

High Speed DMOS N-Channel Switch



SD403

FEATURES

- Ultra High Speed Switching $t_r < 1\text{ns}$
- Very Low Capacitance..... C_{rss} 0.4pf typical
- CMOS and TTL Compatible Input
- Low ON Resistance..... 40 ohms typical

APPLICATIONS

- Switch Drivers
- Video Switches
- Samples and Hold
- Track and Hold
- VHF/UHF Amplifiers

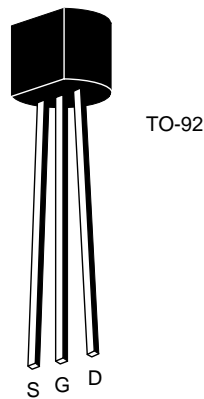
DESCRIPTION

The Calogic SD403 is an N-Channel Enhancement-Mode Lateral DMOS FET. This product has very low capacitance, ($C_{rss} < 0.4\text{pf}$ typical) allowing for high speed switching ($t_r < 1\text{ns}$). The SD403 is a high gain device (19mmhos) and has good performance values for sample and hold circuits, video switches and switch drivers where lower capacitance and high speed switching are critical.

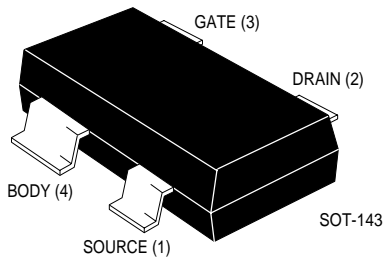
ORDERING INFORMATION

| Part | Package | Temperature Range |
|---------|--------------------------|-------------------|
| SD403BD | Plastic TO-92 | -55 to +125°C |
| SD403CY | SOT-143 Surface Mount | -55 to +125°C |
| XSD403 | Sorted Chips in Carriers | -55 to +125°C |

PIN CONFIGURATION



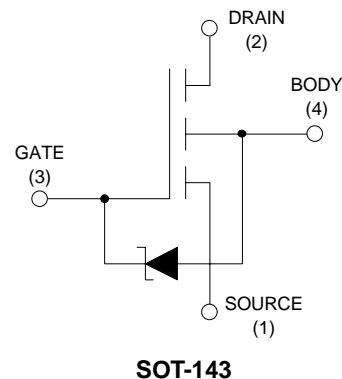
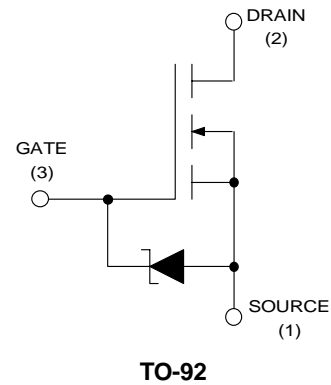
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PRODUCT MARKING

| | |
|---------|-------|
| SD403CY | SD403 |
|---------|-------|

SCHEMATIC DIAGRAM

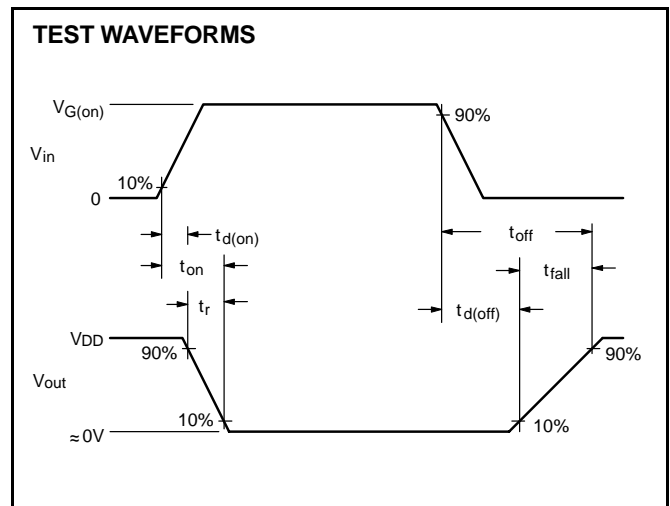
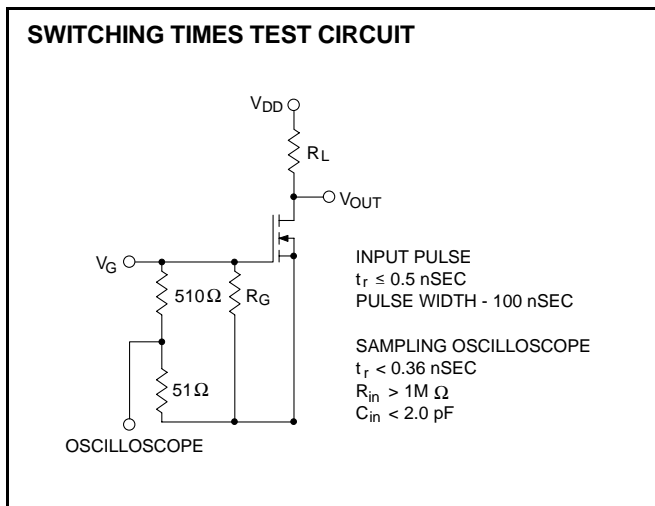


