VISHAY®

N-Channel 2.5-V (G-S) MOSFET
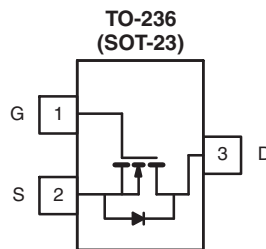
PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)
20	0.060 at V_{GS} = 4.5 V	2.4
	0.115 at V_{GS} = 2.5 V	2.0

FEATURES

- **Halogen-free According to IEC 61249-2-21 Definition**
- 100 % R_g Tested
- Compliant to RoHS Directive 2002/95/EC

Pb-free

RoHS COMPLIANT

HALOGEN FREE Available

TO-236 (SOT-23)

Top View

Si2302ADS (2A)*

* Marking Code

Ordering Information: Si2302ADS-T1-E3 (Lead (Pb)-free)
Si2302ADS-T1-GE3 (Lead (Pb)-free and Halogen-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]	T_A = 25 °C	I_D	2.4	2.1	A
	T_A = 70 °C		1.9	1.7	
Pulsed Drain Current[a]		I_{DM}	10		
Continuous Source Current (Diode Conduction)[a]		I_S	0.94	0.6	
Power Dissipation[a]	T_A = 25 °C	P_D	0.9	0.7	W
	T_A = 70 °C		0.57	0.46	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 150		°C

THERMAL RESISTANCE RATINGS

Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient[a]	t ≤ 5 s	R_{thJA}	115	140	°C/W
	Steady State		140	175	

Notes:
a. Surface mounted on FR4 board.
For SPICE model information via the Worldwide Web: www.vishay.com/www/product/spice.htm

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

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0$ V, $I_D = 10$ µA	20			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 50$ µA	0.65	0.95	1.2	
Gate Body Leakage	I_{GSS}	$V_{DS} = 0$ V, $V_{GS} = \pm 8$ V			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 20$ V, $V_{GS} = 0$ V			0.1	µA
		$V_{DS} = 20$ V, $V_{GS} = 0$ V, $T_J = 55$ °C			2.0	
On-State Drain Current[a]	$I_{D(on)}$	$V_{DS} \geq 5$ V, $V_{GS} = 4.5$ V	6			A
		$V_{DS} \geq 5$ V, $V_{GS} = 2.5$ V	4			
Drain-Source On-Resistance[a]	$R_{DS(on)}$	$V_{GS} = 4.5$ V, $I_D = 3.6$ A		0.045	0.060[b]	Ω
		$V_{GS} = 2.5$ V, $I_D = 3.1$ A		0.070	0.115	
Forward Transconductance[a]	g_{fs}	$V_{DS} = 5$ V, $I_D = 3.6$ A		8		S
Diode Forward Voltage	V_{SD}	$I_S = 0.94$ A, $V_{GS} = 0$ V		0.76	1.2	V
Dynamic						
Total Gate Charge	Q_g	$V_{DS} = 10$ V, $V_{GS} = 4.5$ V, $I_D = 3.6$ A		4.0	10	nC
Gate-Source Charge	Q_{gs}			0.65		
Gate-Drain Charge	Q_{gd}			1.5		
Input Capacitance	C_{iss}	$V_{DS} = 10$ V, $V_{GS} = 0$ V, $f = 1$ MHz		300		pF
Output Capacitance	C_{oss}			120		
Reverse Transfer Capacitance	C_{rss}			80		
Gate Resistance	R_g	$f = 1$ MHz	0.5	1	2	Ω
Switching						
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 10$ V, $R_L = 2.8$ Ω		7	15	ns
Rise Time	t_r	$I_D \cong 3.6$ A, $V_{GEN} = 4.5$ V, $R_g = 6$ Ω		55	80	
Turn-Off DelayTime	$t_{d(off)}$			16	60	
Fall Time	t_f			10	25	

Notes:
a. Pulse test; PW ≤ 300 µs, duty cycle ≤ 2 %.
b. Effective for production 10/04.

