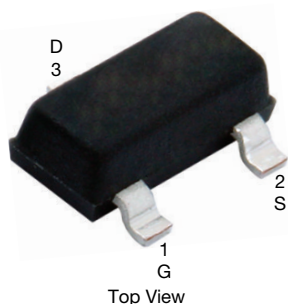


N-Channel 30 V (D-S) MOSFET

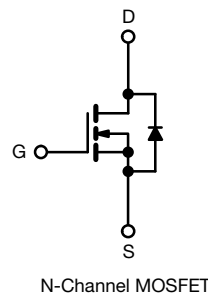
SOT-23 (TO-236)


FEATURES

- TrenchFET® power MOSFET
- 100 % R_g and UIS tested
- Material categorization:
for definitions of compliance please see
www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE
Available



PRODUCT SUMMARY

V_{DS} (V)	30
$R_{DS(on)}$ max. (Ω) at $V_{GS} = 10$ V	0.047
$R_{DS(on)}$ max. (Ω) at $V_{GS} = 4.5$ V	0.065
Q_g typ. (nC)	3.0
I_D (A)	4.0
Configuration	Single

ORDERING INFORMATION

Package	SOT-23 (TO-236)
Lead (Pb)-free	Si2306BDS-T1-E3
Lead (Pb)-free and halogen-free	Si2306BDS-T1-GE3

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, b}	$T_A = 25$ °C	4.0 ^c	A
	$T_A = 70$ °C	3.5 ^c	
	$T_A = 25$ °C	3.16 ^d	
	$T_A = 70$ °C	2.7 ^d	
Pulsed drain current	I_{DM}	20	
Continuous source-drain diode current ^{a, b}	I_S	1.04 ^c	
		0.62 ^d	
Maximum power dissipation ^{a, b}	$T_A = 25$ °C	1.25 ^c	W
	$T_A = 70$ °C	0.8 ^c	
	$T_A = 25$ °C	0.75 ^d	
	$T_A = 70$ °C	0.48 ^d	
Operating junction and storage temperature range	T_J, T_{stg}	-55 to +150	°C

Notes

- Surface mounted on 1" x 1" FR4 board, $t \leq 5$ s
- Pulse width limited by maximum junction temperature
- $t = 5$ s
- Steady state

**THERMAL RESISTANCE RATINGS**

PARAMETER		SYMBOL	TYPICAL	MAXIMUM	UNIT
Maximum junction-to-ambient ^a	$t \leq 5$ s	R_{thJA}	60	100	°C/W
	Steady state		130	166	
Maximum junction-to-foot (drain)	Steady state	R_{thJF}	60	75	

Note

a. Surface mounted on 1" x 1" FR4 board

SPECIFICATIONS ($T_A = 25$ °C, unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static						
Drain-source breakdown voltage	V_{DS}	$V_{GS} = 0\text{ V}$, $I_D = 250\text{ }\mu\text{A}$	30	-	-	V
Gate-source threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\text{ }\mu\text{A}$	1.0	-	3.0	V
Gate-body leakage	I_{GSS}	$V_{DS} = 0\text{ V}$, $V_{GS} = \pm 20\text{ V}$	-	-	± 100	nA
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 30\text{ V}$, $V_{GS} = 0\text{ V}$	-	-	0.5	μA
		$V_{DS} = 30\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 55\text{ }^{\circ}\text{C}$	-	-	10	
On-state drain current ^a	$I_{D(on)}$	$V_{DS} \geq 4.5\text{ V}$, $V_{GS} = 10\text{ V}$	6	-	-	A
Drain-source on-state resistance ^a	$R_{DS(on)}$	$V_{GS} = 10\text{ V}$, $I_D = 3.5\text{ A}$	-	0.038	0.047	Ω
		$V_{GS} = 4.5\text{ V}$, $I_D = 2.8\text{ A}$	-	0.052	0.065	
Forward transconductance ^a	g_{fs}	$V_{DS} = 4.5\text{ V}$, $I_D = 2.5\text{ A}$	-	7.0	-	S
Diode forward voltage	V_{SD}	$V_{GS} = 0\text{ V}$, $I_S = 1.25\text{ A}$	-	0.8	1.2	V
Dynamic						
Gate charge	Q_g	$V_{DS} = 15\text{ V}$, $V_{GS} = 5\text{ V}$, $I_D = 2.5\text{ A}$	-	3.0	4.5	nC
Total gate charge	Q_{gt}	$V_{DS} = 15\text{ V}$, $V_{GS} = 10\text{ V}$, $I_D = 2.5\text{ A}$	-	6	9	
Gate-source charge	Q_{gs}		-	1.6	-	
Gate-drain charge	Q_{gd}		-	0.6	-	
Gate resistance	R_g	$f = 1\text{ MHz}$	2.0	5.0	7.5	Ω
Input capacitance	C_{iss}	$V_{DS} = 15\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1\text{ MHz}$	-	305	-	pF
Output capacitance	C_{oss}		-	65	-	
Reverse transfer capacitance	C_{rss}		-	29	-	
Switching						
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 15\text{ V}$, $R_L = 15\text{ }\Omega$, $I_D \cong 1\text{ A}$, $V_{GEN} = 0\text{ V}$, $R_g = 6\text{ }\Omega$	-	7	11	ns
Rise time	t_r		-	12	18	
Turn-off delay time	$t_{d(off)}$		-	14	25	
Fall time	t_f		-	6	10	
Reverse recovery time	t_{rr}	$I_F = 1.25\text{ A}$, $di/dt = 100\text{ A}/\mu\text{s}$	-	14	21	nC
Body diode reverse recovery charge	Q_{rr}		-	6	10	

