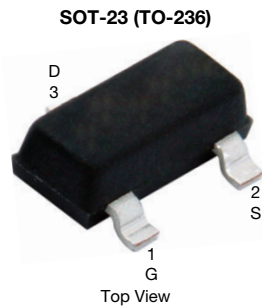


P-Channel 30 V (D-S) MOSFET



Marking code: N7

PRODUCT SUMMARY	
V_{DS} (V)	-30
$R_{DS(on)}$ max. (Ω) at $V_{GS} = -10$ V	0.088
$R_{DS(on)}$ max. (Ω) at $V_{GS} = -4.5$ V	0.138
Q_g typ. (nC)	4.1
I_D (A) ^{a, b}	-3.5
Configuration	Single

ORDERING INFORMATION	
Package	SOT-23
Lead (Pb)-free	Si2307CDS-T1-E3
Lead (Pb)-free and halogen-free	Si2307CDS-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}	I_D	$T_C = 25$ °C	-3.5
		$T_C = 70$ °C	-2.8
		$T_A = 25$ °C	-2.7 ^{a, b}
		$T_A = 70$ °C	-2.2 ^{a, b}
Pulsed drain current (10 μ s pulse width)	I_{DM}	-12	A
Continuous source-drain diode current ^{a, b}	I_S	$T_C = 25$ °C	
		$T_A = 25$ °C	-0.91 ^{a, b}
Maximum power dissipation ^{a, b}	P_D	$T_C = 25$ °C	1.8
		$T_C = 70$ °C	1.14
		$T_A = 25$ °C	1.1 ^{a, b}
		$T_A = 70$ °C	0.7 ^{a, b}
		Operating junction and storage temperature range	T_J, T_{stg}
Soldering recommendations (peak temperature) ^c		260	

THERMAL RESISTANCE RATINGS					
PARAMETER		SYMBOL	TYPICAL	MAXIMUM	UNIT
Maximum junction-to-ambient ^{a, c}	$t \leq 5$ s	R_{thJA}	90	115	°C/W
Maximum junction-to-foot (drain)	Steady state	R_{thJF}	55	70	

Notes

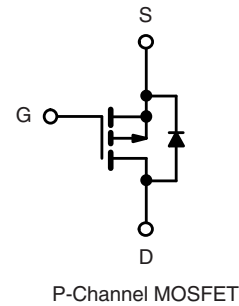
- Surface mounted on 1" x 1" FR4 board
- $t = 5$ s
- Maximum under steady state conditions is 166 °C/W

FEATURES

- TrenchFET[®] power MOSFET
- Material categorization:
for definitions of compliance please see
www.vishay.com/doc?99912

APPLICATIONS

- Load switch for portable devices





SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, 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
V_{DS} temperature coefficient	$\Delta V_{DS}/T_J$	$I_D = -250\text{ }\mu\text{A}$	-	-32	-	mV/ $^\circ\text{C}$
$V_{GS(th)}$ temperature coefficient	$\Delta V_{GS(th)}/T_J$		-	4.5	-	
Gate-source threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	-1	-	-3	V
Gate-source leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$	-	-	-100	nA
Zero gate voltage drain current	I_{DSS}	$V_{DS} = -30\text{ V}, V_{GS} = 0\text{ V}$	-	-	-1	μA
		$V_{DS} = -30\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$	-	-	-10	
On-state drain current ^a	$I_{D(on)}$	$V_{DS} \leq 5\text{ V}, V_{GS} = -10\text{ V}$	-6	-	-	A
Drain-source on-state resistance ^a	$R_{DS(on)}$	$V_{GS} = -10\text{ V}, I_D = -3.5\text{ A}$	-	0.073	0.088	Ω
		$V_{GS} = -4.5\text{ V}, I_D = -2.5\text{ A}$	-	0.110	0.138	
Forward transconductance ^a	g_{fs}	$V_{DS} = -10\text{ V}, I_D = -3.5\text{ A}$	-	7	-	S
Dynamic ^b						
Input capacitance	C_{iss}	$V_{DS} = -15\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$	-	340	-	pF
Output capacitance	C_{oss}		-	67	-	
Reverse transfer capacitance	C_{rss}		-	51	-	
Total gate charge	Q_g	$V_{DS} = -15\text{ V}, V_{GS} = -4.5\text{ V}, I_D = -2.5\text{ A}$	-	4.1	6.2	nC
Gate-source charge	Q_{gs}		-	1.3	-	
Gate-drain charge	Q_{gd}		-	1.8	-	
Gate resistance	R_g	$f = 1\text{ MHz}$	-	10	-	Ω
Turn-on delay time	$t_{d(on)}$	$V_{DD} = -15\text{ V}, R_L = 15\text{ }\Omega$ $I_D \cong -1\text{ A}, V_{GEN} = -4.5\text{ V}, R_g = 1\text{ }\Omega$	-	40	60	ns
Rise time	t_r		-	40	60	
Turn-off delay time	$t_{d(off)}$		-	20	40	
Fall time	t_f		-	17	30	
Turn-on delay time	$t_{d(on)}$	$V_{DD} = -15\text{ V}, R_L = 15\text{ }\Omega$ $I_D \cong -1\text{ A}, V_{GEN} = -10\text{ V}, R_g = 1\text{ }\Omega$	-	5.5	10	
Rise time	t_r		-	13	25	
Turn-off delay time	$t_{d(off)}$		-	17	30	
Fall time	t_f		-	7.7	15	
Drain-Source Body Diode Characteristics						
Continuous source-drain diode current	I_S	$T_C = 25\text{ }^\circ\text{C}$	-	-	-1.5	A
Pulse diode forward current	I_{SM}		-	-	-12	
Body diode voltage	V_{SD}	$I_S = -0.75\text{ A}, V_{GS} = 0\text{ V}$	-	-0.8	-1.2	V
Body diode reverse recovery time	t_{rr}	$I_F = -2.5\text{ A}, di/dt = 100\text{ A}/\mu\text{s},$ $T_J = 25\text{ }^\circ\text{C}$	-	17	30	ns
Body diode reverse recovery charge	Q_{rr}		-	11	20	nC
Reverse recovery fall time	t_a		-	12	-	ns
Reverse recovery rise time	t_b		-	5	-	

