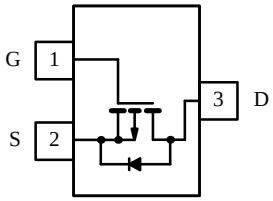
P-Channel 1.25-W, 2.5-V Rated MOSFET

Product Summary

V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
–12	0.130 @ V_{GS} = –4.5 V	–2.3
	0.190 @ V_{GS} = –2.5 V	–1.9

TO-236
(SOT-23)



Top View
Si2301DS (A1)*
*Marking Code

Absolute Maximum Ratings (T_A = 25°C Unless Otherwise Noted)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	–12	V
Gate-Source Voltage		V_{GS}	± 8	
Continuous Drain Current (T_J = 150°C)[b]	T_A= 25°C	I_D	–2.3	A
	T_A= 70°C		–1.5	
Pulsed Drain Current[a]		I_{DM}	–10	
Continuous Source Current (Diode Conduction)[b]		I_S	–1.6	
Power Dissipation[b]	T_A= 25°C	P_D	1.25	W
	T_A= 70°C		0.8	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	–55 to 150	°C

Thermal Resistance Ratings

Parameter	Symbol	Limit	Unit
Maximum Junction-to-Ambient[b]	R_{thJA}	100	°C/W
Maximum Junction-to-Ambient[c]		166	

Notes
a. Pulse width limited by maximum junction temperature.
b. Surface Mounted on FR4 Board, t ≤ 5 sec.
c. Surface Mounted on FR4 Board.

Updates to this data sheet may be obtained via facsimile by calling Siliconix FaxBack, 1-408-970-5600. Please request FaxBack document #70627.

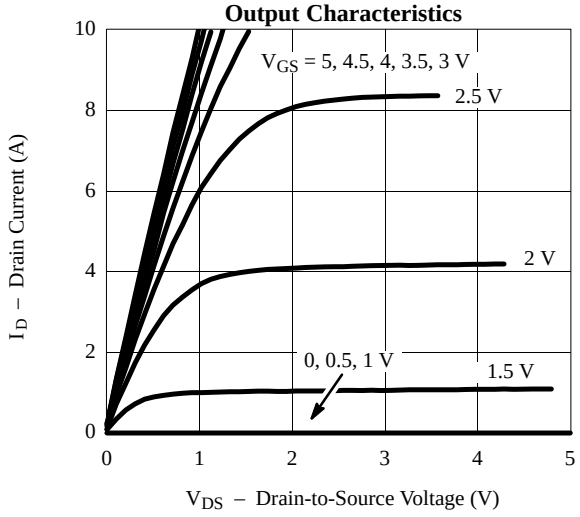
Specifications[a]

Parameter	Symbol	Test Conditions	Limits Min	Limits Typ	Limits Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = –10 µA	–12			V
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = –250 µA	–0.45			V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±8 V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = –12 V, V_{GS} = 0 V			–1	µA
		T_J = 55°C			–10	
On-State Drain Current[c]	$I_{D(on)}$	V_{DS} ≤ –5 V, V_{GS} = –4.5 V	–6			A
		V_{DS} ≤ –5 V, V_{GS} = –2.5 V	–3			
Drain-Source On-Resistance[c]	$r_{DS(on)}$	V_{GS} = –4.5 V, I_D = –2.8 A		0.105	0.130	Ω
		V_{GS} = –2.5 V, I_D = –2.0 A		0.145	0.190	
Forward Transconductance[c]	g_{fs}	V_{DS} = –5 V, I_D = –2.8 A		6.5		S
Diode Forward Voltage	V_{SD}	I_S = –1.6 A, V_{GS} = 0 V		0.80	–1.2	V
Dynamic[b]						
Total Gate Charge	Q_g	V_{DS} = –6 V, V_{GS} = –4.5 V I_D ≅ –2.8 A		5.8	10	pC
Gate-Source Charge	Q_{gs}			0.85		
Gate-Drain Charge	Q_{gd}			1.70		
Input Capacitance	C_{iss}	V_{DS} = –6 V, V_{GS} = 0, f = 1 MHz		415		pF
Output Capacitance	C_{oss}			223		
Reverse Transfer Capacitance	C_{rss}			87		
Switching[d]						
Turn-On Time	$t_{d(on)}$	V_{DD} = –6 V, R_L = 6 Ω I_D ≅ −1.0 A, V_{GEN} = −4.5 V R_G = 6 Ω		13.0	25	ns
	t_r			36.0	60	
Turn-Off Time	$t_{d(off)}$			42	70	
	t_f			34	60	