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 (T_A = 25 °C, unless otherwise noted)

Output Characteristics

Transfer Characteristics

On-Resistance vs. Drain Current

Capacitance

Gate Charge

On-Resistance vs. Junction Temperature

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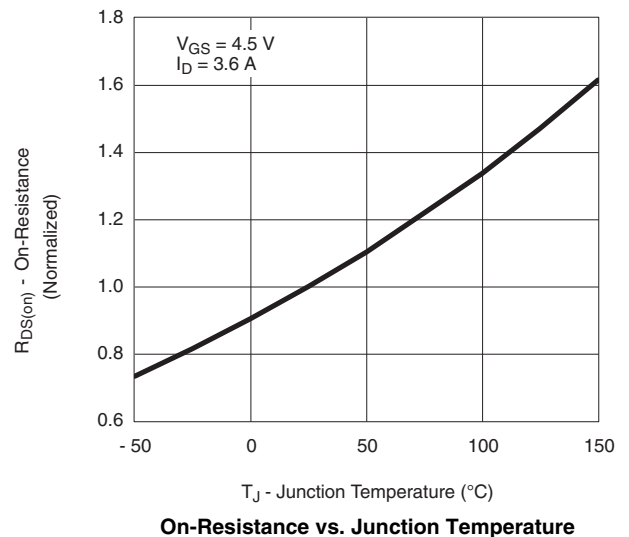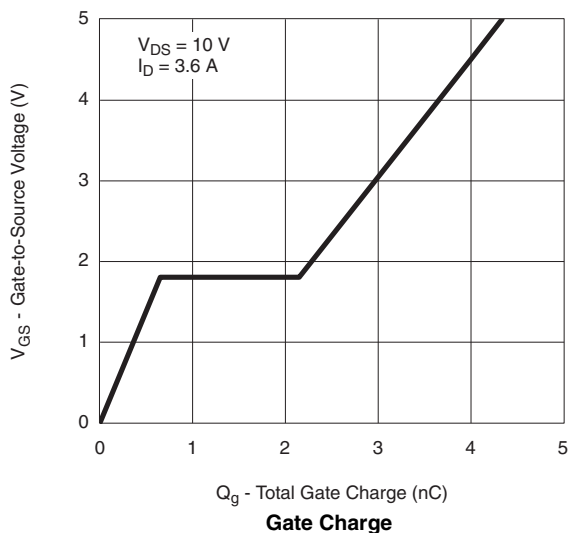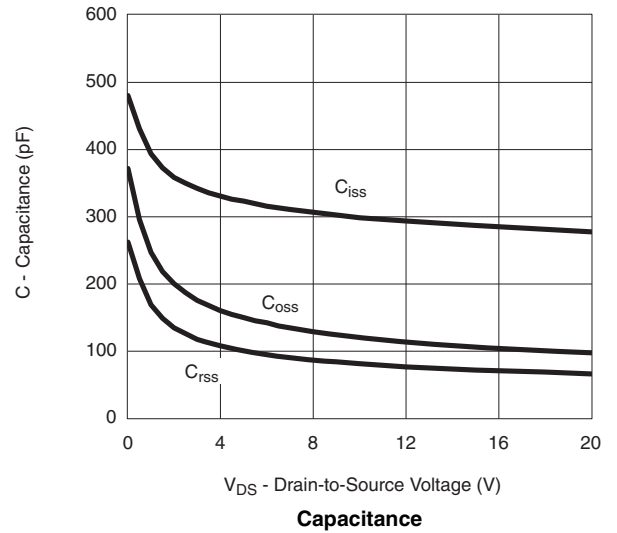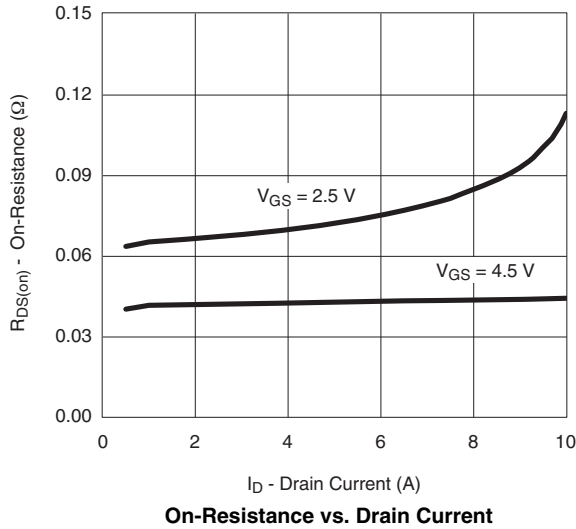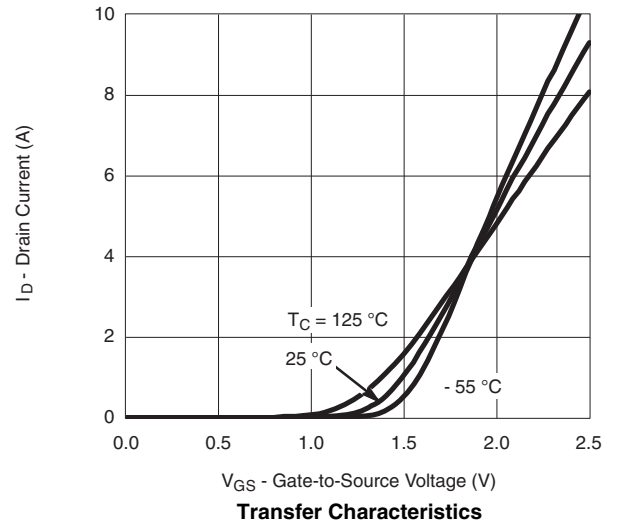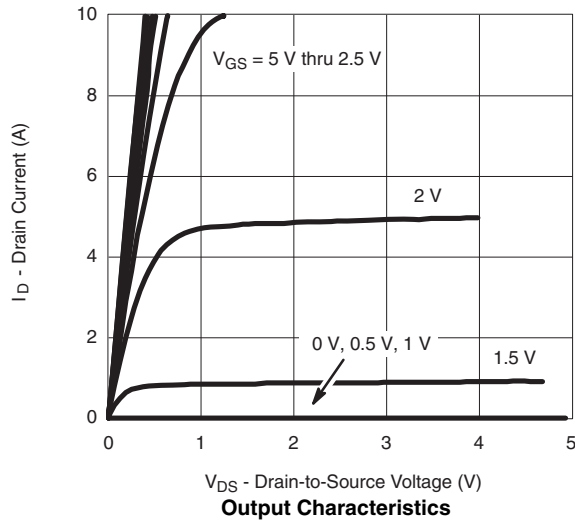
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TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)
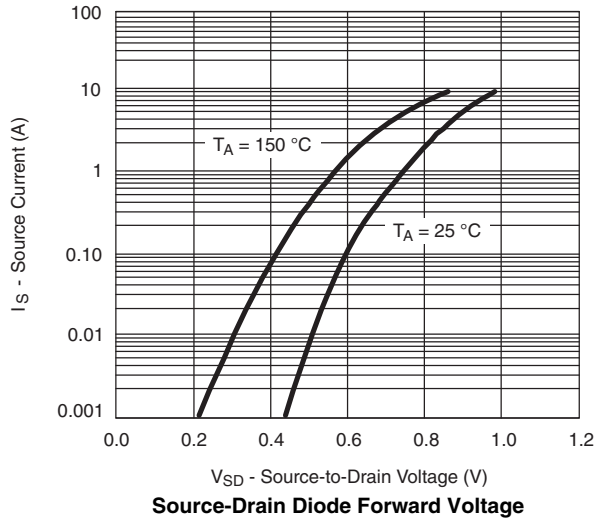
Source-Drain Diode Forward Voltage

