



**Solid State Devices, Inc.**

14701 Firestone Blvd \* La Mirada, Ca 90638  
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# SFT210DE

## 50 mA, 30 Volt, 1 nsec High Speed Analog N-Channel DMOSFET switch

**DESIGNER'S DATA SHEET**

**Part Number / Ordering Information** <sup>1/</sup>

SFT210 DE     

Screening <sup>2/</sup>      = Not Screened  
     TX = TX Level  
     TXV = TXV Level  
     S = S Level

Package DE = TO-72

- Features:**
- Ultra-High Speed Switching –  $t_{ON} = 1 \text{ ns}$
  - Ultra-Low Reverse Capacitance: 0.2pF
  - Low Guaranteed  $r_{DS} @ 5V$
  - Low Turn-On Threshold Voltage
  - N-Channel Enhancement Mode
  - Replacement for SD210DE
  - TX, TXV, and S-Level Screening Available. Consult Factory. <sup>2/</sup>

Maximum Ratings	Symbol	Max	Units
Drain – Source Breakdown Voltage	$V_{DS}$	30	Volts
Source – Drain Voltage	$V_{SD}$	10	Volts
Gate - Drain Voltage	$V_{GD}$	$\pm 40$	Volts
Gate - Source Voltage	$V_{GS}$	$\pm 40$	Volts
Gate – Body (substrate) Voltage	$V_{Gb}$	$\pm 30$	Volts
Drain – Body (substrate) Voltage	$V_{Db}$	30	Volts
Source – Body (substrate) Voltage	$V_{Sb}$	15	Volts
Drain Current	$I_D$	50	mA
Power Dissipation	$P_D$	$T_A = 25^\circ C$ 300	mWatts
		$T_C = 25^\circ C$ 1.2	Watts
Maximum Thermal Resistance	$R_{\theta JA}$ $R_{\theta JC}$	Junction to Ambient 335	$^\circ C/W$
		Junction to Case 85	
Lead Temperature (1/16" from case for 10 seconds)	$T_L$	300	$^\circ C$
Operating & Storage Temperature	$T_{OP}$	-55 to +125	$^\circ C$
	$T_{STG}$	-65 to +150	$^\circ C$

**PACKAGE OUTLINE: TO-72**

PIN ASSIGNMENT	
PIN 1	Source
PIN 2	Drain
PIN 3	Gate
PIN 4	Body (Substrate)

Side view dimensions: .170" (total length), .210" (lead length), .500" MIN (lead length),  $\varnothing .209"$  (lead diameter), .230" (lead thickness),  $\varnothing .178"$  (case diameter), .195" (case thickness).

Top view dimensions: .100" (lead spacing), .050" (lead width), .100" (lead width), .028" (lead thickness), .048" (lead thickness), .036" (lead thickness), .045" (lead thickness),  $\varnothing .016"$  (pin diameter), .019" (pin diameter), 45° (lead angle), (4 Pins).



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Electrical Characteristics <sup>3/</sup>	Symbol	Typ	Min	Max	Units	
<b>Drain – Source Breakdown Voltage</b>	$V_{GS} = V_{BS} = 0\text{ V}, I_D = 10\mu\text{A}$ $V_{GS} = V_{BS} = -5\text{ V}, I_D = 10\text{nA}$	$V_{(BR)DS}$	35 30	30 10	--	Volts
<b>Source – Drain Breakdown Voltage</b>	$V_{GD} = V_{BD} = -5\text{ V}, I_S = 10\text{nA}$	$V_{(BR)SD}$	22	10	--	Volts
<b>Drain – Substrate Breakdown Voltage</b>	$V_{GB} = 0\text{ V}, I_D = 10\text{nA}$ , Source Open	$V_{(BR)DBO}$	35	15	--	Volts
<b>Source – Substrate Breakdown Voltage</b>	$V_{GB} = 0\text{ V}, I_S = 10\mu\text{A}$ , Drain Open	$V_{(BR)SBO}$	35	15	--	Volts
<b>Drain – Source ON State Resistance</b> ( $I_D = 1\text{ mA}, V_{SB} = 0\text{ V}$ )	$V_{GS} = 5\text{ V}$	$r_{DS(ON)}$	58	--	70	Ohms
	$V_{GS} = 10\text{ V}$		38	--	45	
	$V_{GS} = 15\text{ V}$		30	--	--	
	$V_{GS} = 20\text{ V}$		26	--	--	
	$V_{GS} = 25\text{ V}$		24	--	--	
<b>Drain – Source Leakage</b>	$V_{GS} = V_{BS} = -5\text{V}$   $V_{DS} = 10\text{V}$ $V_{DS} = 20\text{V}$	$I_{DS(off)}$	0.5 1.0	-- --	10 --	nA
<b>Source – Drain Leakage</b>	$V_{GD} = V_{BD} = -5\text{V}$   $V_{SD} = 10\text{V}$ $V_{SD} = 20\text{V}$	$I_{SD(off)}$	0.5 0.8	-- --	10 --	nA
<b>Gate Leakage</b>	$V_{DB} = V_{SB} = 0\text{ V}, V_{GB} = \pm 40\text{V}$	$I_{GBS}$	0.001	--	0.1	nA
<b>Threshold Voltage</b>	$V_{DS} = V_{GS}, I_D = 1\mu\text{A}, V_{SB} = 0\text{V}$	$V_{GS(th)}$	0.8	0.5	2.0	Volts
<b>Forward Transconductance</b>	$V_{DS} = 10\text{V}, V_{SB} = 0\text{ V}, I_D = 20\text{mA}, f = 1\text{ kHz}$	$g_{fs}$	11	10	--	mS
		$g_{os}$	0.9	--	--	
<b>Gate Node Capacitance</b>	$V_{DS} = 10\text{V}, f = 1\text{MHz}$ $V_{GS} = V_{BS} = -15\text{V}$	$C_{(GS+GD+GB)}$	2.5	--	3.5	pF
<b>Drain Node Capacitance</b>		$C_{(GD+GB)}$	1.1	--	1.5	pF
<b>Source Node Capacitance</b>		$C_{(GS+SB)}$	3.7	--	5.5	pF
<b>Reverse Transfer Capacitance</b>		$C_{rss} (C_{DG})$	0.2	--	0.5	pF
<b>Turn ON Delay Time</b>		$V_{SB} = 0\text{ V}, V_{IN} 0\text{ to }5\text{ V},$ $R_G = 25\ \Omega$ $V_{DD} = 5\text{ V}, R_L = 680\ \Omega$	$t_{d(on)}$	0.5	--	1
<b>Rise Time</b>	$t_r$		0.6	--	1	ns
<b>Turn OFF Delay Time</b>	$t_{d(off)}$		2	--	--	ns
<b>Fall Time</b>	$t_f$		6	--	--	ns

**NOTES:** \* Pulse Test: Pulse Width = 100  $\mu\text{sec}$ , Duty Cycle = 2%  
 1/ For Ordering Information, Price, and Availability Contact Factory.  
 2/ Screening per MIL-PRF-19500  
 3/ Unless Otherwise Specified, All Electrical Characteristics @25°C