



N-Channel 20 V (D-S) MOSFET

PRODUCT SUMMARY						
V _{DS} (V)	$R_{DS(on)}$ (Ω)	I _D (A) a, e	Q _g (TYP.)			
20	$0.044 \text{ at V}_{GS} = 4.5 \text{ V}$	4.5				
	0.050 at V _{GS} = 2.5 V	4.2	6.8 nC			
	0.056 at V _{GS} = 1.8 V		0.6110			
	0.070 at V _{GS} = 1.5 V	1.5				

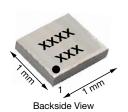
FEATURES

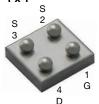
- TrenchFET® power MOSFET
- Ultra small 1 mm x 1 mm maximum outline
- Ultra-thin 0.548 mm maximum height

 Material categorization: for definitions of compliance please see www.vishay.com/doc?99912









Bump Side View

Marking Code: xxxx = 8472

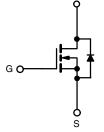
xxx = Date / lot traceability code

Ordering Information:

Si8472DB-T2-E1 (lead (Pb)-free and halogen-free)

APPLICATIONS

- · Baseband switch
- DC/DC conversion
 - Boost converters
- · Smart phones, portable media players



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T _A = 25 °C, unless otherwise noted)							
PARAMETER	SYMBOL	LIMIT	UNIT				
Drain-Source Voltage	V_{DS}	20	V				
Gate-Source Voltage	V _{GS}	± 8	T v				
	T _A = 25 °C		4.5 ^a				
Continuous Drain Current (T. 150 °C)	T _A = 70 °C		3.6 ^a				
Continuous Drain Current (T _J = 150 °C)	T _A = 25 °C	I _D	3.3 b				
	T _A = 70 °C		2.6 b	Α			
Pulsed Drain Current (t = 300 μs)	I _{DM}	20					
Ocalia de Ocada Baria Bioda Ocada	T _C = 25 °C	1	1.5 ^a				
Continuous Source-Drain Diode Current	T _A = 25 °C	I _S	0.65 ^b				
	T _A = 25 °C		1.8 ^a	W			
Mayimum Dayyar Dissination	T _A = 70 °C	П	1.1 ^a				
Maximum Power Dissipation	T _A = 25 °C	P_{D}	0.78 ^b	T VV			
	T _A = 70 °C		0.5 b				
Operating Junction and Storage Temperature Ran	T _J , T _{stg}	-55 to +150					
Package Poffey Conditions C	VPR	-	260	°C			
Package Reflow Conditions ^c	IR/Convection		260				

Notes

- a. Surface mounted on 1" \times 1" FR4 board with full copper, t = 10 s.
- b. Surface mounted on 1" x 1" FR4 board with minimum copper, t = 10 s.
- c. Refer to IPC/JEDEC® (J-STD-020), no manual or hand soldering.
- d. In this document, any reference to case represents the body of the MICRO FOOT device and foot is the bump.
- e. Based on $T_A = 25$ °C.

THERMAL RESISTANCE RATINGS							
PARAMETER		SYMBOL	TYPICAL	MAXIMUM	UNIT		
Maximum Junction-to-Ambient a, b	t = 10 s	D	55	70	°C/W		
Maximum Junction-to-Ambient c, d	t = 10 s	- R _{thJA}	125	160	C/VV		

Notes

- a. Surface mounted on 1" x 1" FR4 board with full copper.
- b. Maximum under steady state conditions is 100 °C/W.
- c. Surface mounted on 1" x 1" FR4 board with minimum copper.
- d. Maximum under steady state conditions is 190 °C/W.



