

P-Channel 20-V (D-S) MOSFET

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)
- 20	0.039 at $V_{GS} = - 4.5$ V	- 4.7
	0.052 at $V_{GS} = - 2.5$ V	- 4.1
	0.068 at $V_{GS} = - 1.8$ V	- 3.5

FEATURES

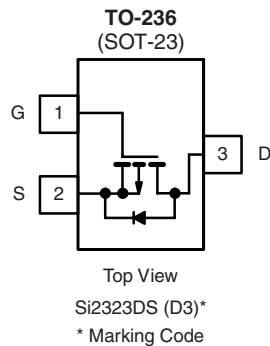
- TrenchFET® Power MOSFET

APPLICATIONS

- Load Switch
- PA Switch



RoHS*
COMPLIANT



Ordering Information: Si2323DS-T1
Si2323DS-T1-E3 (Lead (Pb)-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, b}	$T_A = 25$ °C	- 4.7	- 3.7	A
	$T_A = 70$ °C	- 3.8	- 2.9	
Pulsed Drain Current	I_{DM}	- 20		
Continuous Source Current (Diode Conduction) ^{a, b}	I_S	- 1.0	- 0.6	
Maximum Power Dissipation ^{a, b}	$T_A = 25$ °C	1.25	0.75	W
	$T_A = 70$ °C	0.8	0.48	
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	R_{thJA}	75	100	°C/W
		120	166	
Maximum Junction-to-Foot (Drain)	R_{thJF}	40	50	

Notes:

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

b. Pulse width limited by maximum junction temperature.

* Pb containing terminations are not RoHS compliant, exemptions may apply.

SPECIFICATIONS $T_J = 25\text{ }^{\circ}\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Limits			Unit
			Min.	Typ.	Max.	
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}$, $I_D = -250\text{ }\mu\text{A}$	- 20			V
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = -250\text{ }\mu\text{A}$	- 0.40		- 1.0	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}$, $V_{GS} = \pm 8\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -16\text{ V}$, $V_{GS} = 0\text{ V}$			- 1	μA
		$V_{DS} = -16\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 55\text{ }^{\circ}\text{C}$			- 10	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \leq -5\text{ V}$, $V_{GS} = -4.5\text{ V}$	- 20			A
Drain-Source On-Resistance ^a	$R_{DS(on)}$	$V_{GS} = -4.5\text{ V}$, $I_D = -4.7\text{ A}$		0.031	0.039	Ω
		$V_{GS} = -2.5\text{ V}$, $I_D = -4.1\text{ A}$		0.041	0.052	
		$V_{GS} = -1.8\text{ V}$, $I_D = -2.0\text{ A}$		0.054	0.068	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -5\text{ V}$, $I_D = -4.7\text{ A}$		16		S
Diode Forward Voltage	V_{SD}	$I_S = -1.0\text{ A}$, $V_{GS} = 0\text{ V}$		- 0.7	- 1.2	V
Dynamic ^b						
Total Gate Charge	Q_g	$V_{DS} = -10\text{ V}$, $V_{GS} = -4.5\text{ V}$ $I_D \cong -4.7\text{ A}$		12.5	19	nC
Gate-Source Charge	Q_{gs}			1.7		
Gate-Drain Charge	Q_{gd}			3.3		
Input Capacitance	C_{iss}	$V_{DS} = -10\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1\text{ MHz}$		1020		pF
Output Capacitance	C_{oss}			191		
Reverse Transfer Capacitance	C_{rss}			140		
Switching ^c						
Turn-On Time	$t_{d(on)}$	$V_{DD} = -10\text{ V}$, $R_L = 10\text{ }\Omega$ $I_D \cong -1.0\text{ A}$, $V_{GEN} = -4.5\text{ V}$ $R_G = 6\text{ }\Omega$		25	40	ns
	t_r			43	65	
Turn-Off Time	$t_{d(off)}$			71	110	
	t_f			48	75	

Notes:

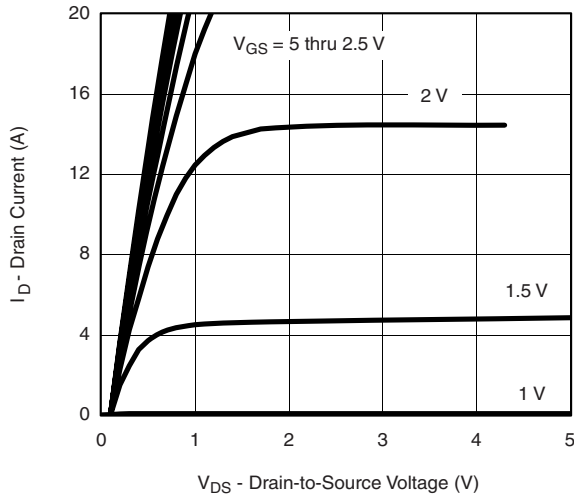
a. Pulse test: $PW \leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.

b. For DESIGN AID ONLY, not subject to production testing.

