P-Channel 12-V (D-S) MOSFET

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
-12	0.032 @ V_{GS} = -4.5 V	-5.3
	0.042 @ V_{GS} = -2.5 V	- 4.6
	0.059 @ V_{GS} = -1.8 V	- 3.9

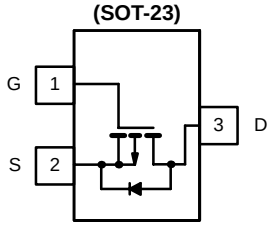
FEATURES

- TrenchFET® Power MOSFET

APPLICATIONS

- Load Switch
- PA Switch

TO-236
(SOT-23)



Top View
Si2333DS (E3)*
*Marking Code

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C UNLESS OTHERWISE NOTED)					
Parameter		Symbol	5 sec	Steady State	Unit
Drain-Source Voltage		V_{DS}	-12		V
Gate-Source Voltage		V_{GS}	±8		
Continuous Drain Current (T_J = 150°C)[a, b]	T_A = 25°C	I_D	- 5.3	-4.1	A
	T_A = 70°C		-4.2	-3.3	
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	P_D	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]	t ≤ 5 sec	R_{thJA}	75	100	°C/W
	Steady State		120	166	
Maximum Junction-to-Foot (Drain)	Steady State	R_{thJF}	40	50	

Notes
a. Surface Mounted on 1" x 1" FR4 Board.
b. Pulse width limited by maximum junction temperature.

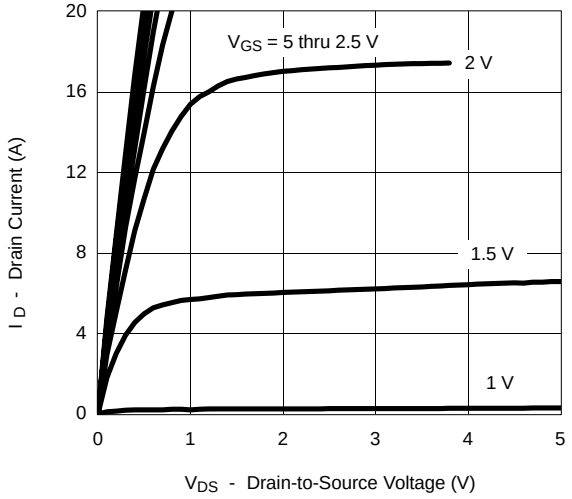
SPECIFICATIONS (T_J = 25°C UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test Conditions	Limits			Unit
			Min	Typ	Max	
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = -250 µA	-12			V
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = -250 µA	-0.40		-1.0	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±8 V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = -9.6 V, V_{GS} = 0 V			-1	µA
		V_{DS} = -9.6 V, V_{GS} = 0 V, T_J = 55°C			-10	
On-State Drain Current[a]	$I_{D(on)}$	V_{DS} ≤ -5 V, V_{GS} = -4.5 V	-20			A
Drain-Source On-Resistance[a]	$r_{DS(on)}$	V_{GS} = -4.5 V, I_D = -5.3 A		0.025	0.032	Ω
		V_{GS} = -2.5 V, I_D = -4.6 A		0.033	0.042	
		V_{GS} = -1.8 V, I_D = -2.0 A		0.046	0.059	
Forward Transconductance[a]	g_{fs}	V_{DS} = -5 V, I_D = -5.3 A		17		S
Diode Forward Voltage	V_{SD}	I_S = -1.0 A, V_{GS} = 0 V		0.7	-1.2	V
Dynamic[b]						
Total Gate Charge	Q_g	V_{DS} = -6 V, V_{GS} = -4.5 V I_D ≅ -5.3 A		11.5	18	nC
Gate-Source Charge	Q_{gs}			1.5		
Gate-Drain Charge	Q_{gd}			3.2		
Input Capacitance	C_{iss}	V_{DS} = -6 V, V_{GS} = 0, f = 1 MHz		1100		pF
Output Capacitance	C_{oss}			390		
Reverse Transfer Capacitance	C_{rss}			300		
Switching[c]						
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		25	40	ns
	t_r			45	70	
Turn-Off Time	$t_{d(off)}$			72	110	
	t_f			60	90	