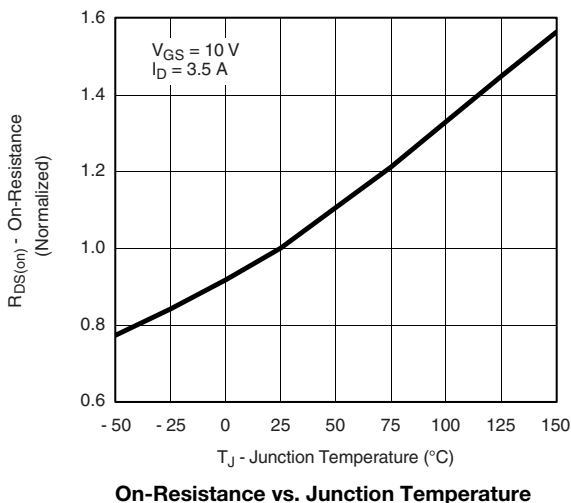
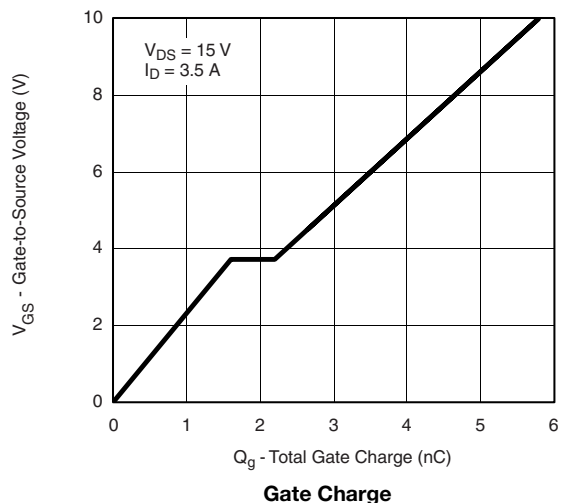
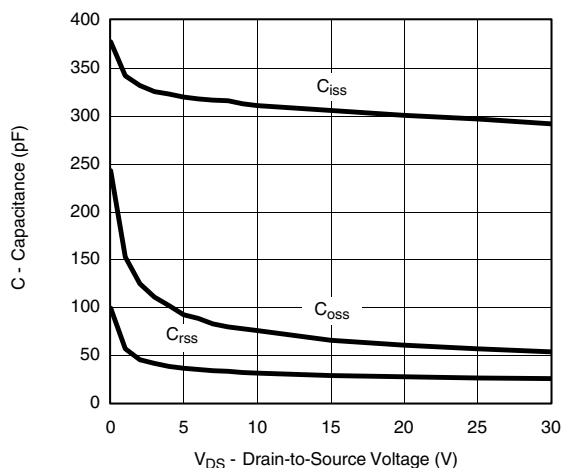
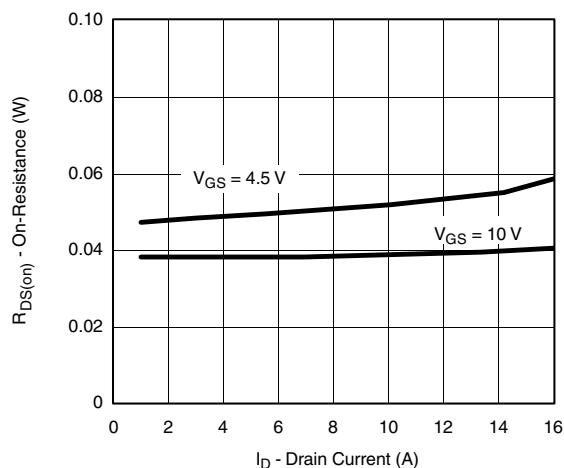
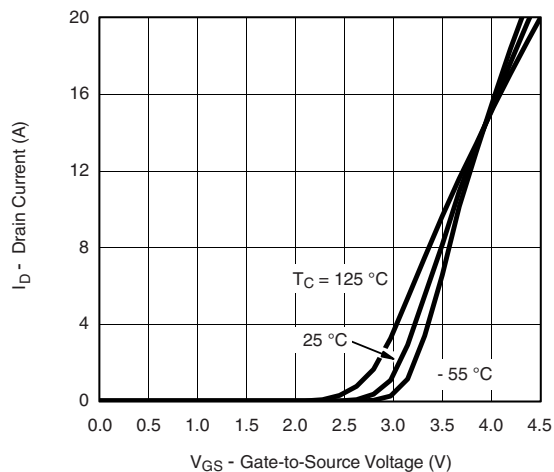
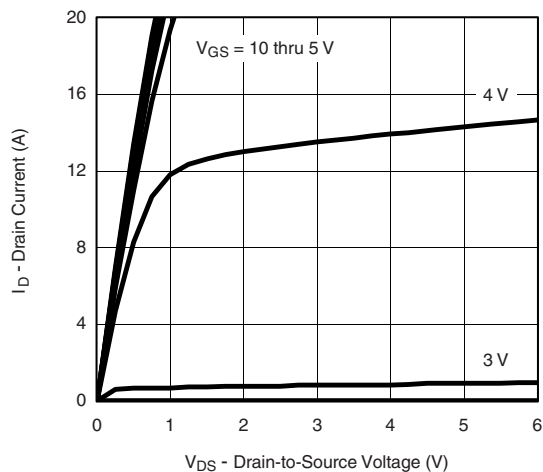
Notes