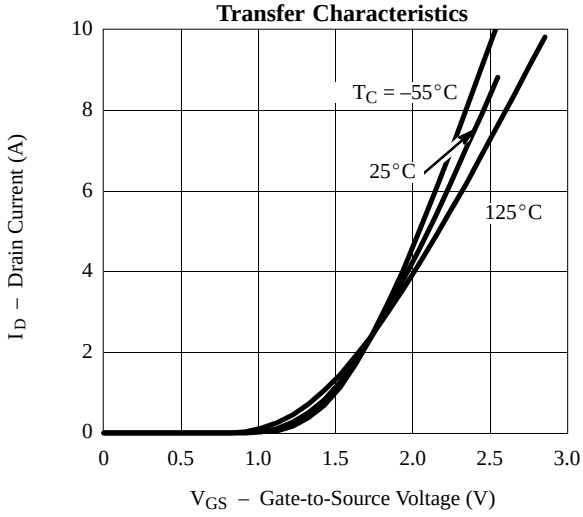
Notes
a. T_A = 25°C unless otherwise noted. VPLR01
b. For DESIGN AID ONLY, not subject to production testing.
c. Pulse test: PW ≤300 µs duty cycle ≤2%.
d. Switching time is essentially independent of operating temperature.

Typical Characteristics (25°C Unless Otherwise Noted)