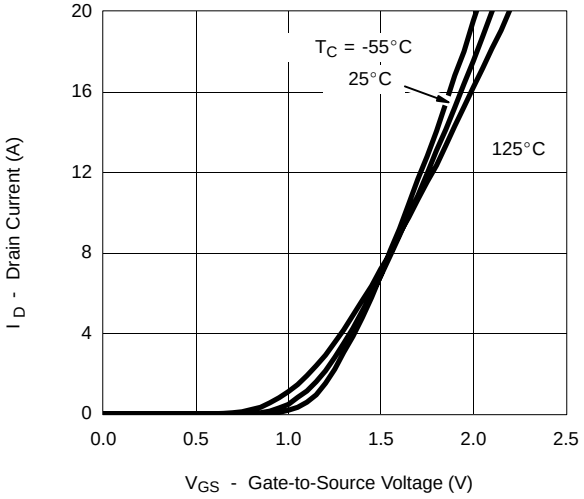
Notes
a. Pulse test: PW ≤300 µs duty cycle ≤2%.
b. For DESIGN AID ONLY, not subject to production testing.
c. Switching time is essentially independent of operating temperature.

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

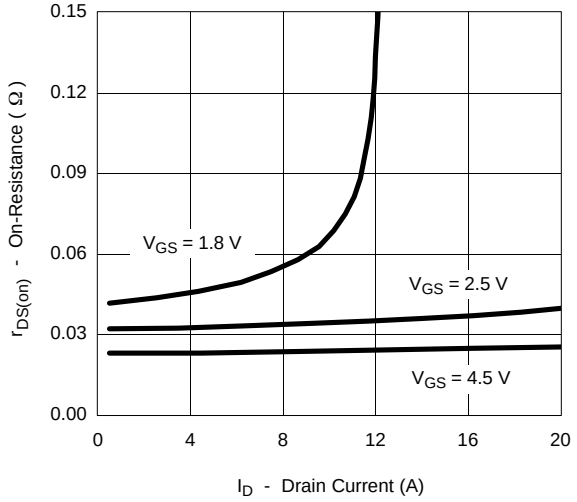
Output Characteristics



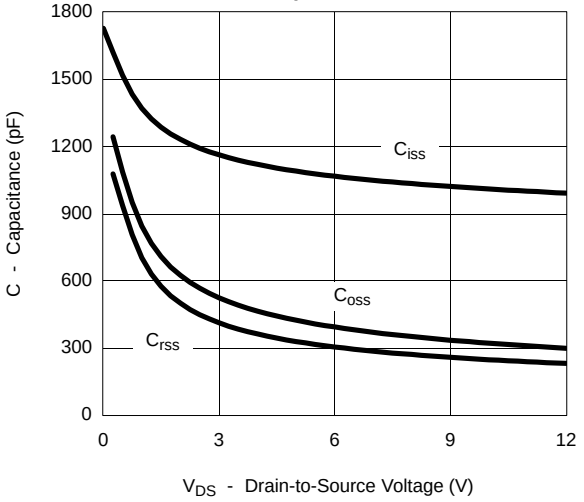
