N-Channel Enhancement-Mode Vertical DMOS FET

Features

- 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 devices
- Analog switches
- General purpose line drivers
- Telecom switches

General Description

The Supertex TN2529 is a low threshold enhancement-mode transistor that 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 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 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.

Ordering Information

Device	Package Option	BV_{DSS}/BV_{DGS} (V)	$R_{DS(ON)}$ (max) (Ω)	$V_{GS(th)}$ (max) (V)	$I_{D(ON)}$ (min) (A)
	14-Lead QFN *5.00x5.00mm body 1.00mm height (max) 1.27mm pitch*				
TN2529	TN2529K6-G	290	6.0	2.0	1.0

-G indicates package is RoHS compliant ('Green')

Absolute Maximum Ratings

Parameter	Value
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
Maximum junction temperature	150°C

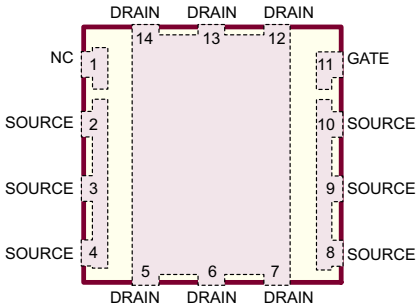
Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these conditions is not implied. Continuous operation of the device at the absolute rating level may affect device reliability. All voltages are referenced to device ground.

Product Marking

L = Lot Number
YY = Year Sealed
WW = Week Sealed
A = Assembler ID
C = Country of Origin
— = "Green" Packaging

14-Lead QFN (K6)

Pin Configuration



14-Lead QFN (K6)

Thermal Characteristics

Package	I_D† (continuous) (mA)	I_D (pulsed) (A)	Power Dissipation @T_A = 25°C (W)	θ_{jc} (°C/W)	θ_{ja} (°C/W)	I_{DR}† (mA)	I_{DRM} (A)
14-Lead QFN	410†	2.0	2.0‡	30	62.5	410	2.0

Notes:

† I_D (continuous) is limited by max rated T_j of 150°C.

‡ Mounted on FR4 board, 25mm x 25mm x 1.57mm.

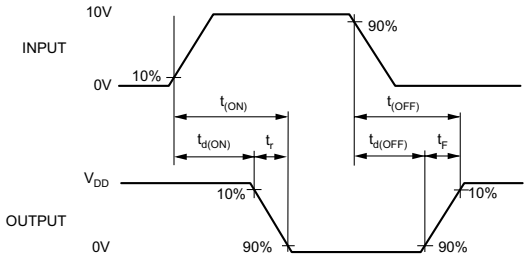
Electrical Characteristics *(T_A = 25°C unless otherwise specified)*

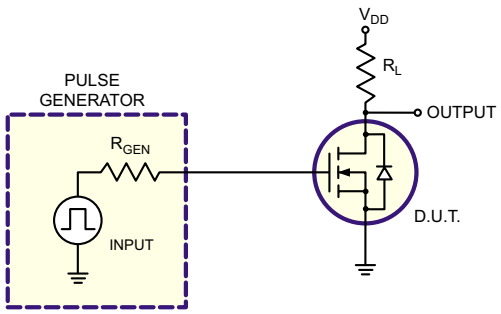
Sym	Parameter	Min	Typ	Max	Units	Conditions
BV_{DSS}	Drain-to-source breakdown voltage	290	-	-	V	V_{GS} = 0V, I_D = 2.0mA
$V_{GS(th)}$	Gate threshold voltage	0.6	-	2.0	V	V_{GS} = V_{DS}, I_D = 1.0mA
$\Delta V_{GS(th)}$	$V_{GS(th)}$ change with temperature	-	-	-5.0	mV/°C	V_{GS} = V_{DS}, I_D = 1.0mA
I_{GSS}	Gate body leakage current	-	-	100	nA	V_{GS} = ±20V, V_{DS} = 0V
I_{DSS}	Zero gate voltage drain current	-	-	10	µA	V_{GS} = 0V, V_{DS} = Max rating
		-	-	1.0	mA	V_{DS} = 0.8 Max Rating, V_{GS} = 0V, T_A = 125°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 = 500mA
$\Delta R_{DS(ON)}$	Change in $R_{DS(ON)}$ with temperature	-	-	1.4	%/°C	V_{GS} = 10V, I_D = 500mA
G_{FS}	Forward transconductance	300	600	-	mmho	V_{DS} = 25V, I_D = 500mA
C_{ISS}	Input capacitance	-	65	125	pF	V_{GS} = 0V, V_{DS} = 25V, f = 1.0MHz
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} = 25Ω
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: 300µs pulse, 2% duty cycle.)*
2. *All A.C. parameters sample tested.*

