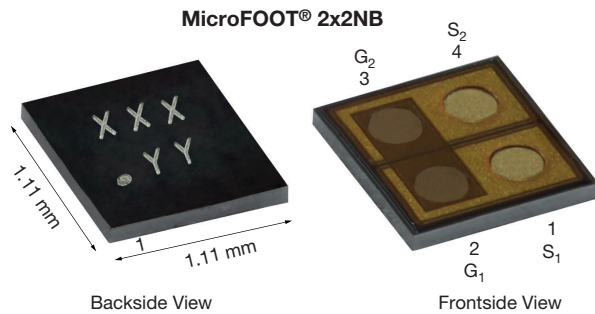


Common Drain Dual N-Channel 20 V (S1-S2) MOSFET



Marking code: XXX = Date/lot traceability code
YY = AA

PRODUCT SUMMARY	
V_{S1S2} (V)	20
$R_{S1S2(on)}$ max. (Ω) at $V_{GS} = 4.5$ V	0.075
$R_{S1S2(on)}$ max. (Ω) at $V_{GS} = 3.8$ V	0.082
$R_{S1S2(on)}$ max. (Ω) at $V_{GS} = 3.1$ V	0.095
$R_{S1S2(on)}$ max. (Ω) at $V_{GS} = 2.5$ V	0.115
Q_g typ. (nC)	2.7
I_{S1S2} (A) ^a	2.5
Configuration	Common drain

ORDERING INFORMATION	
Package	MicroFOOT® 2x2NB
Lead (Pb)-free and halogen-free	Si8916EDB-T5-E1

ABSOLUTE MAXIMUM RATINGS ($T_A = 25$ °C, unless otherwise noted)			
Parameter	Symbol	Limit	Unit
Drain-source voltage	V_{S1S2}	20	V
Gate-source voltage	V_{GS}	± 12	
Continuous drain current ($T_J = 150$ °C)	$T_A = 25$ °C	2.5 ^a	A
	$T_A = 70$ °C	2.0 ^a	
Pulsed drain current ($V_{GS} = 4.5$ V, $t = 100$ μ s)	I_{S1S2}	20	
Maximum power dissipation	$T_A = 25$ °C	0.77 ^a	W
	$T_A = 70$ °C	0.49 ^a	
Operating junction and storage temperature range	T_J, T_{stg}	-55 to +150	°C
Soldering recommendations (peak temperature) ^c		260	

THERMAL RESISTANCE RATINGS				
Parameter		Symbol	Typical	Maximum
Maximum junction-to-ambient ^{a, d}	$t \leq 5$ s	R_{thJA}	121	162

Notes

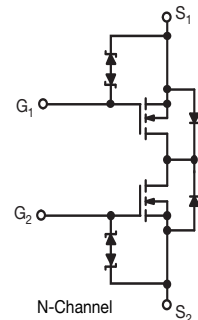
- Surface mounted on 1" x 1" FR4 board with full copper, $t = 5$ s
- Refer to IPC/JEDEC® (J-STD-020), no manual or hand soldering
- Maximum under steady state conditions is 202 °C/W

FEATURES

- TrenchFET® power MOSFET
- Ultra small 1.1 mm x 1.1 mm outline
- Ultra thin 0.13 mm max. height
- Typical ESD protection 2500 V (HBM)
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

