



**N-Channel Depletion-Mode Vertical DMOS FET**

**Features**

- High input impedance
- Low input capacitance
- Fast switching speeds
- Low on resistance
- Free from secondary breakdown
- Low input and output leakages

**Application**

- Normally-on switches
- Solid state relays
- Battery operated systems
- Converters
- Linear amplifiers
- Constant current sources
- Telecom

**Absolute Maximum Ratings**

Drain-to-Source Voltage	$BV_{DSX}$
Drain-to-Gate Voltage	$BV_{DGX}$
Gate-to-Source Voltage	$\pm 20V$
Operating and Storage Temperature	$-55^{\circ}C$ to $+150^{\circ}C$
Soldering Temperature*	$300^{\circ}C$

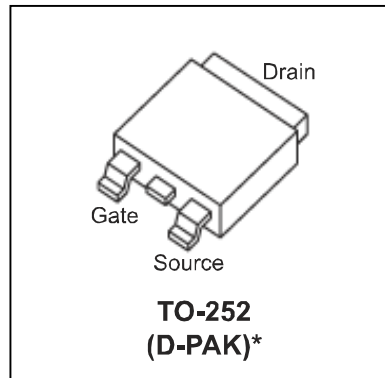
\* Distance of 1.6mm from case for 10 seconds.

**General Description**

This low threshold depletion-mode (normally-on) transistor utilizes an advanced vertical DMOS structure and Supertex's well-proven silicon-gate manufacturing process. This combination produces a device 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, this device is free from thermal runaway and thermally-induced secondary breakdown.

Supertex's vertical DMOS FET is 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.

**Package Option**



\*\* "Green" Certified Package

**Ordering Information**

Order Number / Package	$BV_{DSX} / BV_{DGX}$	$R_{DS(ON)}$ (max)	$I_{DSS}$ (typ)
<b>TO-252</b>			
DN2470K4	700V	$42\Omega$	500mA
DN2470K4-G **	700V	$42\Omega$	500mA



### Thermal Characteristics

Package	I <sub>D(continuous)*</sub>	I <sub>D(pulsed)</sub>	Power Dissipation @ T <sub>A</sub> =25°C	θ <sub>JC</sub> °C/W	θ <sub>JA</sub> °C/W	I <sub>DR*</sub>	I <sub>DRM</sub>
TO-252	170mA	500mA	2.5W**	6.25	50**	170mA	500mA

