**Solid State Devices, Inc.**
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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** [1/]

**SFT210DE __**

**Screening** [2/] __ = Not Screened
TX = TX Level
TXV = TXV Level
S = S Level

**Package** DE = TO-72

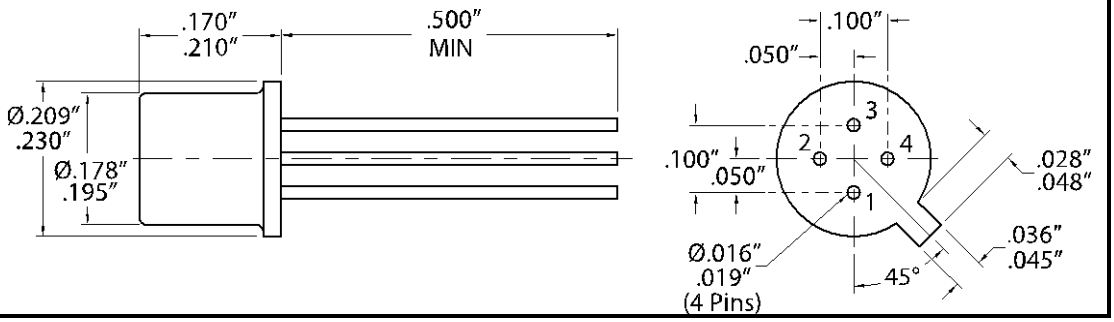
**Features:**

- Ultra-High Speed Switching – $t_{ON}$ = 1 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.[2/]

| Maximum Ratings | | Symbol | Max | Units |
|---|---|---|---|---|
| Drain – Source Breakdown Voltage<br>Source – Drain Voltage | | $V_{DS}$<br>$V_{SD}$ | 30<br>10 | Volts |
| Gate - Drain Voltage | | $V_{GD}$ | ±40 | Volts |
| Gate - Source Voltage | | $V_{GS}$ | ±40 | Volts |
| Gate – Body (substrate) Voltage | | $V_{Gb}$ | ±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 | $T_A$= 25°C<br>$T_C$= 25°C | $P_D$ | 300<br>1.2 | mWatts<br>Watts |
| Maximum Thermal Resistance | Junction to Ambient<br>Junction to Case | $R_{\Theta JA}$<br>$R_{\Theta JC}$ | 335<br>85 | °C/W |
| Lead Temperature (1/16" from case for 10 seconds) | | $T_L$ | 300 | °C |
| Operating & Storage Temperature | | $T_{OP}$<br>$T_{STG}$ | -55 to +125<br>-65 to +150 | °C<br>°C |

**PACKAGE OUTLINE: TO-72**

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




**NOTE:** All specifications are subject to change without notification.
SCD's for these devices should be reviewed by SSDI prior to release.

**DATA SHEET #: FT0035A** | **DOC**

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# SFT210DE

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

**NOTES:** * Pulse Test: Pulse Width = 100 μsec, 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 @25ºC

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