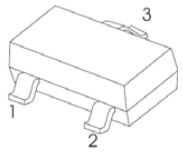
SI2333CDS

P-Channel 12 V (D-S) MOSFET

MOSFET PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (mΩ)	I_D (A)[a]	Q_g (Typ.)
- 12	35 at V_{GS} = - 4.5 V	- 5.1	9 nC
	45 at V_{GS} = - 2.5 V	- 4.5	
	59 at V_{GS} = - 1.8 V	- 3.9	

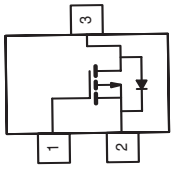
SOT-23



1. GATE
2. SOURCE
3. DRAIN

APPLICATIONS

- Load Switch
- PA Switch



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)	T_C = 25 °C	I_D	- 7.1	A
	T_C = 70 °C		- 5.7	
	T_A = 25 °C		- 5.1[b, c]	
	T_A = 70 °C		- 4.0[b, c]	
Pulsed Drain Current		I_{DM}	- 20	
Continuous Source-Drain Diode Current	T_C = 25 °C	I_S	- 1.0	
	T_A = 25 °C		- 0.63[b, c]	
Maximum Power Dissipation	T_C = 25 °C	P_D	2.5	W
	T_C = 70 °C		1.6	
	T_A = 25 °C		1.25[b, c]	
	T_A = 70 °C		0.8[b, c]	
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[b, d]	≤ 5 s	R_{thJA}	75	100	°C/W
Maximum Junction-to-Foot (Drain)	Steady State	R_{thJF}	40	50	

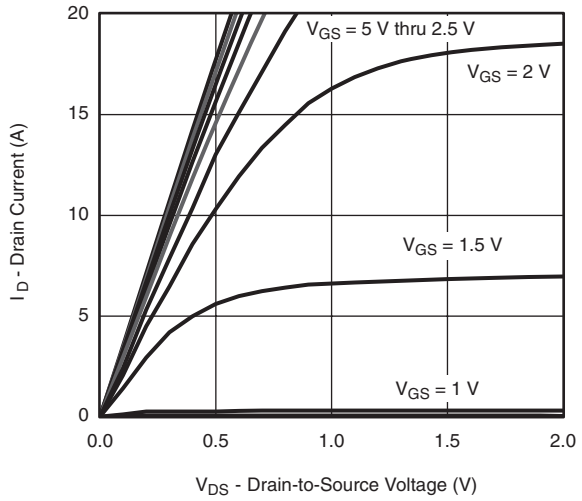
Notes:
a. Based on T_C = 25 °C.
b. Surface Mounted on 1" x 1" FR4 board.
c. t = 5 s.
d. Maximum under Steady State conditions is 166 °C/W.