\* I<sub>D(continuous)</sub> is limited by maximum rated T<sub>J</sub> of 150°C

\*\* Mounted on FR4, 25mm x 25mm x 1.57mm

### Electrical Characteristics (@25°C unless otherwise specified)

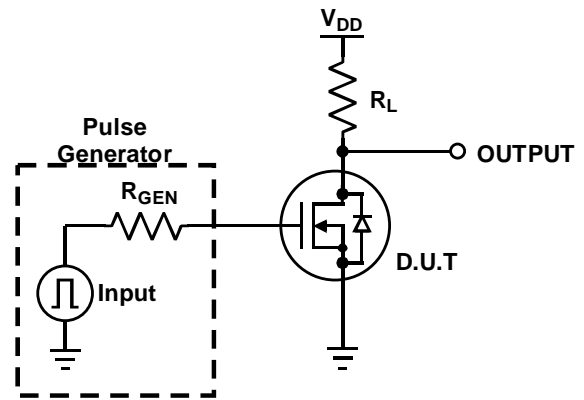
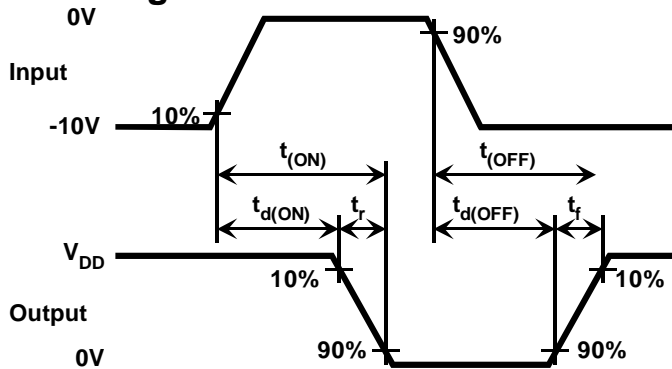
Symbol	Parameter	Min	Typ	Max	Units	Conditions
BV <sub>DSX</sub>	Drain-to-Source Breakdown Voltage	700			V	V <sub>GS</sub> =-5V, I <sub>D</sub> =100µA
V <sub>GS(OFF)</sub>	Gate-to-Source OFF Voltage	-1.5		-3.5	V	V <sub>DS</sub> =25V, I <sub>D</sub> =10µA
ΔV <sub>GS(OFF)</sub>	Change in V <sub>GS(OFF)</sub> with Temperature			4.5	mV/°C	V <sub>DS</sub> =25V, I <sub>D</sub> =10µA
I <sub>GSS</sub>	Gate Body Leakage			100	nA	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V
I <sub>D(OFF)</sub>	Drain-to-Source Leakage Current			1.0	µA	V <sub>GS</sub> =-10V, V <sub>DS</sub> =Max Rating
				1.0	mA	V <sub>GS</sub> =-10V, V <sub>DS</sub> =0.8 Max Rating, T <sub>A</sub> =125°C
I <sub>DSS</sub>	Saturated Drain-to-source Current		500		mA	V <sub>GS</sub> =0V, V <sub>DS</sub> =25V
R <sub>DS(ON)</sub>	Static Drain-to-Source ON-State Resistance			42	Ω	V <sub>GS</sub> =0V, I <sub>D</sub> =100mA
ΔR <sub>DS(ON)</sub>	Change in R <sub>DS(ON)</sub> with Temperature			1.1	%/°C	V <sub>GS</sub> =0V, I <sub>D</sub> =100mA
G <sub>FS</sub>	Forward Transconductance	100			mmho	I <sub>D</sub> =100mA, V <sub>DS</sub> =10V
C <sub>ISS</sub>	Input Capacitance			540	pF	V <sub>GS</sub> =-10V, V <sub>DS</sub> =25V f=1MHz
C <sub>OSS</sub>	Common Source Output Capacitance			60		
C <sub>RSS</sub>	Reverse Transfer Capacitance			25		
t <sub>d(ON)</sub>	Turn-ON Delay Time			30	ns	V <sub>DD</sub> =25V, I <sub>D</sub> =100mA, R <sub>GEN</sub> =25 Ω
t <sub>r</sub>	Rise Time			45		
t <sub>d(OFF)</sub>	Turn-Off Delay Time			45		
t <sub>f</sub>	Fall Time			60		
V <sub>SD</sub>	Diode Forward Voltage Drop			1.8		
t <sub>rr</sub>	Reverse Recovery Time		800		ns	V <sub>GS</sub> =0V, I <sub>SD</sub> =200mA

Notes:

1) All DC parameters 100% tested at 25°C unless otherwise stated. (Pulsed test: 300µs pulse at 2% duty cycle.)

2) All AC parameters sample tested.

### Switching Waveforms and Test Circuit



Supertex Inc. does not recommend the use of its products in life support applications and will not knowingly sell its products for use in such applications unless it receives an adequate "products liability indemnification insurance agreement." Supertex does not assume responsibility for use of devices described and limits its liability to the replacement of devices determined to be defective due to workmanship. No responsibility is assumed for possible omissions or inaccuracies. Circuitry and specifications are subject to change without notice. For the latest product specifications, refer to the Supertex website: <http://www.supertex.com>. For complete liability information on all Supertex products, refer to the most current databook or to the Legal/Disclaimer page on the Supertex website.