a. Pulse test; pulse width ≤ 300 μ s, duty cycle ≤ 2 %

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.

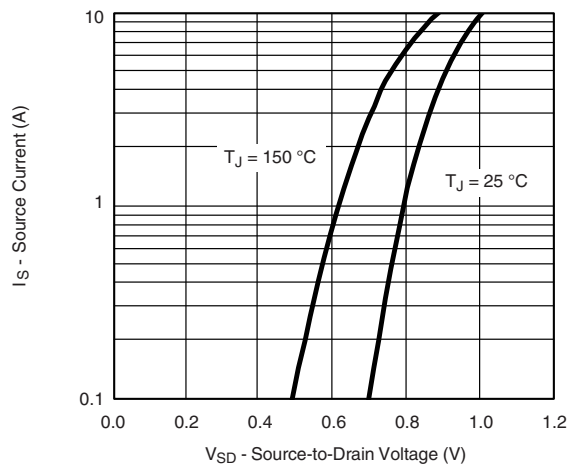


TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

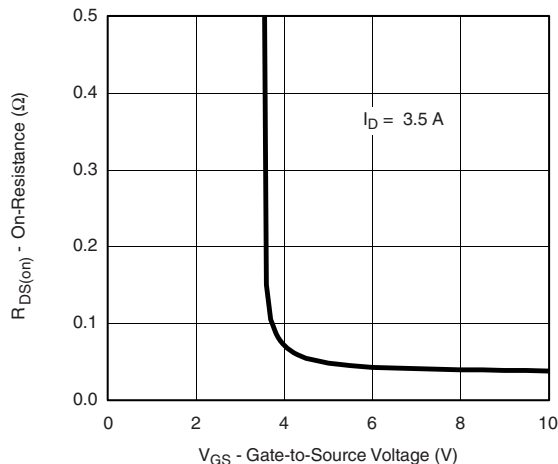




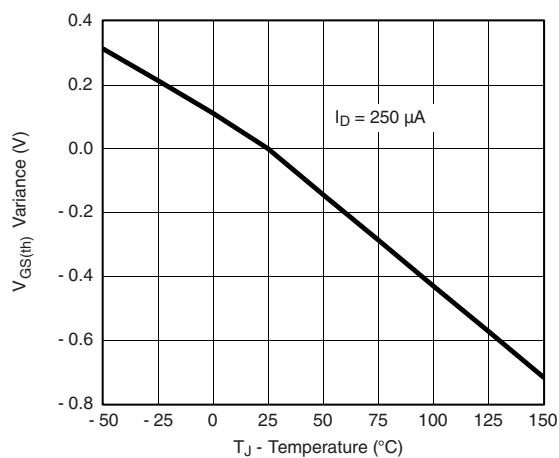
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