MOSFET SPECIFICATIONS T_J = 25 °C, unless otherwise noted

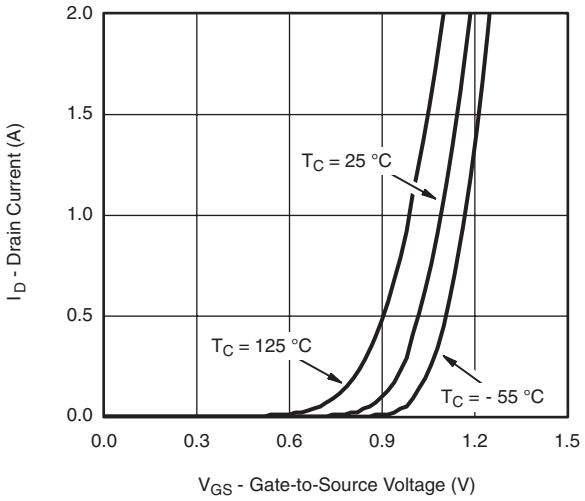
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	V_{DS} = 0 V, I_D = - 250 µA	- 12			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	I_D = - 250 µA		- 13		mV/°C
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			2.6		
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = - 250 µA	- 0.4		- 1	V
Gate-Source 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
		V_{DS} = - 12 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-State Resistance[a]	$R_{DS(on)}$	V_{GS} = - 4.5 V, I_D = - 5.1 A		28.5	35	mΩ
		V_{GS} = - 2.5 V, I_D = - 4.5 A		36	45	
		V_{GS} = - 1.8 V, I_D = - 2.0 A		46	59	
Forward Transconductance[a]	g_{fs}	V_{DS} = - 5 V, I_D = - 5.3 A		18.5		S
Dynamic[b]						
Input Capacitance	C_{iss}	V_{DS} = - 6 V, V_{GS} = 0 V, f = 1 MHz		1225		pF
Output Capacitance	C_{oss}			315		
Reverse Transfer Capacitance	C_{rss}			260		
Total Gate Charge	Q_g	V_{DS} = - 6 V, V_{GS} = - 4.5 V, I_D = - 5.1 A		15	25	nC
		V_{DS} = - 6 V, V_{GS} = - 2.5 V, I_D = - 5.1 A		9	15	
Gate-Source Charge	Q_{gs}			1.9		
Gate-Drain Charge	Q_{gd}			3.8		
Gate Resistance	R_g	f = 1 MHz		4.0		Ω
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = - 6 V, R_L = 6 Ω I_D = - 1 A, V_{GEN} = - 4.5 V, R_G = 1 Ω		13	20	ns
Rise Time	t_r			35	60	
Turn-Off Delay Time	$t_{d(off)}$			45	70	
Fall Time	t_f			12	20	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	T_C = 25 °C			- 1.0	A
Pulse Diode Forward Current[a]	I_{SM}				- 20	
Body Diode Voltage	V_{SD}	I_S = - 1.0 A		- 0.7	- 1.2	V
Body Diode Reverse Recovery Time	t_{rr}	I_F = - 1.0 A, dI/dt = 100 A/µs, T_J = 25 °C		32	50	ns
Body Diode Reverse Recovery Charge	Q_{rr}			20	40	nC
Reverse Recovery Fall Time	t_a			16		ns
Reverse Recovery Rise Time	t_b			16		

Notes:
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.

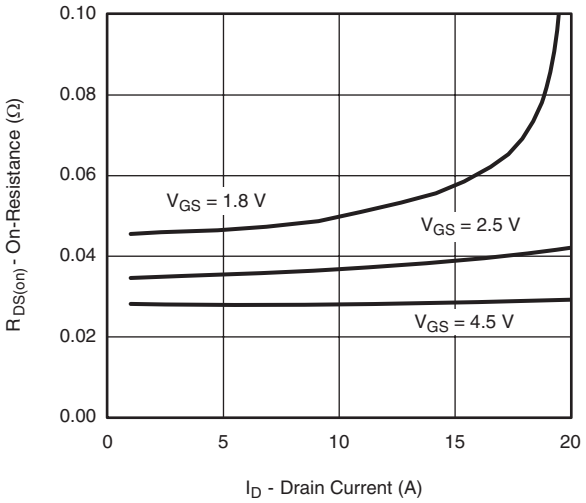
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