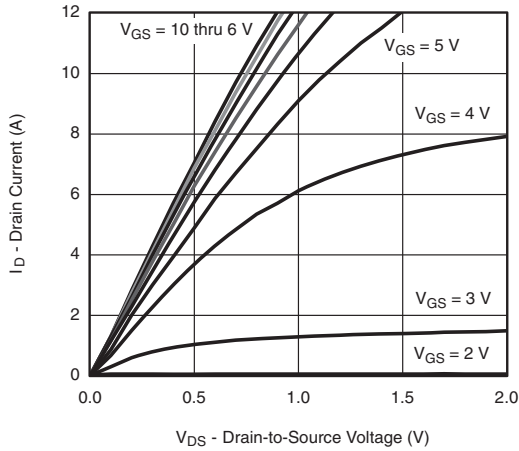
Notes

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

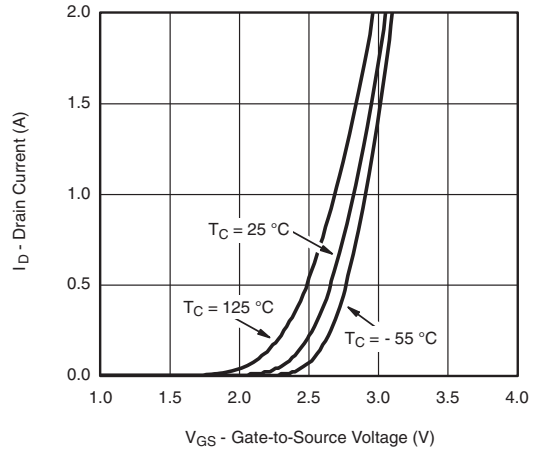
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.



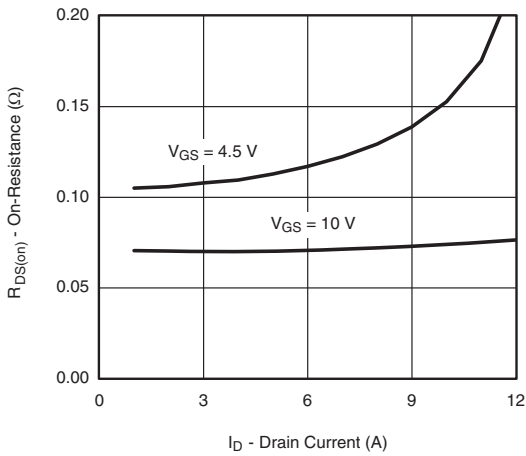
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