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SPECIFICATIONS (T _J = 25 °C	, unless ot	herwise noted)					
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT	
Static				•			
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0 \text{ V}, I_D = 250 \mu\text{A}$	20	-	-	V	
V _{DS} Temperature Coefficient	$\Delta V_{DS}/T_{J}$	J 050A	-	16	-	mV/°C	
V _{GS(th)} Temperature Coefficient	$\Delta V_{GS(th)}/T_J$	I _D = 250 μA	-	-2.6	-		
Gate-Source Threshold Voltage	V _{GS(th)}	$V_{DS} = V_{GS}, I_D = 250 \mu A$	0.4	-	0.9	V	
Gate-Source Leakage	I _{GSS}	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 8 \text{ V}$	-	-	± 100	nA	
Zoro Cata Voltago Drain Current	ı	$V_{DS} = 20 \text{ V}, V_{GS} = 0 \text{ V}$	-	-	1	11.0	
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 20 V, V _{GS} = 0 V, T _J = 70 °C	-	-	10	μA	
On-State Drain Current ^a	I _{D(on)}	$V_{DS} \le -5 \text{ V}, V_{GS} = 4.5 \text{ V}$	10	-	-	Α	
		V _{GS} = 4.5 V, I _D = 1.5 A	-	0.036	0.044	1	
Drain Source On State Begintance	В	V _{GS} = 2.5 V, I _D = 1 A	-	0.041	0.050		
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 1.8 V, I _D = 1 A	-	0.046	0.056	Ω	
		V _{GS} = 1.5 V, I _D = 0.5 A	-	0.050	0.070		
Forward Transconductance ^a	9fs	V _{DS} = 10 V, I _D = 1.5 A	-	16	-	S	
Dynamic ^b							
Input Capacitance	C _{iss}		-	630	-	pF	
Output Capacitance	Coss	V _{DS} = 10 V, V _{GS} = 0 V, f = 1 MHz	-	105	-		
Reverse Transfer Capacitance	C _{rss}]	-	42	-		
Total Gate Charge	Q _g	V _{DS} = 10 V, V _{GS} = 8 V, I _D = 1.5 A	-	12	18		
		V _{DS} = 10 V, V _{GS} = 4.5 V, I _D = 1.5 A	-	6.8	11	nC	
Gate-Source Charge			-	0.8	-		
Gate-Drain Charge	Q_{gd}]	-	1.1	-		
Gate Resistance	R_g	V _{GS} = 0.1 V, f = 1 MHz	-	5.3	-	Ω	
Turn-On Delay Time	t _{d(on)}		-	7	15	ns	
Rise Time	t _r	$V_{DD} = -10 \text{ V}, R_1 = 6.7 \Omega$	-	15	30		
Turn-Off Delay Time	t _{d(off)}	$I_D \cong 1.5 \text{ A}, V_{GEN} = -4.5 \text{ V}, R_g = 1 \Omega$	-	30	60		
Fall Time	t _f		-	10	20		
Turn-On Delay Time	t _{d(on)}		-	5	10		
Rise Time	t _r	$V_{DD} = -10 \text{ V}, R_L = 6.7 \Omega$	-	15	30		
Turn-Off Delay Time	t _{d(off)}	$I_D \cong -1.5 \text{ A}, V_{GEN} = -8 \text{ V}, R_g = 1 \Omega$	-	30	60		
Fall Time	t _f]	-	10	20		
Drain-Source Body Diode Characteri	stics						
Continuous Source-Drain Diode Current	I _S	T _A = 25 °C	-	-	1.5	А	
Pulse Diode Forward Current	I _{SM}		-	-	20		
Body Diode Voltage	V_{SD}	I _S = 1.5 A, V _{GS} = 0	-	0.7	1.2	V	
Body Diode Reverse Recovery Time	t _{rr}		-	15	30	ns	
Body Diode Reverse Recovery Charge	Q _{rr}	O.,.	-	6	15	nC	
Reverse Recovery Fall Time	ta	$I_F = 1.5 \text{ A}, \text{ dI/dt} = 100 \text{ A/}\mu\text{s}, T_J = 25 °\text{C}$	-	7	-	ns	
Reverse Recovery Rise Time	t _b	1	-	8	-		

Notes

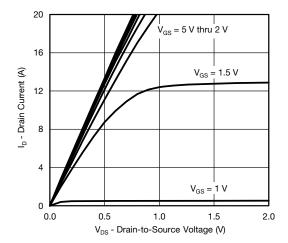
- a. Pulse test; pulse width \leq 300 µs, duty cycle \leq 2 %.
- b. Guaranteed by design, not subject to production testing.

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.

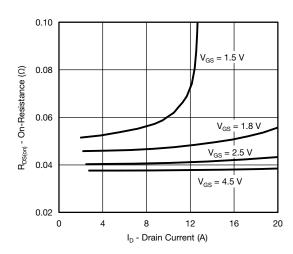
ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000



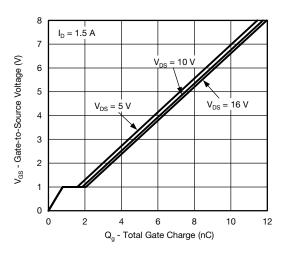
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



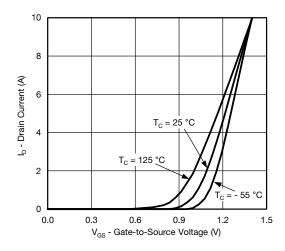
Output Characteristics



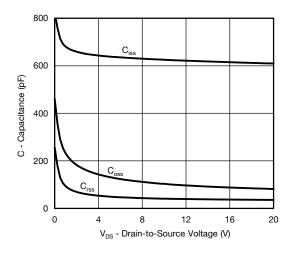
On-Resistance vs. Drain Current and Gate Voltage