ABSOLUTE MAXIMUM RATINGS ($T_A = +25^\circ\text{C}$ unless otherwise noted)

| | | | |
|----------------------|-------|--|-----------------|
| Drain-Source Voltage | +15V | Continuous Drain Current | 50mA |
| Gate-Source Voltage | -0.3V | Power Dissipation (at or below $T_A = +25^\circ\text{C}$) | 300mW |
| | +20V | Linear Derating Factor | 3.0mW/°C |
| Gate-Drain Voltage | -0.3V | Operating Junction and Storage | |
| | +20V | Temperature Range | -55°C to +125°C |
| Source-Drain Voltage | -0.3V | | |

ELECTRICAL CHARACTERISTICS ($T_A = +25^\circ\text{C}$ unless otherwise specified)

| SYMBOL | CHARACTERISTICS | MIN | TYP | MAX | UNIT | TEST CONDITIONS |
|----------------|--|-----|-----|-----|---------------|--|
| STATIC | | | | | | |
| BV_{DSS} | Drain-Source Breakdown Voltage | 15 | 25 | | V | $I_D = 1.0\mu\text{A}$, $V_{GS} = 0$ |
| $I_{D(OFF)}$ | Drain-Source OFF Leakage Current | | | 1.0 | μA | $V_{DS} = 15\text{V}$, $V_{GS} = 0$ |
| I_{GSS} | Gate-Source Leakage Current | | | 1.0 | μA | $V_{GS} = 20\text{V}$, $V_{DS} = 0$ |
| $I_{D(ON)}$ | Drain-Source ON Current | 80 | 120 | | mA | $V_{DS} = 10\text{V}$, $V_{GS} = 10\text{V}$ Pulse Test |
| $V_{GS(th)}$ | Gate-Source Threshold Voltage | 0.3 | | 1.5 | V | $I_D = 1.0\mu\text{A}$, $V_{DS} = V_{GS}$ |
| $V_{DS(ON)}$ | Drain-Source ON Voltage | | 140 | 175 | mV | $I_D = 1\text{mA}$, $V_{GS} = 2.4\text{V}$ |
| $r_{DS(ON)}$ | Drain-Source ON Resistance | | 140 | 175 | ohms | |
| $V_{DS(ON)}$ | Drain-Source ON Voltage | | 40 | 60 | mV | $I_D = 1\text{mA}$, $V_{GS} = 4.5\text{V}$ |
| $r_{DS(ON)}$ | Drain-Source ON Resistance | | 40 | 60 | ohms | |
| DYNAMIC | | | | | | |
| g_{fs} | Common-Source Forward Transconductance | 15 | 19 | | mS | $I_D = 20\text{mA}$, $V_{DS} = 10\text{V}$, $f = 1\text{KHz}$ Pulse Test |
| C_{iss} | Common-Source Input Capacitance | | 4.5 | 6.0 | pf | $V_{DS} = 10\text{V}$, $V_{GS} = 0$ $f = 1\text{MHz}$ |
| C_{oss} | Common-Source Output Capacitance | | 2.0 | 3.0 | | |
| C_{rss} | Common-Source Reverse Transfer Capacitance | | 0.4 | 0.6 | | |
| $t_{d(on)}$ | Turn ON Delay Time | | 0.8 | 1.2 | ns | $V_{DD} = 10\text{V}$, $R_L = 680\Omega$ $V_{G(ON)} = 10\text{V}$, $R_G = 51\Omega$ $C_L = 1.5\text{pF}$ |
| t_r | Rise Time | | 0.9 | 1.2 | | |
| $t_{(OFF)}$ | Turn OFF Time | | 1.4 | | | |



TYPICAL PERFORMANCE CHARACTERISTICS ($T_A = +25^\circ\text{C}$ unless otherwise noted)