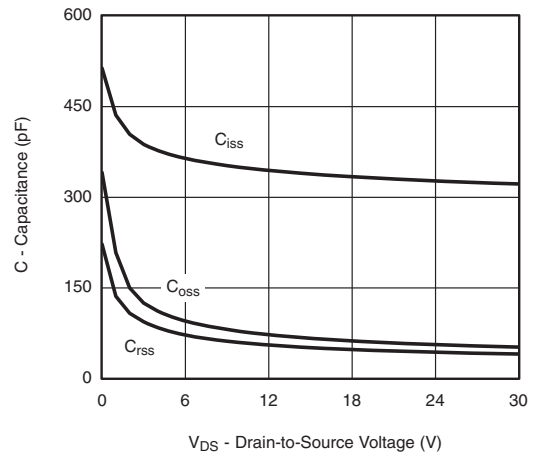
Output Characteristics



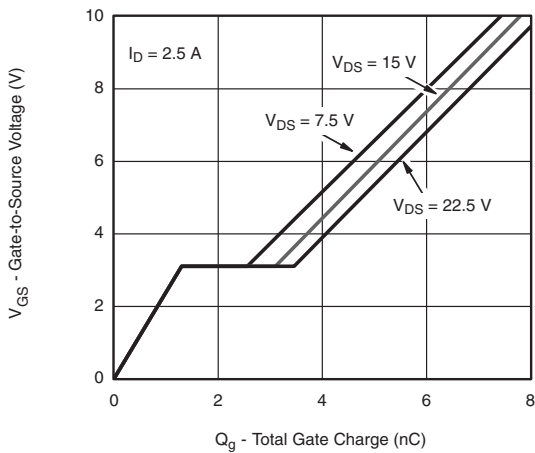
Transfer Characteristics



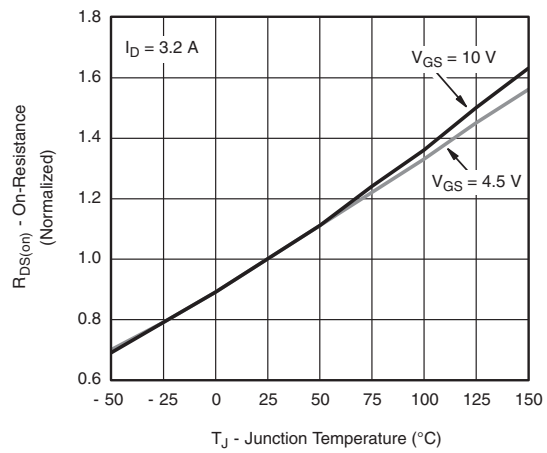
On-Resistance vs. Drain Current and Gate Voltage



Capacitance

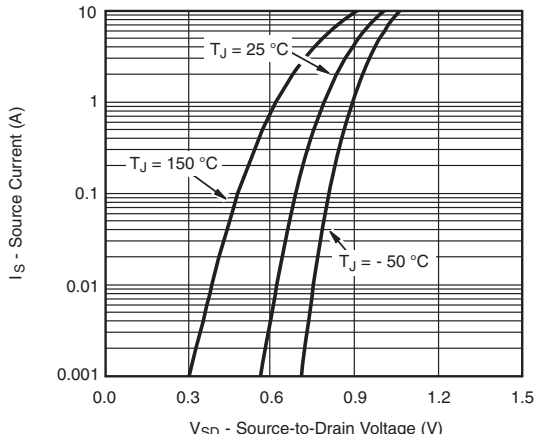


Gate Charge

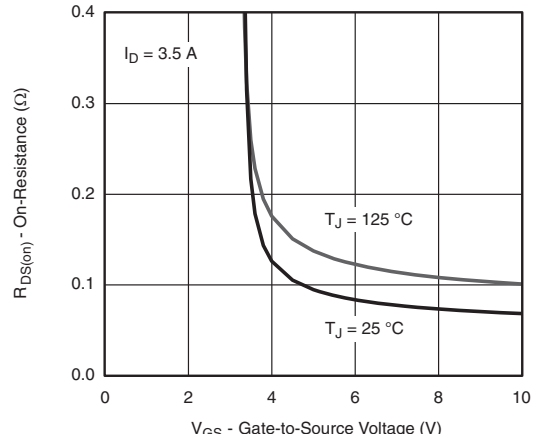


On-Resistance vs. Junction Temperature

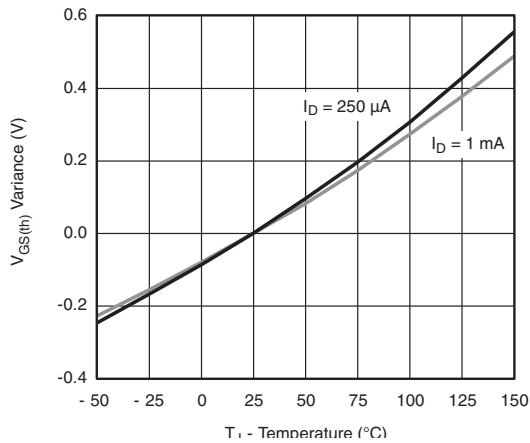
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