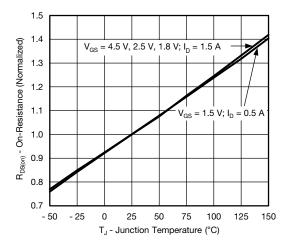
Gate Charge



Transfer Characteristics



Capacitance

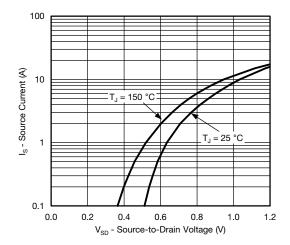


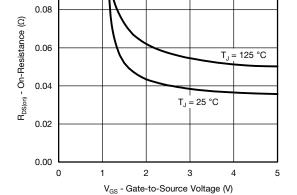
On-Resistance vs. Junction Temperature

 $I_{D} = 1.5 A$



TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

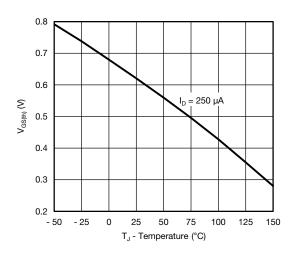


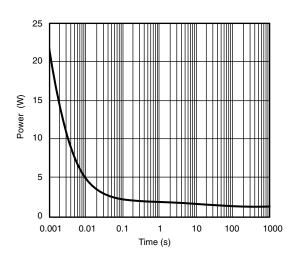


0.10

Source-Drain Diode Forward Voltage

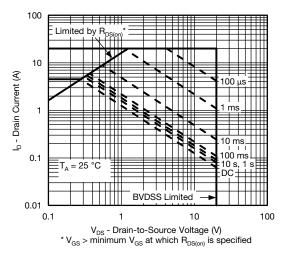






Threshold Voltage

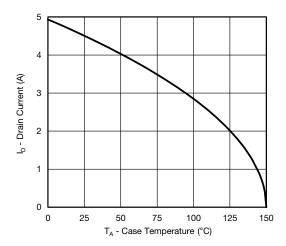
Single Pulse Power, Junction-to-Ambient

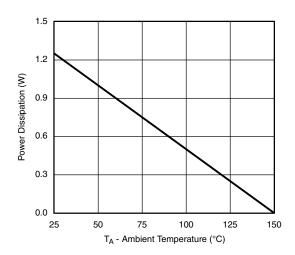


Safe Operating Area, Junction-to-Ambient



TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)





Power Derating

Current Derating a

Note

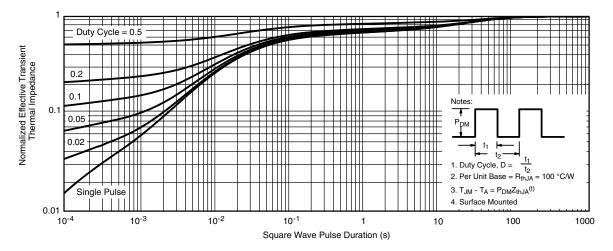
• When mounted on 1" x 1" FR4 with full copper.

Note

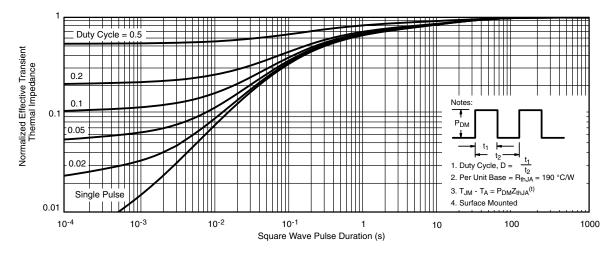
a. The power dissipation P_D is based on T_J (max.) = 150 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the



TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



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



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

Vishay Siliconix maintains worldwide manufacturing capability. Products may be manufactured at one of several qualified locations. Reliability data for Silicon Technology and Package Reliability represent a composite of all qualified locations. For related documents such as package/tape drawings, part marking, and reliability data, see www.vishay.com/ppg263300.

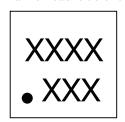


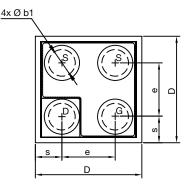
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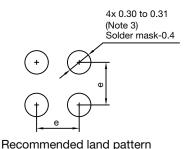
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MICRO FOOT®: 4-Bumps (1 mm x 1 mm, 0.5 mm Pitch, 0.286 mm Bump Height)

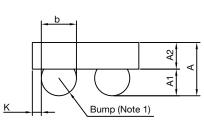
Mark on backside of die











Notes

- 1. Bumps are 95.5/3.8/0.7 Sn/Ag/Cu.
- 2. Backside surface is coated with a Ti/Ni/Ag layer.
- 3. Non-solder mask defined copper landing pad.
- 4. Laser mark on the backside surface of die.
- 5. "b1" is the diameter of the solderable substrate surface, defined by an opening in the solder resist layer solder mask defined.
- 6. is the location of pin 1

DIM.	MILLIMETERS			INCHES			
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.	
Α	0.458	0.504	0.550	0.0180	0.0198	0.0217	
A1	0.214	0.250	0.286	0.0084	0.0098	0.0113	
A2	0.244	0.254	0.264	0.0096	0.0100	0.0104	
b	0.297	0.330	0.363	0.0117	0.0130	0.0143	
b1	0.250			0.0098			
е	0.500			0.0197			
S	0.210	0.230	0.250	0.0083	0.0091	0.0096	
D	0.920	0.960	1.000	0.0362	0.0378	0.0394	
K	0.029	0.065	0.102	0.0011	0.0026	0.0040	

Note

• Use millimeters as the primary measurement.

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DWG: 6039

Revision: 27-Apr-15 **1** Document Number: 69370



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