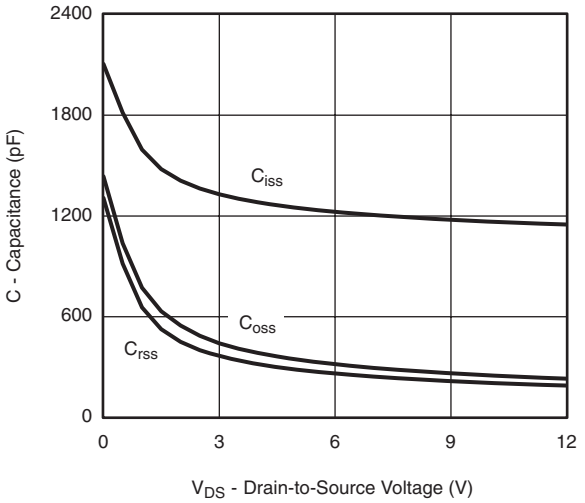
Output Characteristics



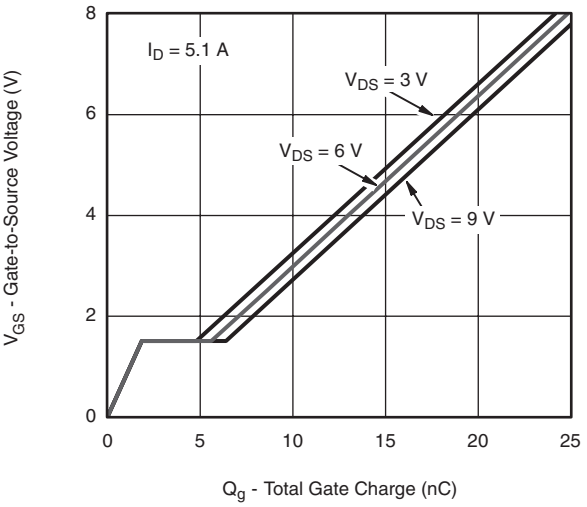
Transfer Characteristics



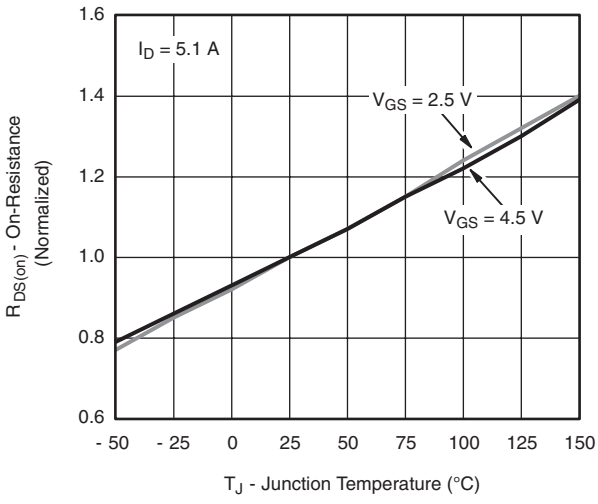
On-Resistance vs. Drain Current and Gate Voltage



Capacitance

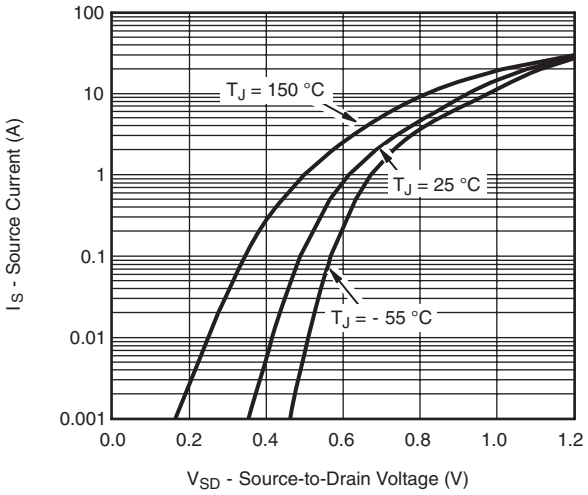


Gate Charge

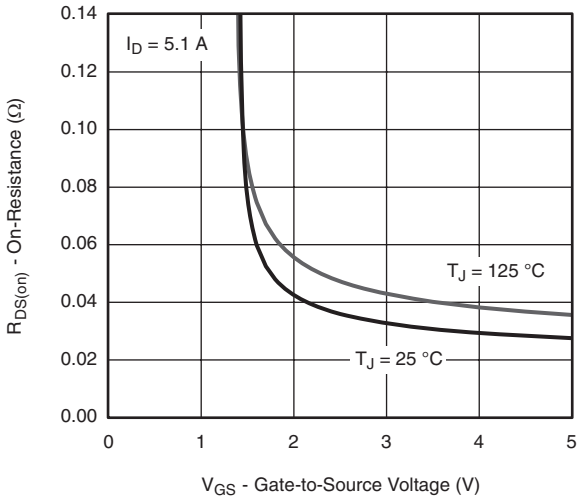


On-Resistance vs. Junction Temperature

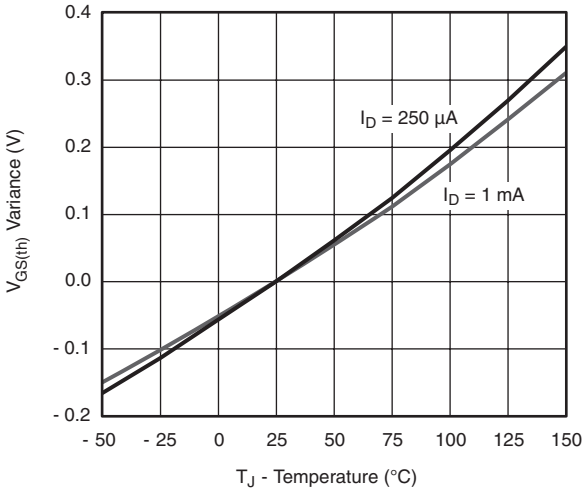
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