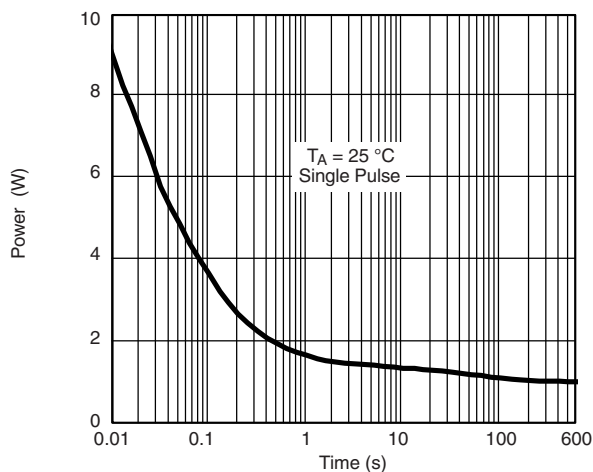
Source-Drain Diode Forward Voltage



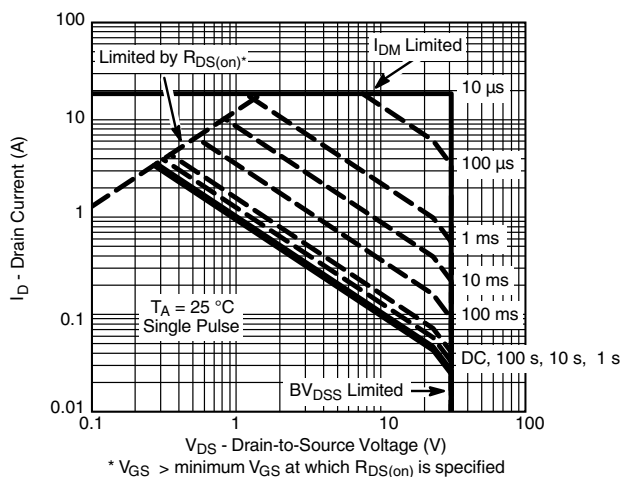
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



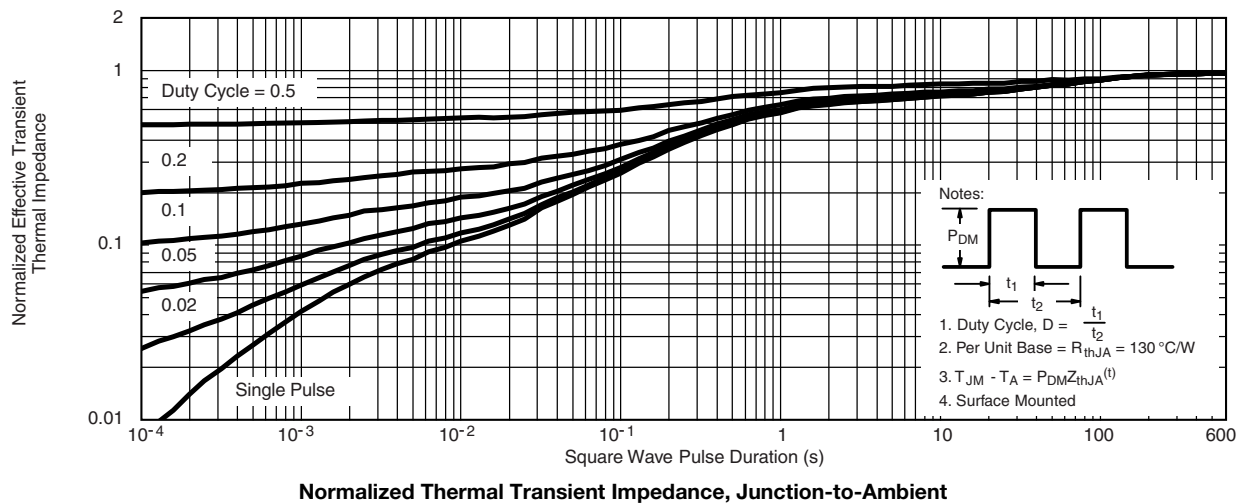
Single Pulse Power



Safe Operating Area



TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



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/ppg?73234.

SOT-23 (TO-236): 3-LEAD



Dim	MILLIMETERS		INCHES	
	Min	Max	Min	Max
A	0.89	1.12	0.035	0.044
A ₁	0.01	0.10	0.0004	0.004
A ₂	0.88	1.02	0.0346	0.040
b	0.35	0.50	0.014	0.020
c	0.085	0.18	0.003	0.007
D	2.80	3.04	0.110	0.120
E	2.10	2.64	0.083	0.104
E ₁	1.20	1.40	0.047	0.055
e	0.95 BSC		0.0374 Ref	
e ₁	1.90 BSC		0.0748 Ref	
L	0.40	0.60	0.016	0.024
L ₁	0.64 Ref		0.025 Ref	
S	0.50 Ref		0.020 Ref	
q	3°	8°	3°	8°
ECN: S-03946-Rev. K, 09-Jul-01				
DWG: 5479				

RECOMMENDED MINIMUM PADS FOR SOT-23



Recommended Minimum Pads
Dimensions in Inches/(mm)

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