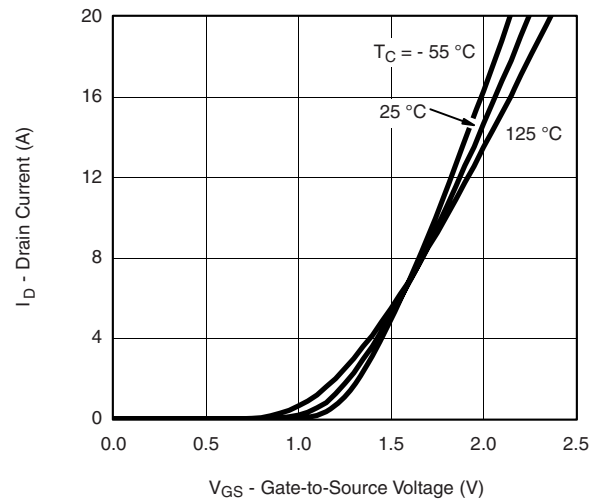
c. Switching time is essentially independent of operating temperature.

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.

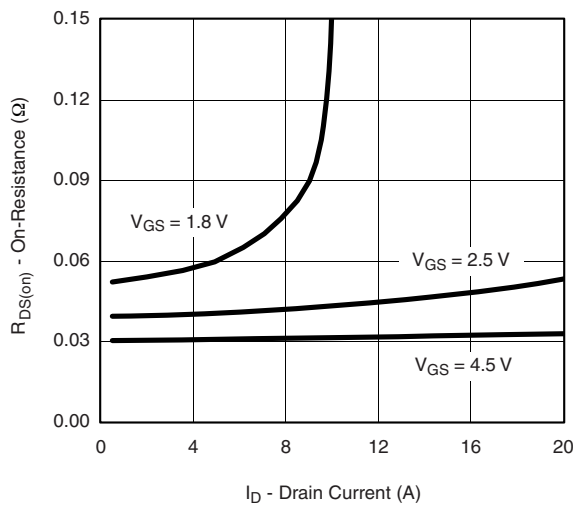
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