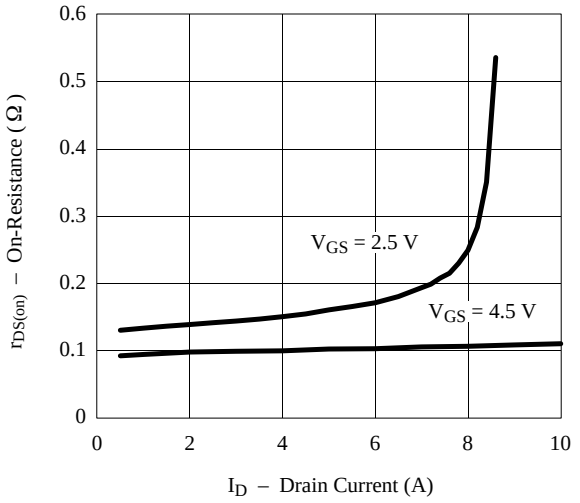
Output Characteristics



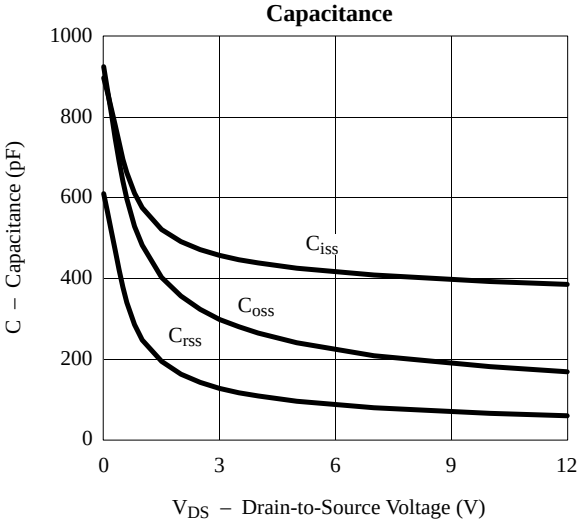
Transfer Characteristics



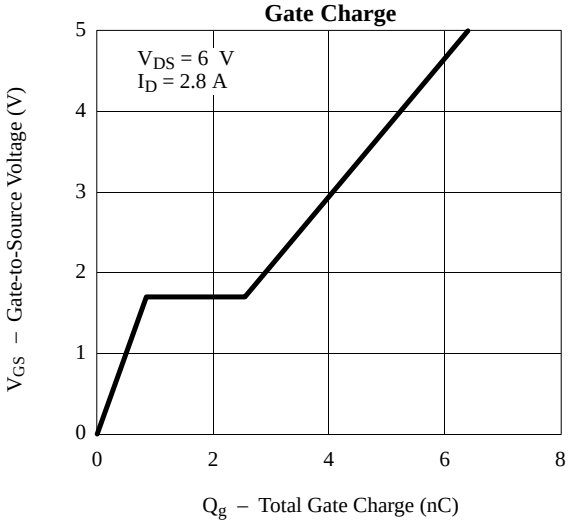
On-Resistance vs. Drain Current



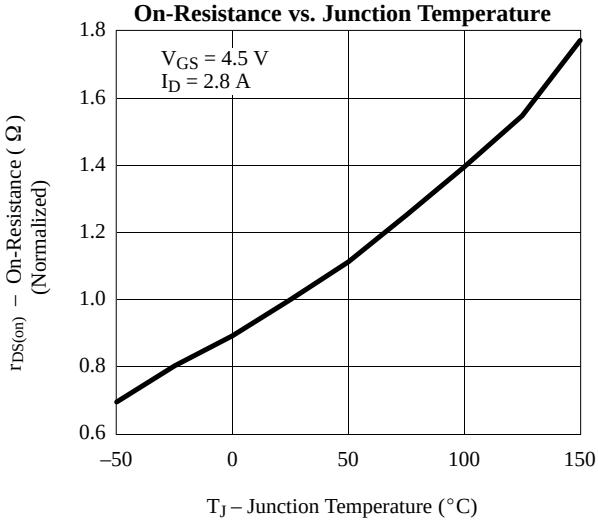
Capacitance



Gate Charge

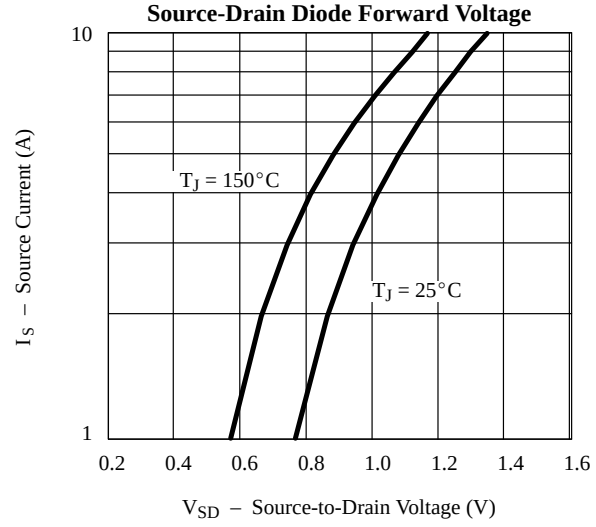


On-Resistance vs. Junction Temperature

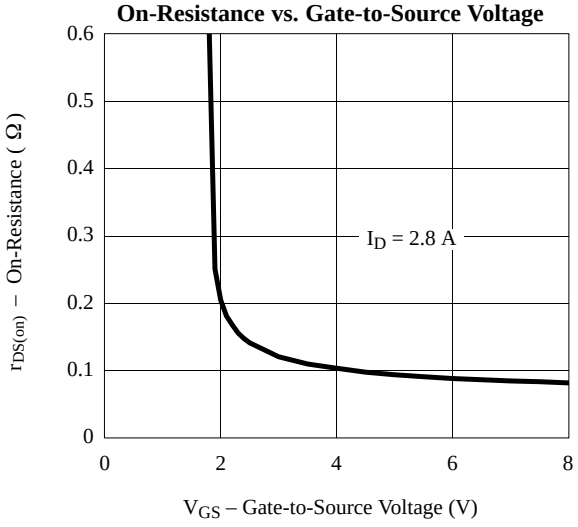


Typical Characteristics (25°C Unless Otherwise Noted)

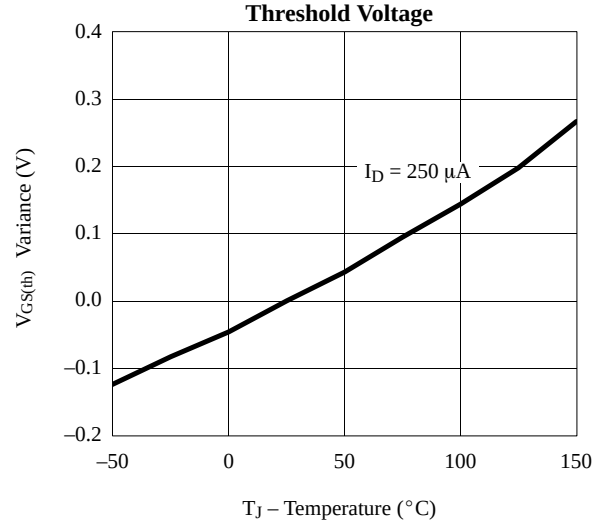
Source-Drain Diode Forward Voltage



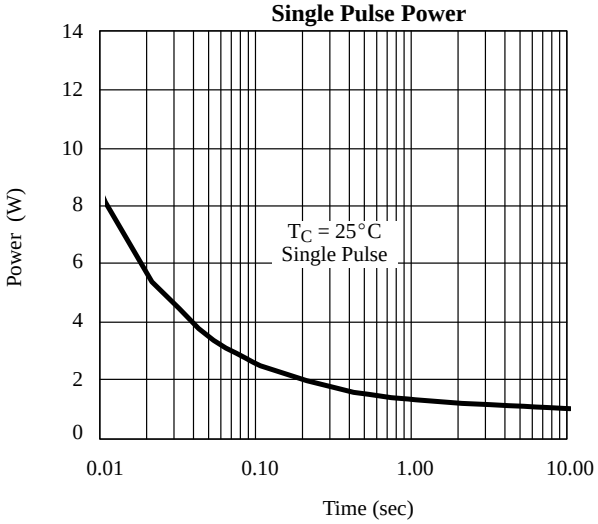
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



Single Pulse Power



Normalized Thermal Transient Impedance, Junction-to-Ambient