Transfer Characteristics



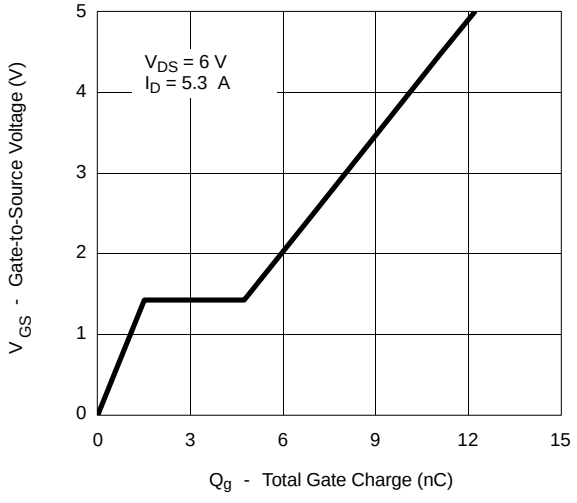
On-Resistance vs. Drain Current



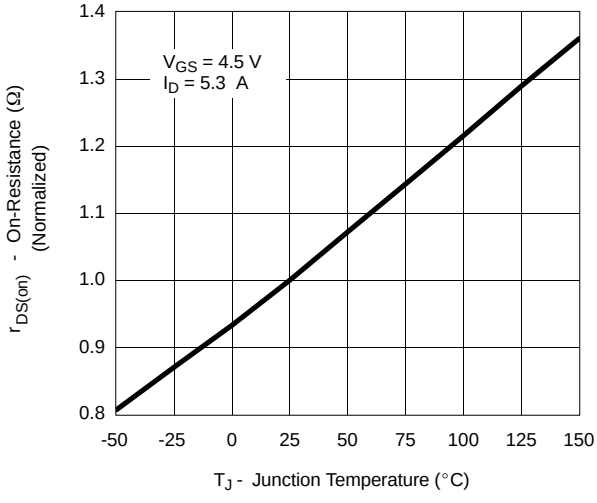
Capacitance



Gate Charge

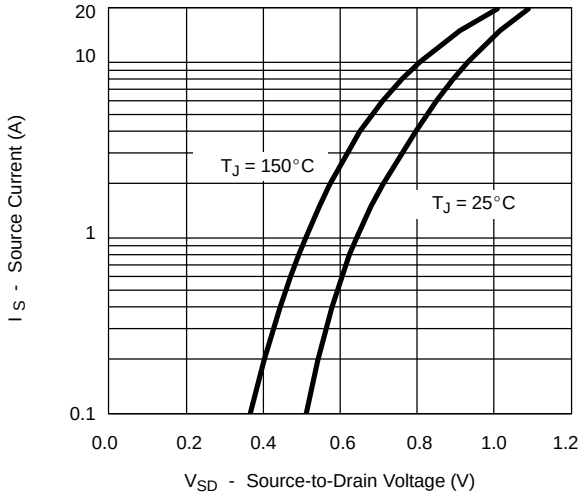


On-Resistance vs. Junction Temperature

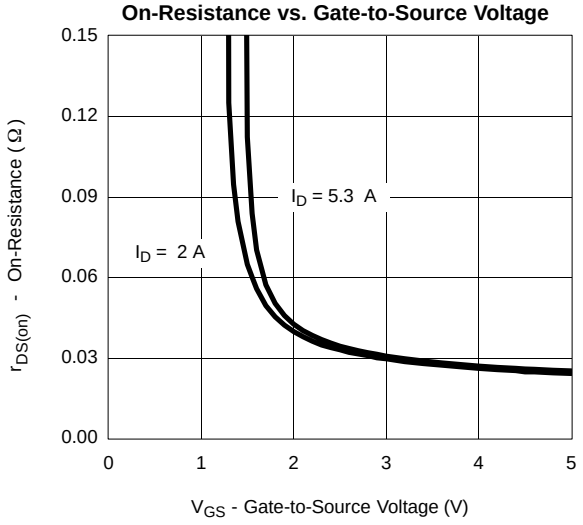


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

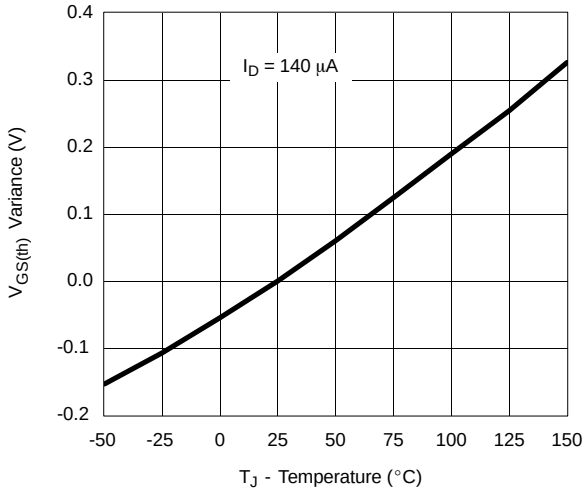
