

Supertex inc.

TD9944
Low Threshold



Dual N-Channel Enhancement-Mode Vertical DMOS FETs

Ordering Information

BV_{DSS} / BV_{DGS}	$R_{DS(ON)} (max)$	$V_{GS(th)} (max)$	$I_{D(ON)} (min)$	Order Number/Package
				SO-8
240V	6.0Ω	2.0V	1.0A	TD9944TG

Features

- ☐ Dual N-channel devices
- ☐ Low threshold — 2.0V max.
- ☐ High input impedance
- ☐ Low input capacitance — 125pF max.
- ☐ Fast switching speeds
- ☐ Low on resistance
- ☐ Free from secondary breakdown
- ☐ Low input and output leakage

Applications

- ☐ Logic level interfaces – ideal for TTL and CMOS
- ☐ Solid state relays
- ☐ Battery operated systems
- ☐ Photo voltaic drives
- ☐ Analog switches
- ☐ General purpose line drivers
- ☐ Telecom switches

Absolute Maximum Ratings

Drain-to-Source Voltage	BV_{DSS}
Drain-to-Gate Voltage	BV_{DGS}
Gate-to-Source Voltage	± 20V
Operating and Storage Temperature	-55°C to +150°C
Soldering Temperature*	300°C

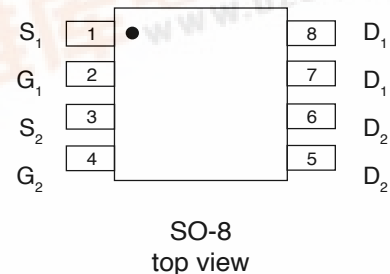
* Distance of 1.6 mm from case for 10 seconds.

Low Threshold DMOS Technology

These dual low threshold enhancement-mode (normally-off) transistors utilize a vertical DMOS structure and Supertex's well-proven silicon-gate manufacturing process. This combination produces devices with the power handling capabilities of bipolar transistors and with the high input impedance and positive temperature coefficient inherent in MOS devices. Characteristic of all MOS structures, these devices are free from thermal runaway and thermally induced secondary breakdown.

Supertex's vertical DMOS FETs are ideally suited to a wide range of switching and amplifying applications where very low threshold voltage, high breakdown voltage, high input impedance, low input capacitance, and fast switching speeds are desired.

Pin Configuration



Note: See Package Outline section for dimensions.



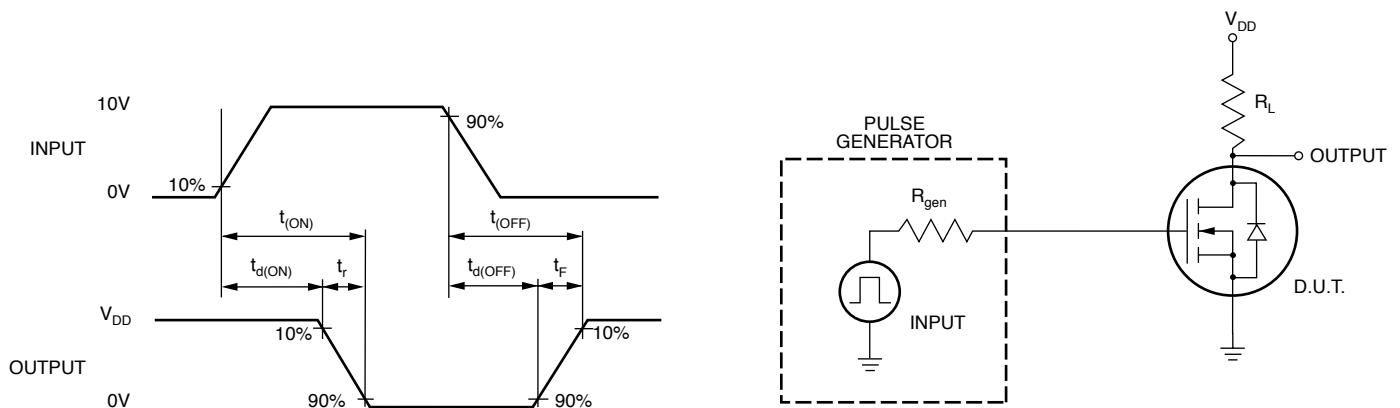
Electrical Characteristics (each device, @ 25°C unless otherwise specified)