APPLICATIONS

- Battery protection switch
- Bi-directional switch
- Load switch



RoHS
COMPLIANT
HALOGEN
FREE

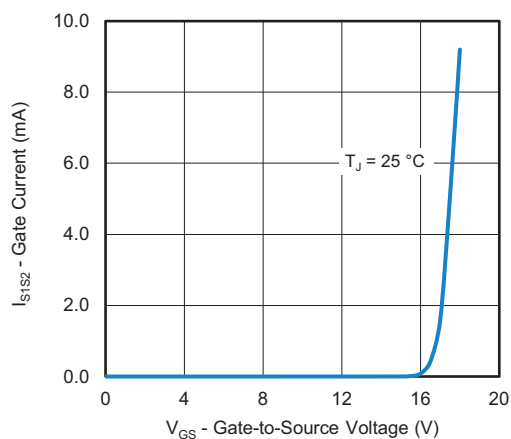
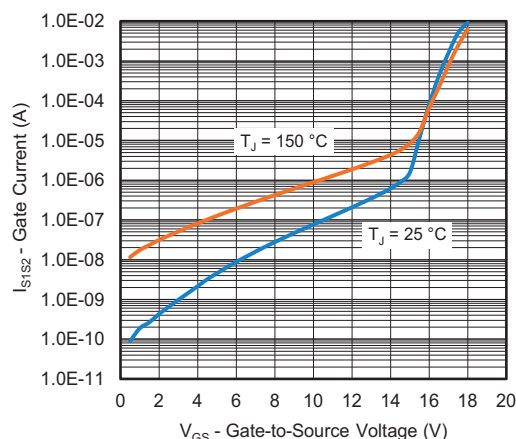
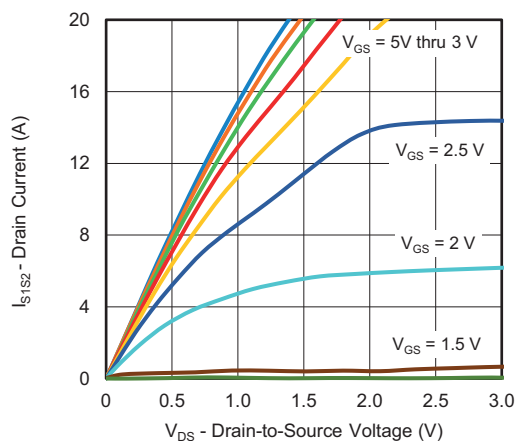
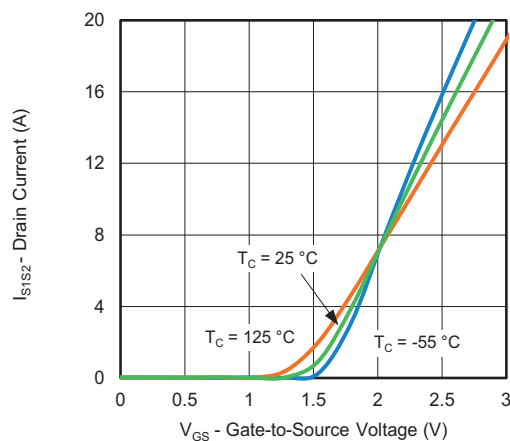
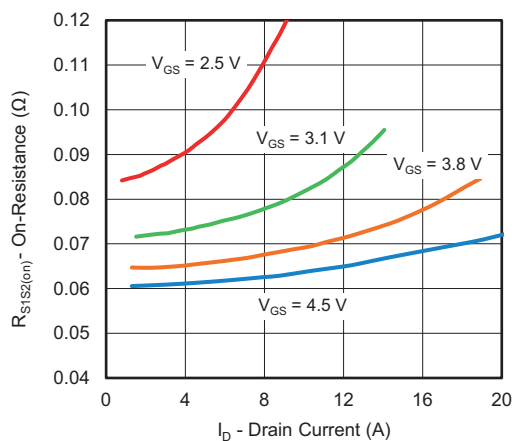
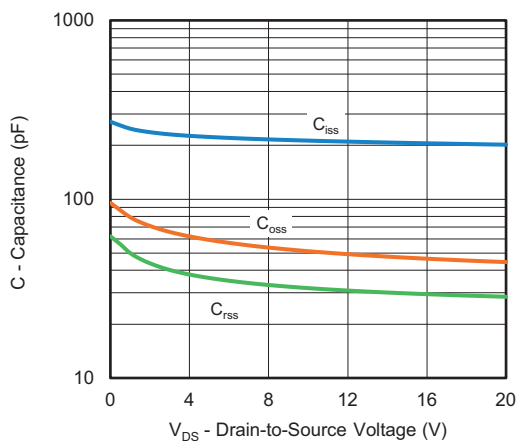