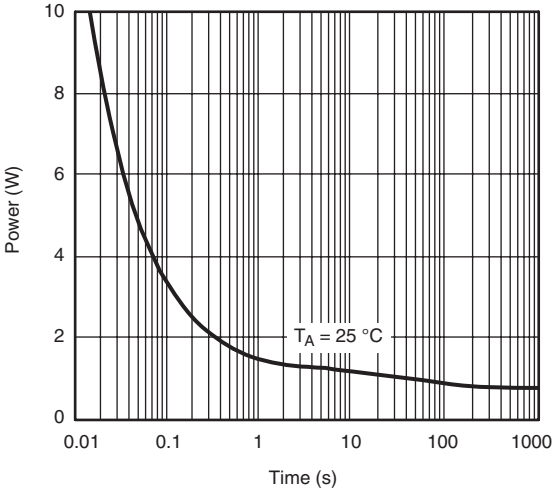
Source-Drain Diode Forward Voltage



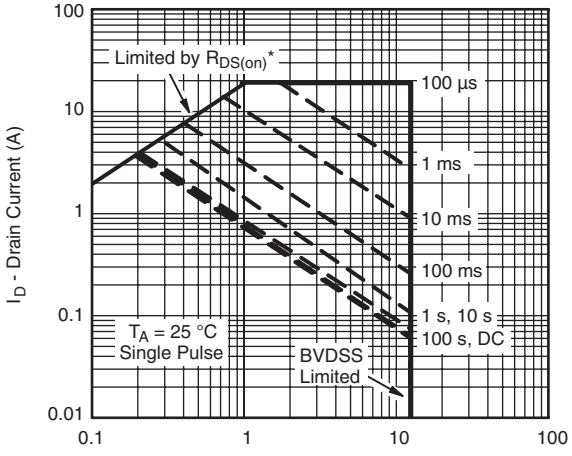
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