Source-Drain Diode Forward Voltage



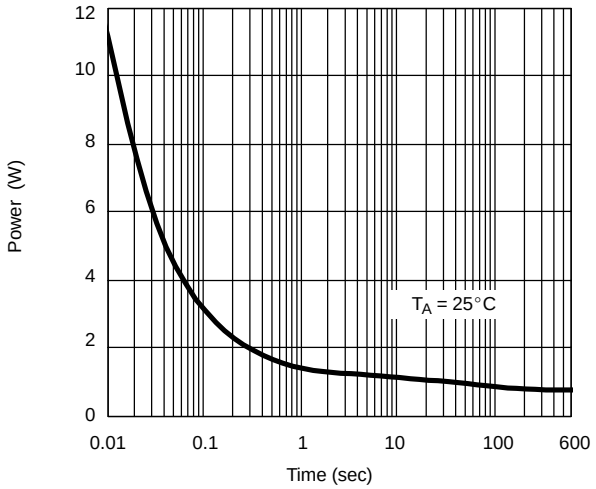
On-Resistance vs. Gate-to-Source Voltage



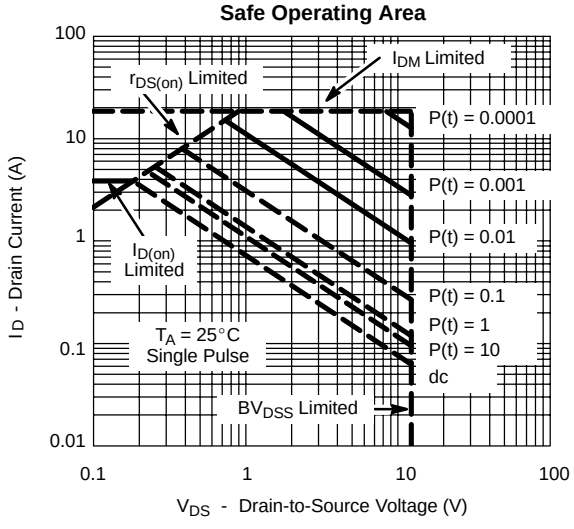
Threshold Voltage



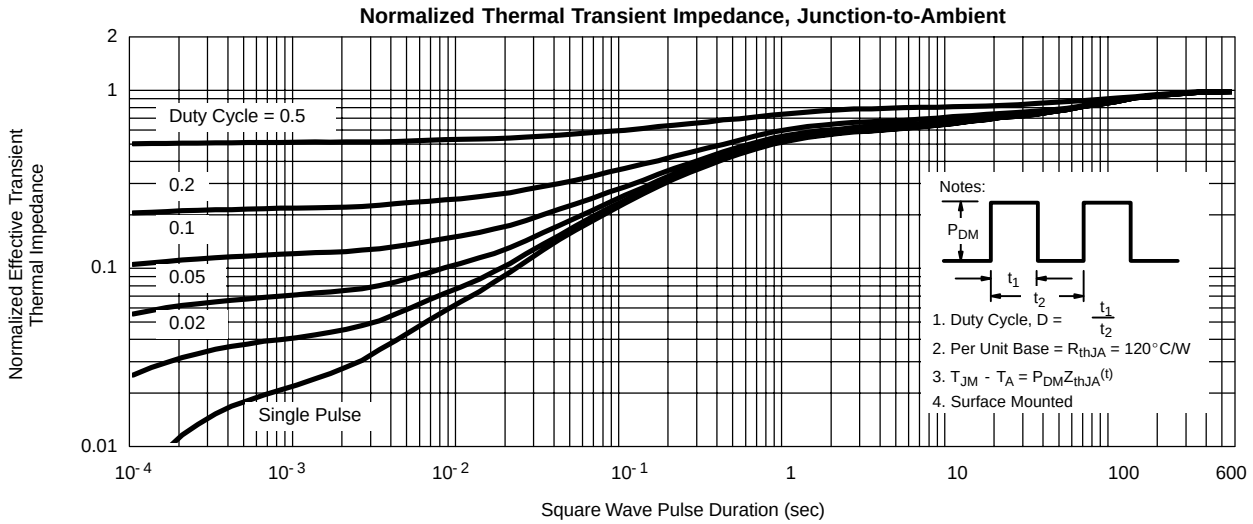
Single Pulse Power



Safe Operating Area



TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)



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