Symbol	Parameter	Min	Typ	Max	Unit	Conditions
BV_{DSS}	Drain-to-Source Breakdown Voltage	240			V	$V_{GS} = 0V, I_D = 2mA$
$V_{GS(th)}$	Gate Threshold Voltage	0.6		2.0	V	$V_{GS} = V_{DS}, I_D = 1mA$
$\Delta V_{GS(th)}$	Change in $V_{GS(th)}$ with Temperature			-5.0	mV/°C	$V_{GS} = V_{DS}, I_D = 1mA$
I_{GSS}	Gate Body Leakage			100	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$
I_{DSS}	Zero Gate Voltage Drain Current			10	μA	$V_{GS} = 0V, V_{DS} = \text{Max Rating}$
				1.0	mA	$V_{GS} = 0V, V_{DS} = 0.8 \text{ Max Rating}$ $T_A = 125^\circ C$
$I_{D(ON)}$	ON-State Drain Current	0.5	1.9		A	$V_{GS} = 4.5V, V_{DS} = 25V$
		1.0	2.8			$V_{GS} = 10V, V_{DS} = 25V$
$R_{DS(ON)}$	Static Drain-to-Source ON-State Resistance		4.0	6.0	Ω	$V_{GS} = 4.5V, I_D = 250mA$
			4.0	6.0		$V_{GS} = 10V, I_D = 0.5A$
$\Delta R_{DS(ON)}$	Change in $R_{DS(ON)}$ with Temperature			1.4	%/°C	$V_{GS} = 10V, I_D = 0.5A$
G_{FS}	Forward Transconductance	300	600		mS	$V_{DS} = 25V, I_D = 0.5A$
C_{ISS}	Input Capacitance		65	125	pF	$V_{GS} = 0V, V_{DS} = 25V$ $f = 1 \text{ MHz}$
C_{OSS}	Common Source Output Capacitance		35	70		
C_{RSS}	Reverse Transfer Capacitance		10	25		
$t_{d(ON)}$	Turn-ON Delay Time			10	ns	$V_{DD} = 25V,$ $I_D = 1.0A,$ $R_{GEN} = 25\Omega$
t_r	Rise Time			10		
$t_{d(OFF)}$	Turn-OFF Delay Time			20		
t_f	Fall Time			20		
V_{SD}	Diode Forward Voltage Drop			1.8	V	$V_{GS} = 0V, I_{SD} = 1.0A$
t_{rr}	Reverse Recovery Time		300		ns	$V_{GS} = 0V, I_{SD} = 1.0A$

Notes:

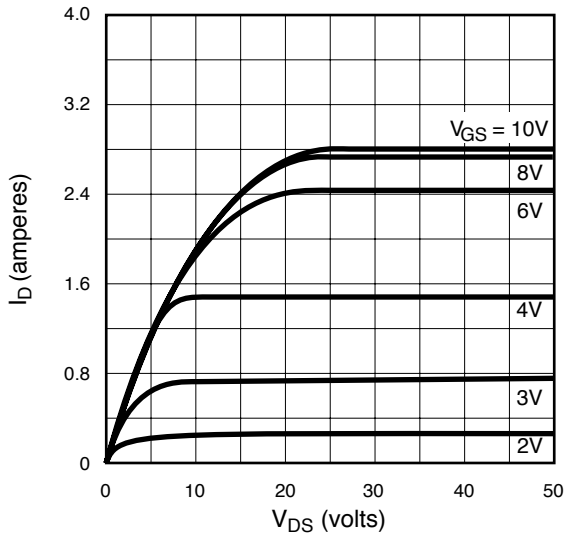
1. All D.C. parameters 100% tested at 25°C unless otherwise stated. (Pulse test: 300 μ s pulse, 2% duty cycle.)
2. All A.C. parameters sample tested.

