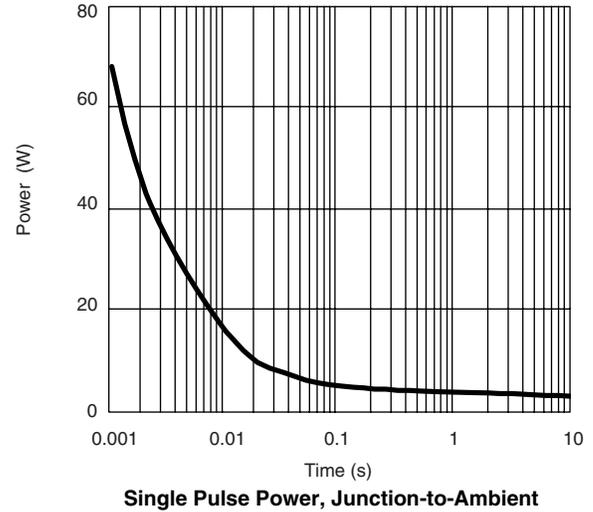
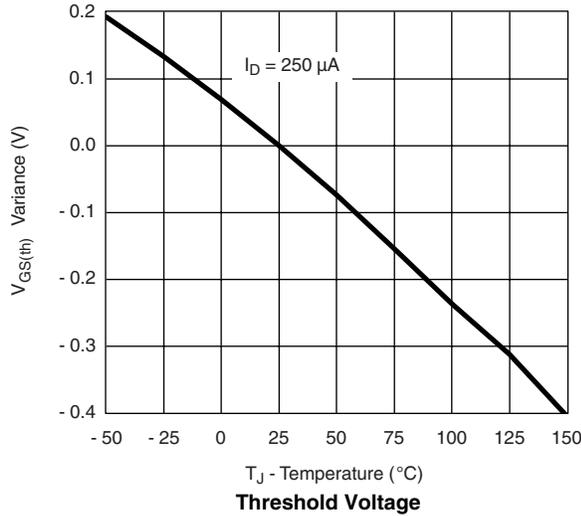