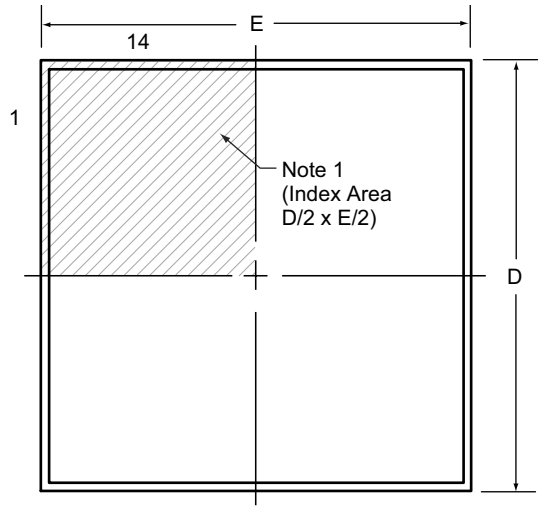
Switching Waveforms and Test Circuit



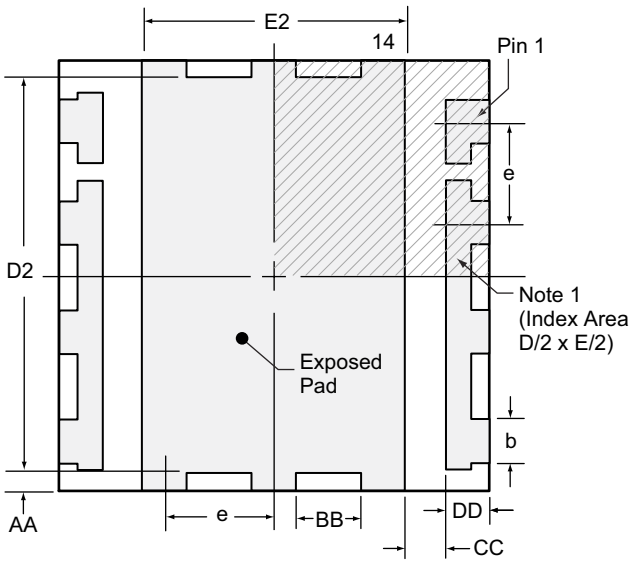


14-Lead QFN Package Outline (K6)

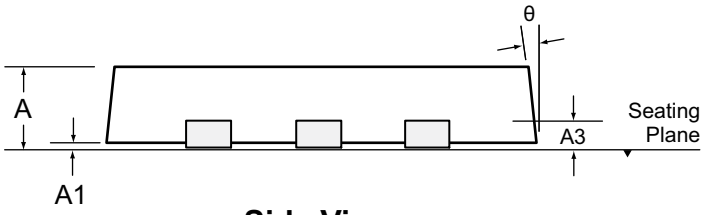
5.00x5.00mm body, 1.00mm height (max), 1.27mm pitch



Top View



Bottom View



Side View

Notes:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 Identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*

Symbol		A	A1	A3	b	D	D2	E	E2	e	AA	BB	CC	DD	θ
Dimension (mm)	MIN	0.80	0.00	0.20 REF	0.46	4.85	4.45	4.85	2.52	1.27 BSC	0.152	0.473	0.66	0.456	0°
	NOM	0.90	0.02		0.51	5.00	4.50	5.00	2.57		0.252	0.523	0.71	0.506	-
	MAX	1.00	0.05		0.58	5.15	4.55	5.15	2.62		0.352	0.583	0.77	0.566	14°

Drawings not to scale.
Supertex Doc. #: *DSPD-14QFNK65X5P127, Version B090808.*

(The package drawing(s) in this data sheet may not reflect the most current specifications. For the latest package outline information go to http://www.supertex.com/packaging.html.)

Supertex inc.
1235 Bordeaux Drive, Sunnyvale, CA 94089
Tel: 408-222-8888
www.supertex.com