I_S - Source Current (A) vs. V_{SD} - Source-to-Drain Voltage (V), T_A = 150 °C, T_A = 25 °C
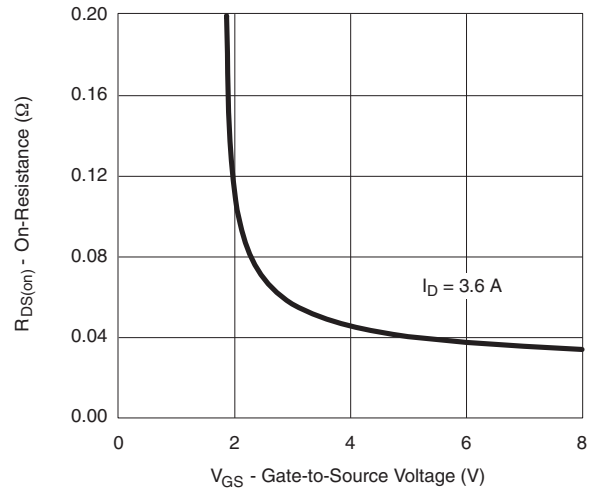
On-Resistance vs. Gate-to-Source Voltage

$R_{DS(on)}$ - On-Resistance (Ω) vs. V_{GS} - Gate-to-Source Voltage (V), I_D = 3.6 A