Source-Drain Diode Forward Voltage

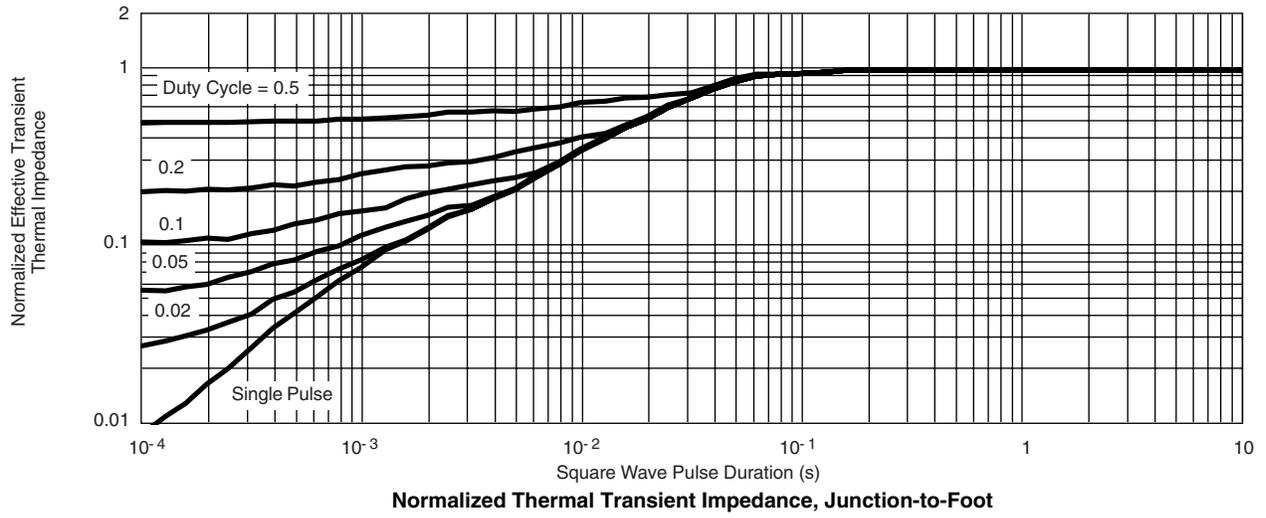


On-Resistance vs. Gate-to-Source Voltage

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

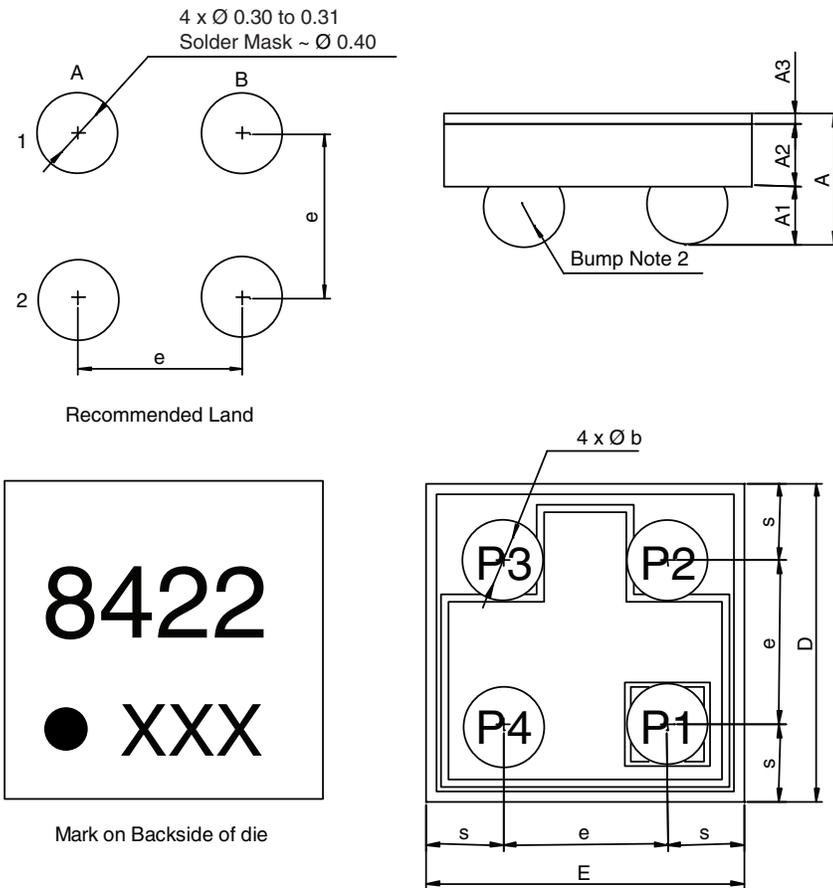


TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



PACKAGE OUTLINE

MICRO FOOT: 4-BUMP (2 x 2, 0.8 mm PITCH)



Notes (Unless Otherwise Specified):

1. Laser mark on the backside surface of die.
2. Bumps are 95.5 Sn, 3.8 Ag, 0.7 Cu.
3. A3 is the backside coating thickness.
4. • is location of Pin 1.

Dim.	Millimeters ^a			Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	0.597	0.635	0.673	0.0235	0.0250	0.0265
A1	0.270	0.285	0.300	0.0106	0.0112	0.0118
A2	0.290	0.300	0.310	0.0114	0.0118	0.0122
A3	0.037	0.050	0.063	0.0015	0.0020	0.0025
b	0.380	0.390	0.400	0.0150	0.0154	0.0157
e	0.800			0.0315		
s	0.350	0.375	0.400	0.0138	0.0148	0.0157
D	1.500	1.550	1.600	0.0591	0.0610	0.0630
E	1.500	1.550	1.600	0.0591	0.0610	0.0630

Notes:

- a. Use millimeters as the primary measurement.

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