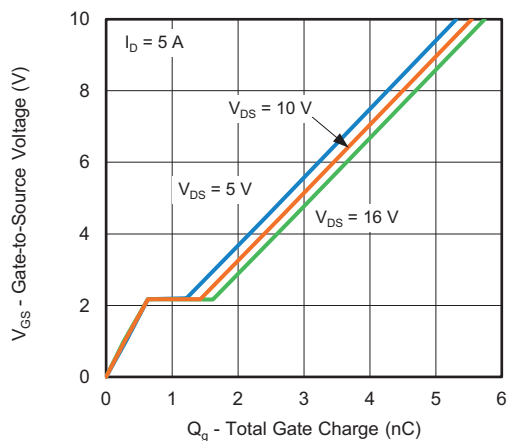
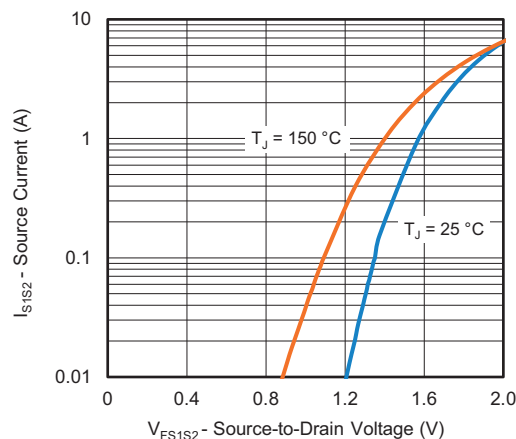
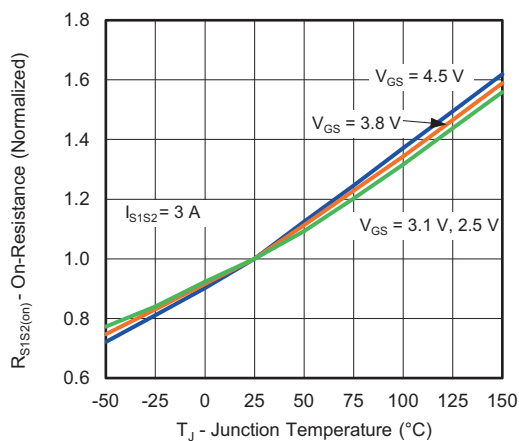
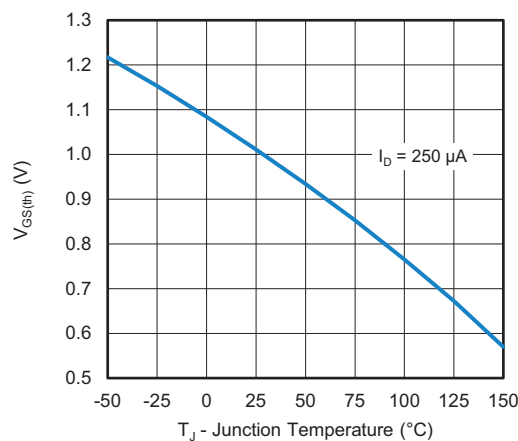
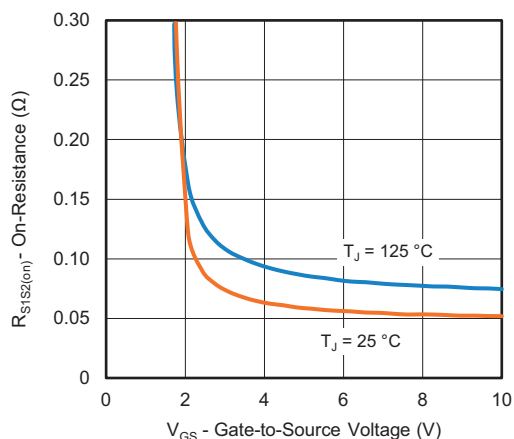
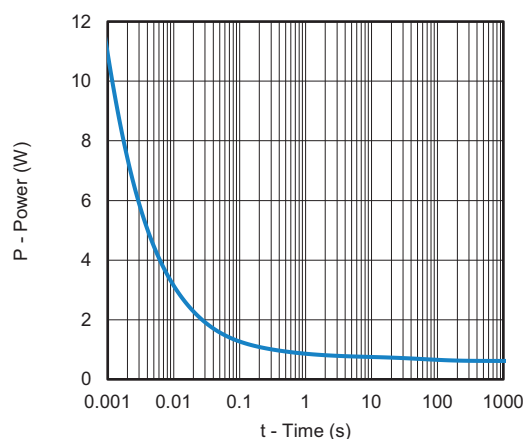
SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-source breakdown voltage	V _{S1S2}	V _{GS} = 0 V, I _{S1S2} = 250 μA	20	-	-	V
V _{DS} temperature coefficient	ΔV _{S1S2} /T _J	I _{S1S2} = 250 μA	-	17	-	mV/°C
V _{GS(th)} temperature coefficient	ΔV _{GS(th)} /T _J		-	-3.2	-	
Gate-source threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _{S1S2} = 250 μA	0.6	-	1.4	V
Gate-source leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 4.5 V	-	-	± 0.1	μA
		V _{DS} = 0 V, V _{GS} = ± 12 V	-	-	± 15	
Zero gate voltage drain current	I _{S1S2}	V _{S1S2} = 20 V, V _{GS} = 0 V	-	-	1	
		V _{S1S2} = 20 V, V _{GS} = 0 V, T _J = 55 °C	-	-	10	
Drain-source on-state resistance ^a	R _{S1S2}	V _{GS} = 4.5 V, I _D = 3 A	-	0.061	0.075	Ω
		V _{GS} = 3.8 V, I _{S1S2} = 3 A	-	0.066	0.082	
		V _{GS} = 3.1 V, I _{S1S2} = 2 A	-	0.073	0.095	
		V _{GS} = 2.5 V, I _{S1S2} = 1 A	-	0.086	0.115	
Forward transconductance ^a	g _{fs}	V _{S1S2} = 10 V, I _{S1S2} = 6 A	-	15	-	S