Switching Waveforms and Test Circuit

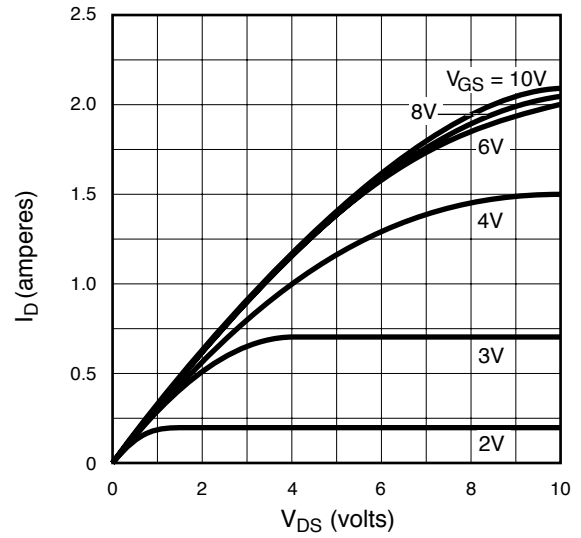


Typical Performance Curves

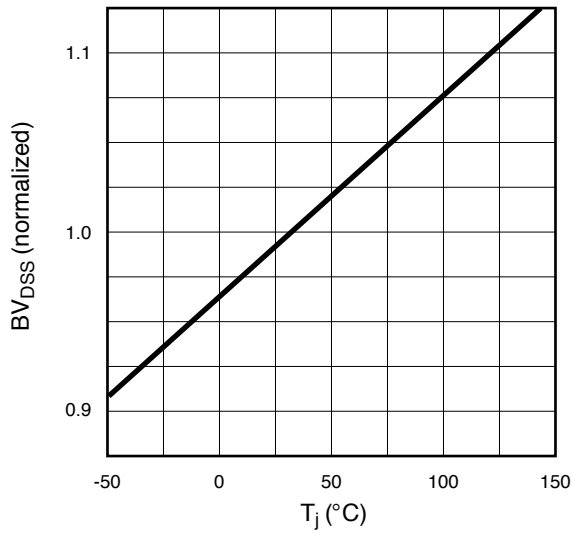
Output Characteristics



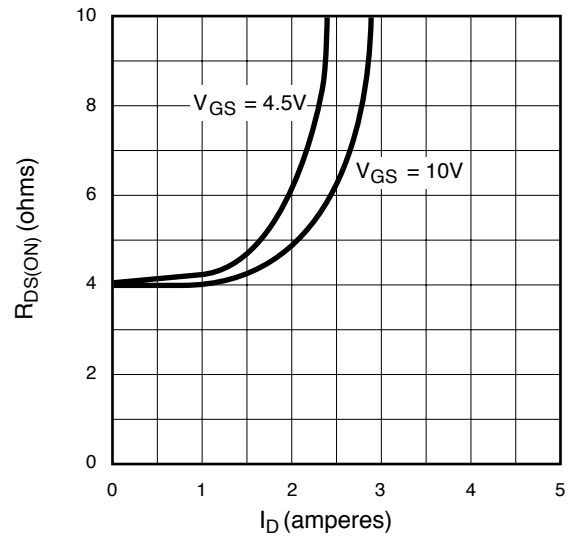
Saturation Characteristics



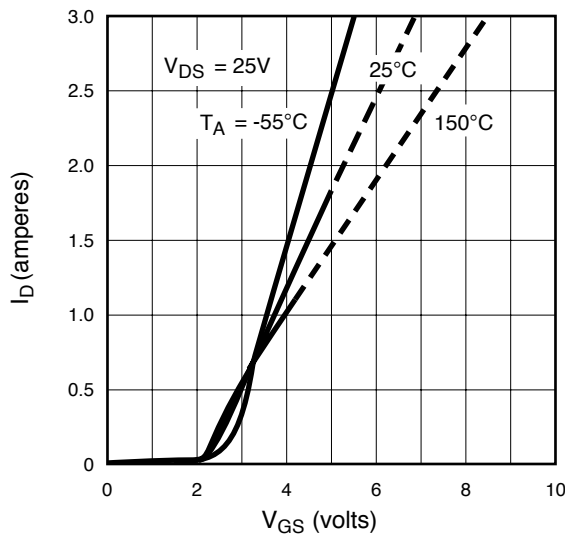
BV_{DSS} Variation with Temperature



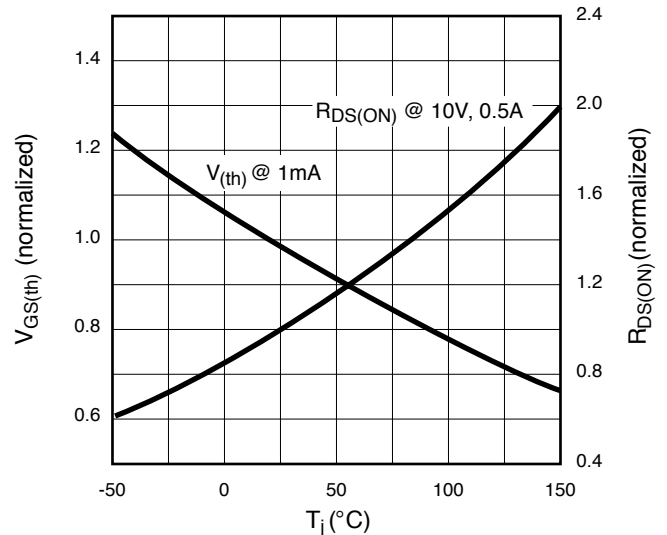
On-Resistance vs. Drain Current



Transfer Characteristics



V_{th} and R_{DS} Variation with Temperature



Typical Performance Curves