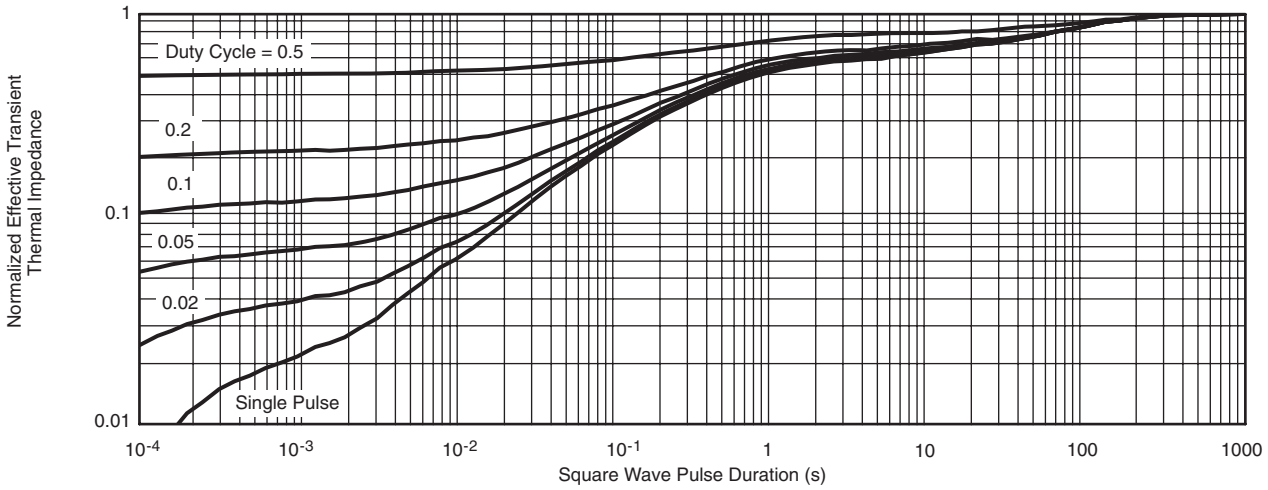
Single Pulse Power



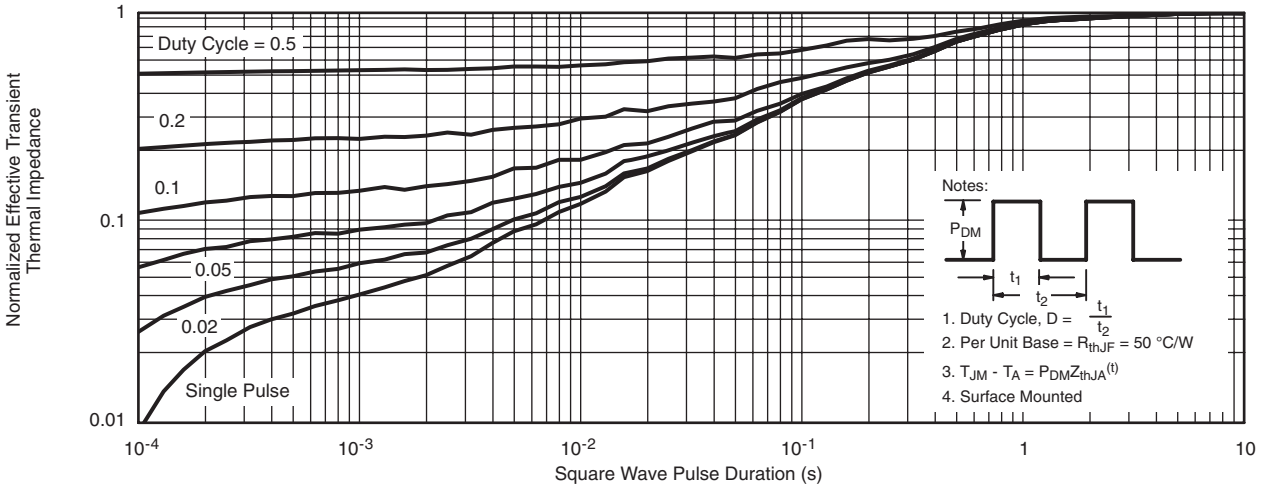
* V_{GS} > minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

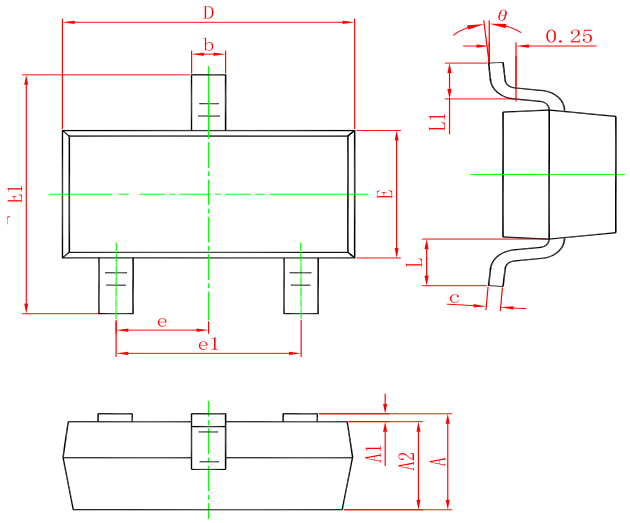


Normalized Thermal Transient Impedance, Junction-to-Ambient



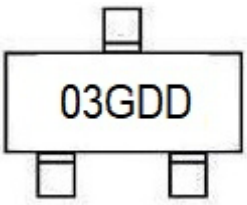
Normalized Thermal Transient Impedance, Junction-to-Foot

SOT-23 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP.		0.037 TYP.	
e1	1.800	2.000	0.071	0.079
L	0.550 REF.		0.022 REF.	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

Marking



Ordering information

Order code	Package	Baseqty	Deliverymode
SI2333CDS	SOT-23	3000	Tape and reel