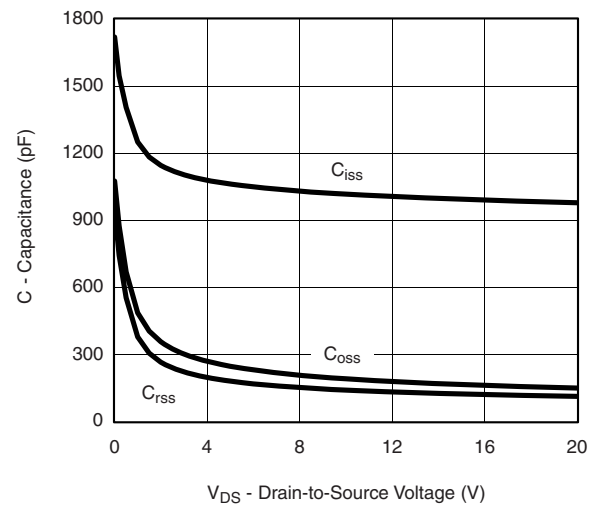
Output Characteristics



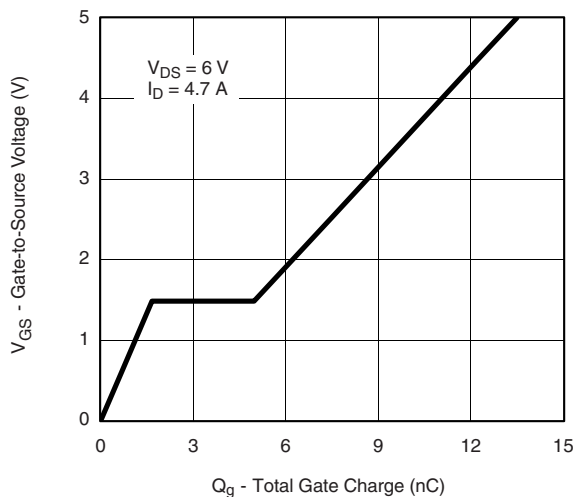
Transfer Characteristics



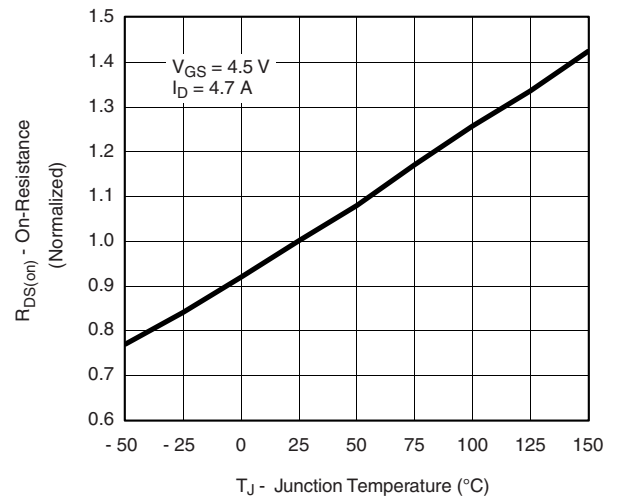
On-Resistance vs. Drain Current



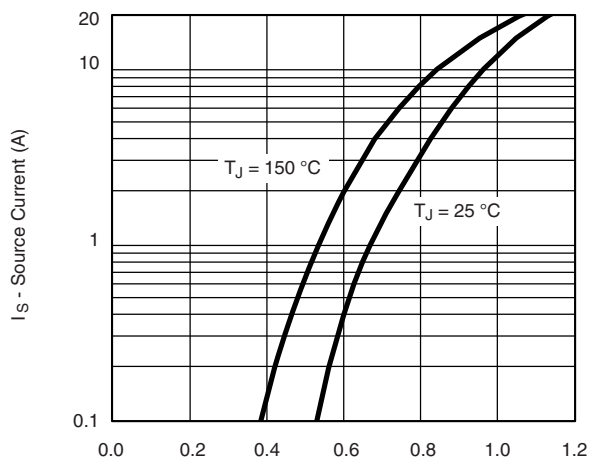
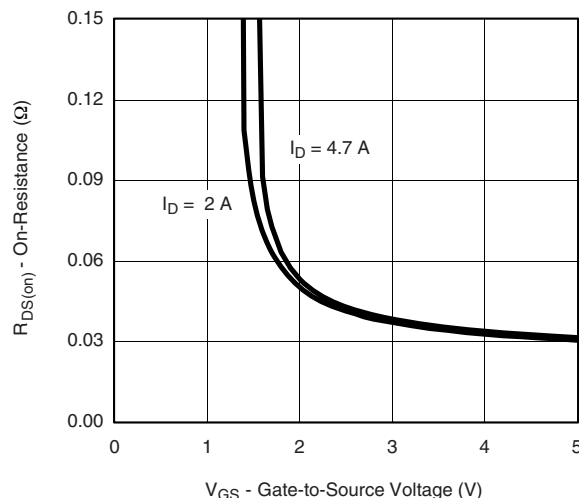
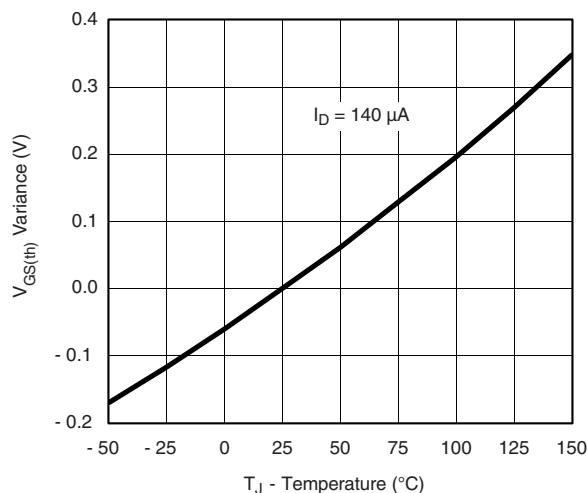
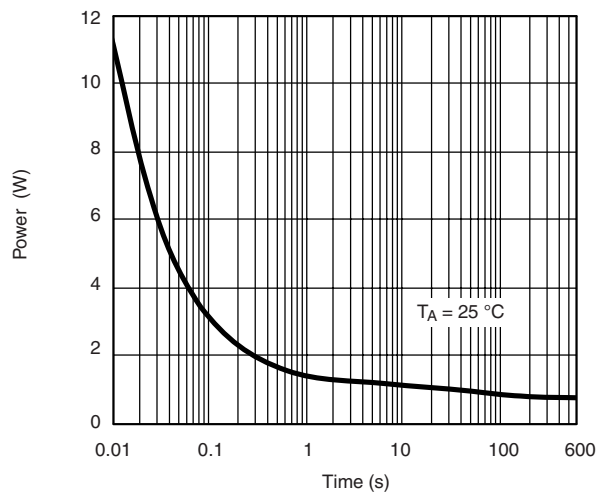
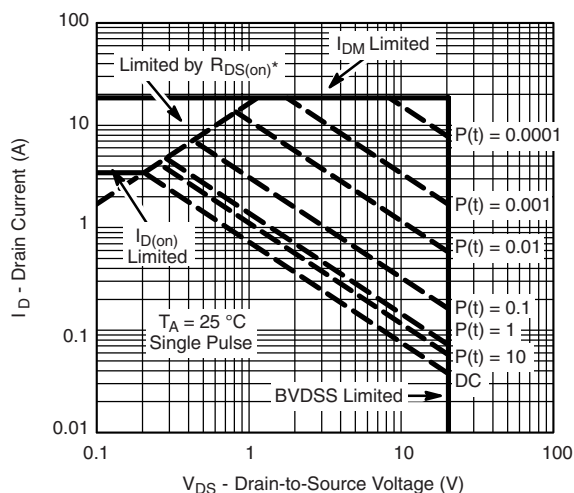
Capacitance



