

## Product Objective Specification



## P-Channel Enhancement-Mode Vertical DMOS FETs

### Ordering Information

BV <sub>DSS</sub> / BV <sub>DGS</sub>	R <sub>DS(ON)</sub> (max)	V <sub>GS(th)</sub> (max)	Order Number/Package	
			TO-236AB*	Wafer
-350V	30Ω	-2.4V	TP5335K1	TP5335NW

\*Same as SOT-23. All units shipped on 3,000 piece carrier tape reels.

Product marking for SOT-23

**P3S\***

Where \*=2-week alpha date code

### Features

- Free from secondary breakdown
- Low power drive requirement
- Ease of paralleling
- Low C<sub>iss</sub> and fast switching speeds
- Excellent thermal stability
- Integral Source-Drain diode
- High input impedance and high gain
- Complementary N- and P-channel devices

### Advanced DMOS Technology

These 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 high breakdown voltage, high input impedance, low input capacitance, and fast switching speeds are desired.

### Applications

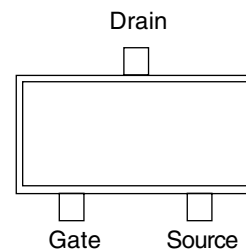
- Logic level interfaces – ideal for TTL and CMOS
- Solid state relays
- Analog switches
- Power Management
- Telecom switches

### Absolute Maximum Ratings

Drain-to-Source Voltage	BV <sub>DSS</sub>
Drain-to-Gate Voltage	BV <sub>DGS</sub>
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.

### Package Options



TO-236AB  
(SOT-23)  
top view

Note: See Package Outline section for dimensions.

## Thermal Characteristics

Package	$I_D$ (continuous)*	$I_D$ (pulsed)	Power Dissipation @ $T_A = 25^\circ\text{C}$	$\theta_{jc}$ $^\circ\text{C/W}$	$\theta_{ja}$ $^\circ\text{C/W}$	$I_{DR}^*$	$I_{DRM}$
SOT-23	-85mA	-400mA	0.36W	200	350	-85mA	-400mA

\*  $I_D$  (continuous) is limited by max rated  $T_j$ .

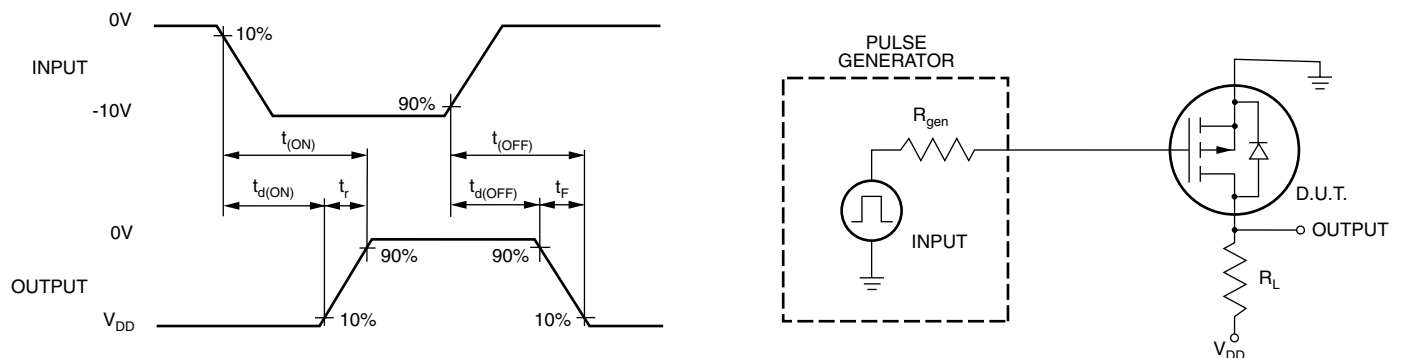
## Electrical Characteristics (@ $25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Min	Typ	Max	Unit	Conditions
$BV_{DSS}$	Drain-to-Source Breakdown Voltage	-350			V	$V_{GS} = 0V, I_D = -100\mu\text{A}$
$V_{GS(th)}$	Gate Threshold Voltage	-1.0		-2.4	V	$V_{GS} = V_{DS}, I_D = -1.0\text{mA}$
$\Delta V_{GS(th)}$	Change in $V_{GS(th)}$ with Temperature			4.5	mV/ $^\circ\text{C}$	$V_{GS} = V_{DS}, I_D = -1.0\text{mA}$
$I_{GSS}$	Gate Body Leakage			-100	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$
$I_{DSS}$	Zero Gate Voltage Drain Current			-10	$\mu\text{A}$	$V_{GS} = 0V, V_{DS} = \text{Max Rating}$
				-1.0	mA	$V_{GS} = 0V, V_{DS} = 0.8 \text{ Max Rating}$ $T_A = 125^\circ\text{C}$
				-5.0	nA	$V_{GS} = 0V, V_{DS} = -330V$
$I_{D(ON)}$	ON-State Drain Current	-200			mA	$V_{GS} = -4.5V, V_{DS} = -25V$
		-400				$V_{GS} = -10V, V_{DS} = -25V$
$R_{DS(ON)}$	Static Drain-to-Source ON-State Resistance			75	$\Omega$	$V_{GS} = -4.5V, I_D = -150\text{mA}$
				30	$\Omega$	$V_{GS} = -10V, I_D = -200\text{mA}$
$\Delta R_{DS(ON)}$	Change in $R_{DS(ON)}$ with Temperature			1.7	%/ $^\circ\text{C}$	$V_{GS} = -10V, I_D = -200\text{mA}$
$G_{FS}$	Forward Transconductance	125			mS	$V_{DS} = -25V, I_D = -200\text{mA}$
$C_{ISS}$	Input Capacitance			110	pF	$V_{GS} = 0V, V_{DS} = -25V$ $f = 1 \text{ MHz}$
$C_{OSS}$	Common Source Output Capacitance			60		
$C_{RSS}$	Reverse Transfer Capacitance			22		
$t_{d(ON)}$	Turn-ON Delay Time			20	ns	$V_{DD} = -25V$ $I_D = -150\text{mA}$ $R_{GEN} = 25\Omega$
$t_r$	Rise Time			15		
$t_{d(OFF)}$	Turn-OFF Delay Time			25		
$t_f$	Fall Time			25		
$V_{SD}$	Diode Forward Voltage Drop			-1.8	V	$V_{GS} = 0V, I_{SD} = -200\text{mA}$
$t_{rr}$	Reverse Recovery Time		800		ns	$V_{GS} = 0V, I_{SD} = -200\text{mA}$

### Notes:

- All D.C. parameters 100% tested at  $25^\circ\text{C}$  unless otherwise stated. (Pulse test: 300 $\mu\text{s}$  pulse, 2% duty cycle.)
- All A.C. parameters sample tested.

## Switching Waveforms and Test Circuit



11/12/01