Dynamic ^{b, c}						
Input capacitance	C _{iss}	V _{DS} = 10 V, V _{GS} = 0 V, f = 1 MHz	-	220	-	pF
Output capacitance	C _{oss}		-	55	-	
Reverse transfer capacitance	C _{rss}		-	35	-	
Total gate charge	Q _g	V _{DS} = 10 V, V _{GS} = 10 V, I _D = 5 A	-	5.6	11	nC
		V _{DS} = 10 V, V _{GS} = 4.5 V, I _D = 5 A	-	2.7	5.4	
Gate-source charge	Q _{gs}		-	0.65	-	
Gate-drain charge	Q _{gd}		-	0.8	-	
Gate resistance	R _g	f = 1 MHz	0.6	3	6	Ω
Turn-on delay time	t _{d(on)}	V _{DD} = 10 V, R _L = 2 Ω I _D ≅ 5 A, V _{GEN} = 4.5 V, R _g = 1 Ω	-	10	20	ns
Rise time	t _r		-	40	80	
Turn-off delay time	t _{d(off)}		-	20	40	
Fall time	t _f		-	15	30	
Turn-on delay time	t _{d(on)}	V _{DD} = 10 V, R _L = 2 Ω I _D ≅ 5 A, V _{GEN} = 10 V, R _g = 1 Ω	-	5	10	
Rise time	t _r		-	20	40	
Turn-off delay time	t _{d(off)}		-	15	30	
Fall time	t _f		-	5	10	
Drain-Source Body Diode Characteristics						
Continuous source-drain diode current	I _{S1S2}	T _C = 25 °C	-	-	0.38	A
Pulse diode forward current	I _{S1S2}		-	-	20	
Body diode reverse recovery time	t _{rr}	I _F = 5 A, di/dt = 100 A/μs, T _J = 25 °C	-	10	20	ns
Body diode reverse recovery charge	Q _{rr}		-	2.5	5	nC
Reverse recovery fall time	t _a		-	4	-	ns
Reverse recovery rise time	t _b		-	6	-	