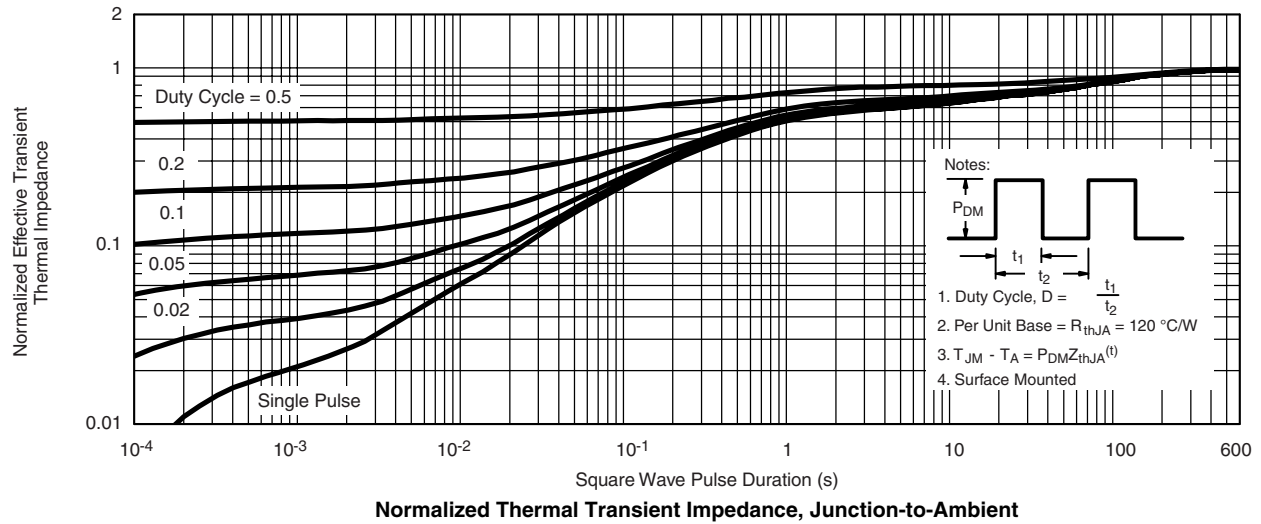
Gate Charge



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*** V_{GS} > minimum V_{GS} at which $R_{DS(on)}$ is specified**Safe Operating Area**

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



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