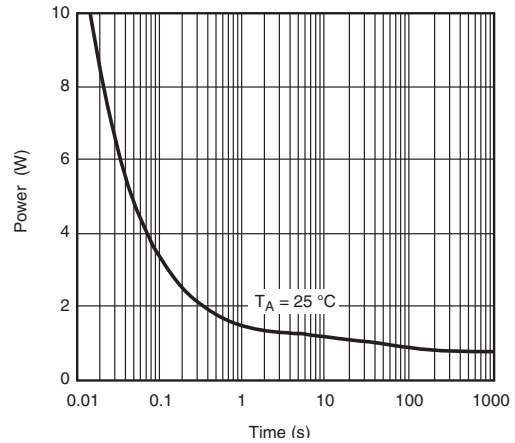
Source-Drain Diode Forward Voltage



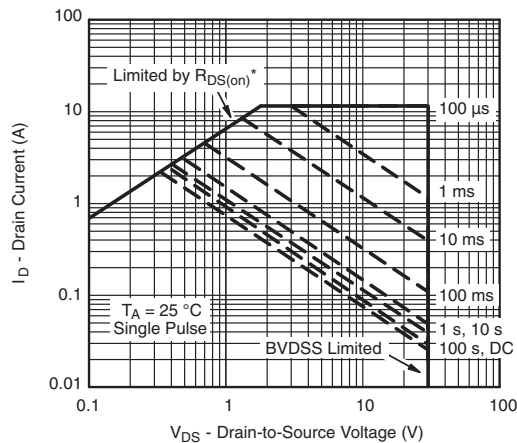
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



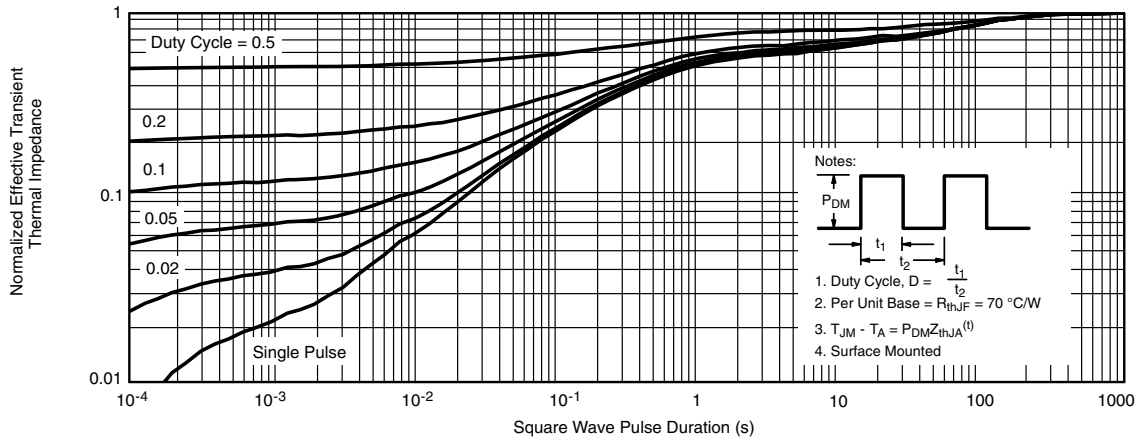
Single Pulse Power, Junction-to-Ambient



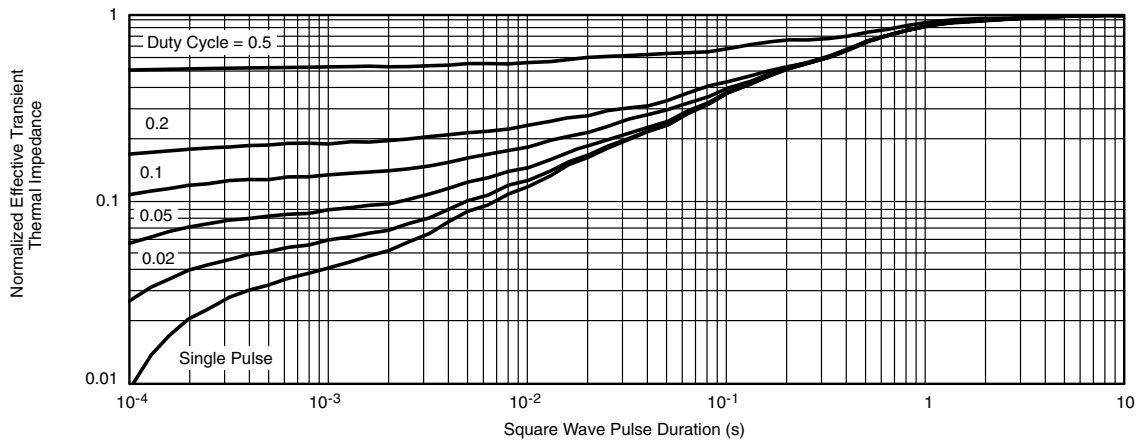
Safe Operating Area, Junction-to-Ambient



TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Foot

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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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