Threshold Voltage

$V_{GS(th)}$ Variance (V) vs. T_J - Temperature (°C), I_D = 250 µA

Single Pulse Power

Power (W) vs. Time (s), T_C = 25 °C Single Pulse
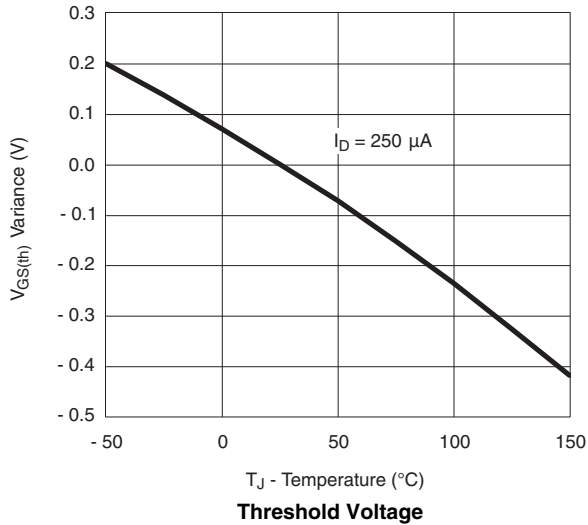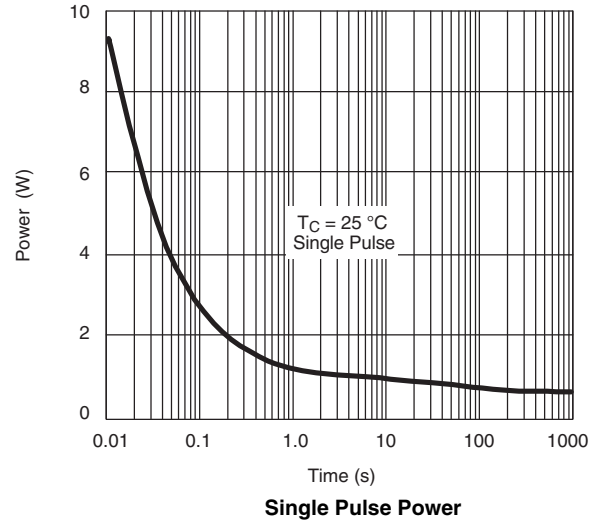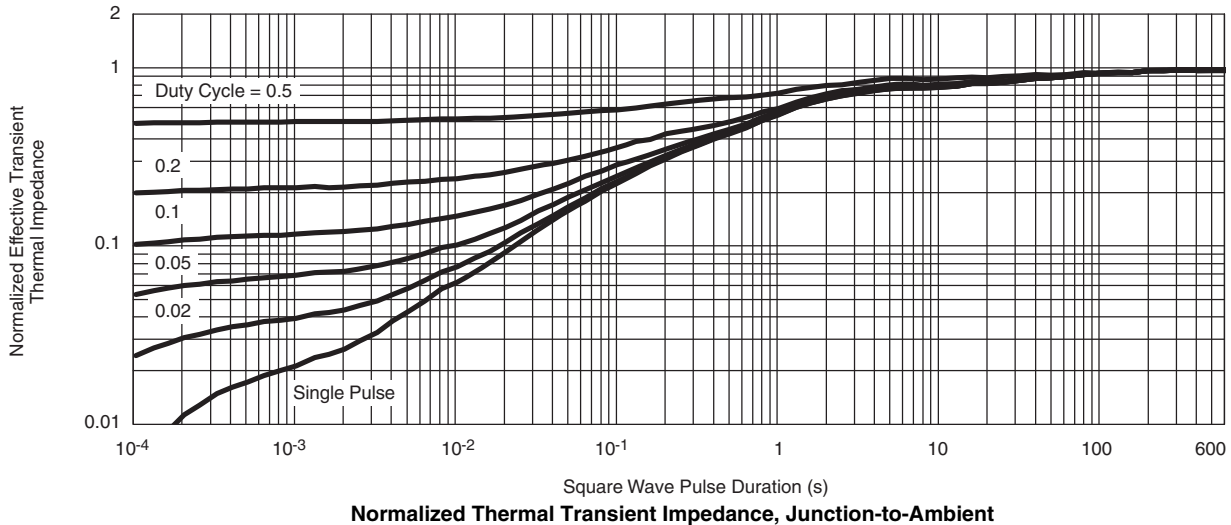
Normalized Thermal Transient Impedance, Junction-to-Ambient

Normalized Effective Transient Thermal Impedance vs. Square Wave Pulse Duration (s), Duty Cycle = 0.5, 0.2, 0.1, 0.05, 0.02, Single Pulse