Note

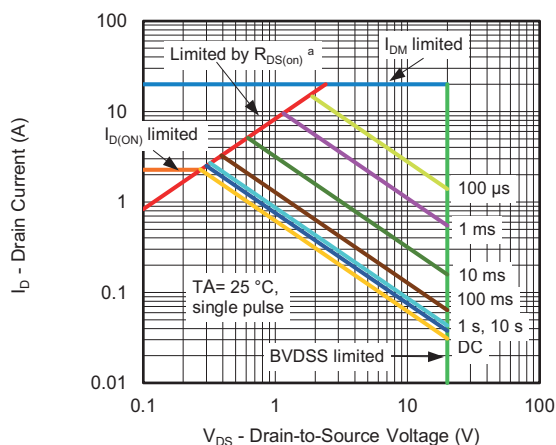
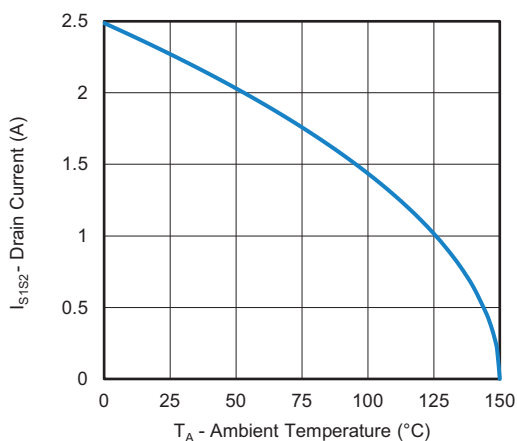
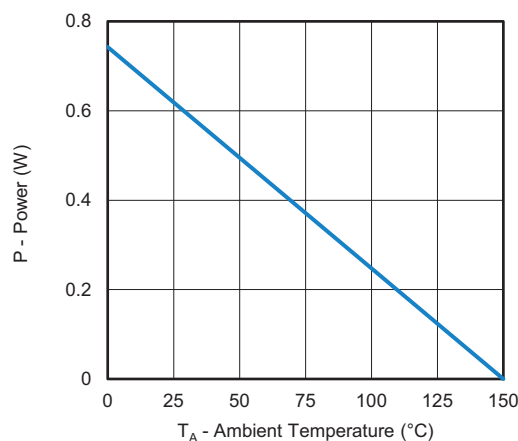
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$
b. Guaranteed by design, not subject to production testing
c. For single MOSFET only

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)

Gate Current vs. Gate-Source Voltage

Gate Current vs. Gate-Source Voltage

Output Characteristics

Transfer Characteristics

On-Resistance vs. Drain Current

Capacitance vs. Drain-to-Source Voltage

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

Gate Charge

Source-Drain Diode Forward Voltage

On-Resistance vs. Junction Temperature

Threshold Voltage

On-Resistance vs. Gate-to-Source Voltage

Single Pulse Power, Junction-to-Ambient ^a
Note

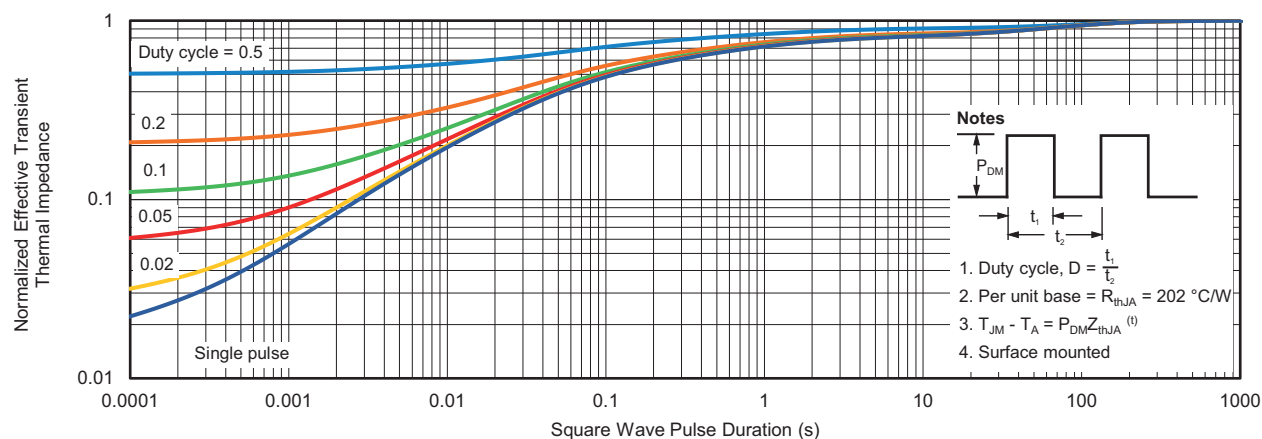
a. When Mounted on 1" x 1" FR4 with full copper

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

Safe Operating Area, Junction-to-Ambient ^b

Current Derating ^{a, b}

Power Derating ^b
Notes

- The power dissipation P_D is based on T_J max. = 150 °C, using junction-to-ambient thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit
- When mounted on 1" x 1" FR4 with full copper



TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Ambient (On 1" x 1" FR4 Board with Maximum Copper)

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