High Speed DMOS N-Channel Switch

calogic CORPORATION

SD403

FEATURES

- **Ultra High Speed Switching . . . . . t_r < 1ns**
- **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**

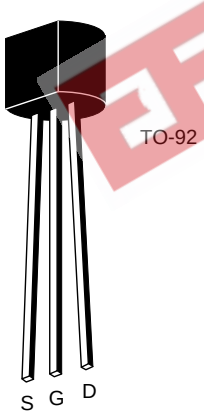
DESCRIPTION

The Calogic SD403 is an N-Channel Enhancement-Mode Lateral DMOS FET. This product has very low capacitance, (c_{rss} < 0.4pf typical) allowing for high speed switching (t_r 1ns). 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.

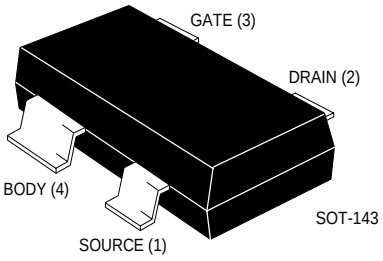
ORDERING INFORMATION

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

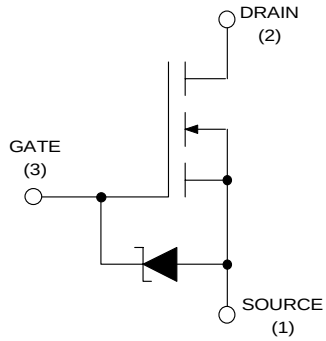


CD1-1

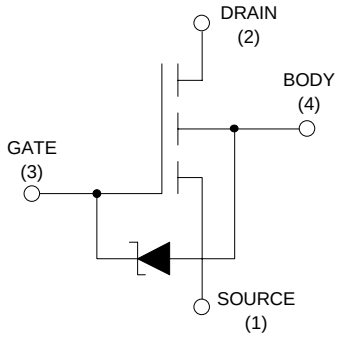


PRODUCT MARKING	
SD403CY	SD403

SCHEMATIC DIAGRAM



TO-92



SOT-143

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ABSOLUTE MAXIMUM RATINGS (T_A = +25°C unless otherwise noted)

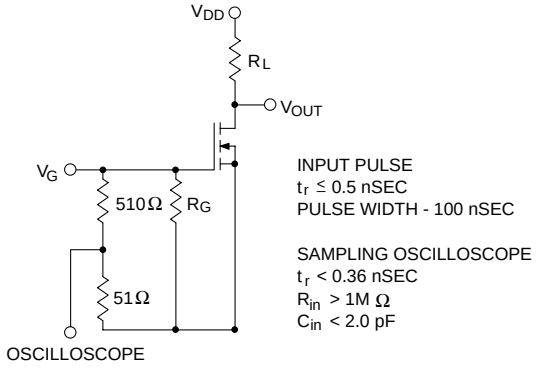
Drain-Source Voltage . . . . . +15V
Gate-Source Voltage . . . . . -0.3V
+20V
Gate-Drain Voltage . . . . . -0.3V
+20V
Source-Drain Voltage . . . . . -0.3V

Continuous Drain Current 50mA
Power Dissipation (at or below T_A = +25°C) 300mW
Linear Derating Factor . . . . . 3.0mW/ °C
Operating Junction and Storage
Temperature Range . . . . . -55°C to +125°C

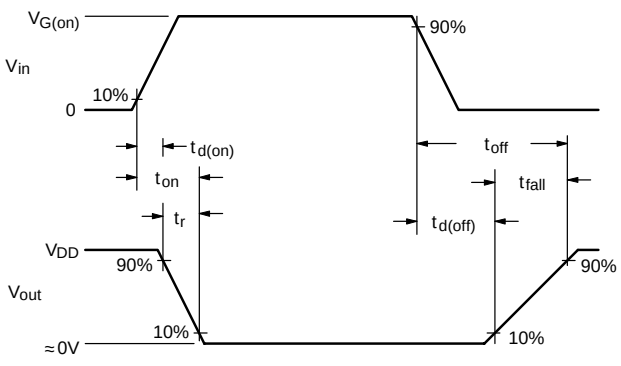
ELECTRICAL CHARACTERISTICS (T_A = +25°C unless otherwise specified)

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

SWITCHING TIMES TEST CIRCUIT



TEST WAVEFORMS



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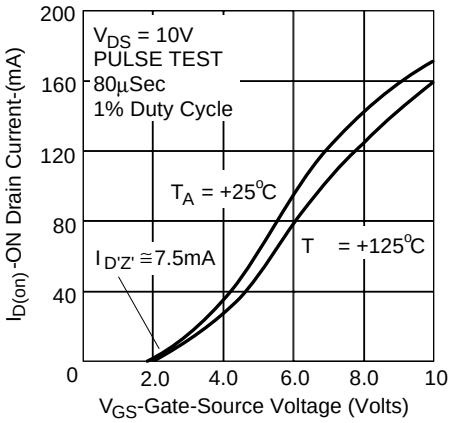
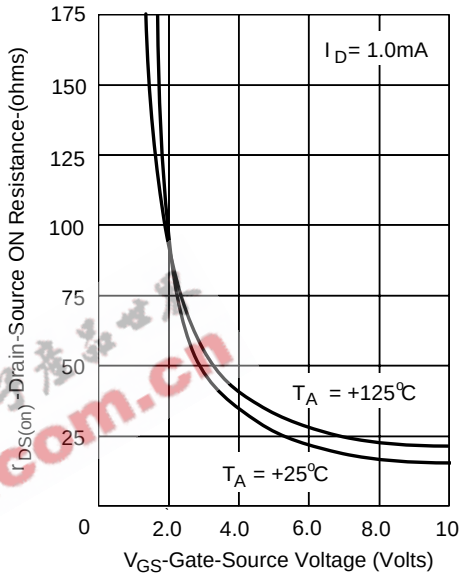
TYPICAL PERFORMANCE CHARACTERISTICS (T_A = +25°C unless otherwise noted)

ON DRAIN CURRENT -VS- GATE-SOURCE VOLTAGE



DRAIN-SOURCE ON RESISTANCE -VS- GATE-SOURCE VOLTAGE



FORWARD TRANSCONDUCTANCE -VS- ON DRAIN CURRENT