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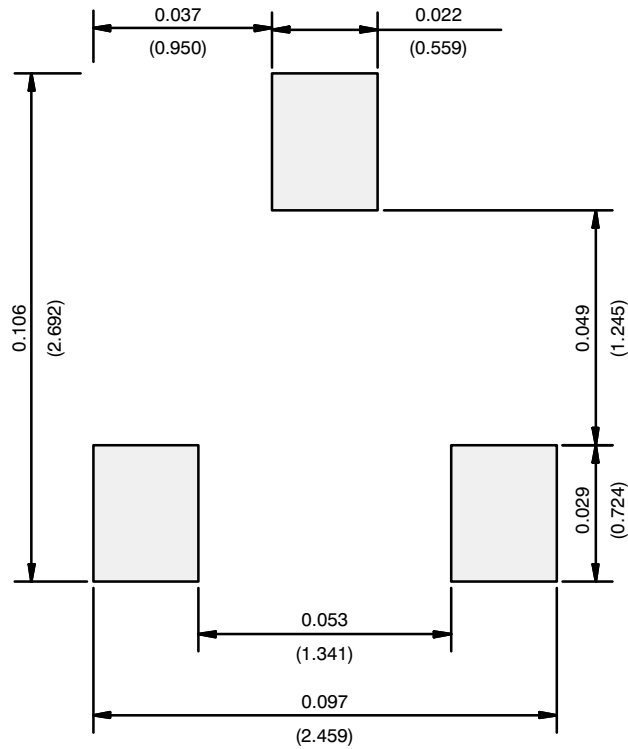
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SOT-23 (TO-236): 3-LEAD
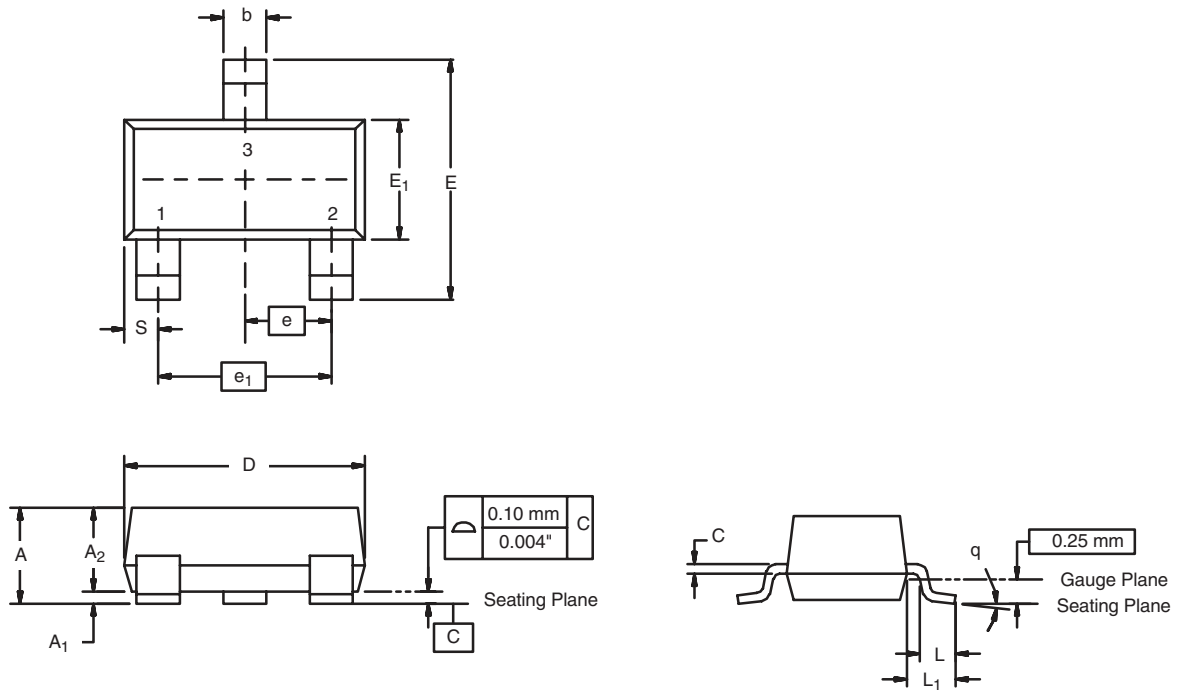
Dim	MILLIMETERS		INCHES	
	Min	**Max**	**Min**	**Max**
A	0.89	1.12	0.035	0.044
A$_1$	0.01	0.10	0.0004	0.004
A$_2$	0.88	1.02	0.0346	0.040
b	0.35	0.50	0.014	0.020
c	0.085	0.18	0.003	0.007
D	2.80	3.04	0.110	0.120
E	2.10	2.64	0.083	0.104
E$_1$	1.20	1.40	0.047	0.055
e	0.95 BSC		0.0374 Ref	
e$_1$	1.90 BSC		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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