

N- and P- Channel Enhancement-Mode Dual MOSFET

BV _{DSS} /BV _{DGS}		R _{DS(ON)}	(max)	Order Number/Package		
N-Channel	P-Channel	N-Channel	P-Channel	SO-8		
200V	-200V	7.0	12	TC2320TG		

Features

- Low threshold
- Low on resistance
- □ Independent, electrically isolated N- and P-channels
- Low input capacitance
- Fast switching speeds
- □ Free from secondary breakdowns
- Low input and output leakage

Application

- Medical Ultrasound Transmitters
- High voltage pulsers
- □ Amplifiers
- Buffers
- Piezoelectric transducer drivers
- General purpose line drivers
- Logic level interfaces

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 1.6mm from case for 10 seconds.

Low Threshold DMOS Technology

The Supertex TC2320TG consist of a high voltage low threshold Nchannel and P-channel MOSFET in an SO-8 package. These low threshold enhancement-mode (normally-off) transistors utilize an advanced 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.

Package Option



09/17/02

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.

N-Channel Electrical Characteristics (@ 25°C unless otherwise specified)

Symbol	Parameter	Min	Тур	Мах	Unit	Conditions
BV _{DSS}	Drain-to-Source Breakdown Voltage	200			V	$I_{D} = 100 \mu A, V_{GS} = 0 V$
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			-4.5	mV/°C	$I_D = 1mA, V_{GS} = V_{DS}$
I _{GSS}	Gate Body Leakage			100	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$
I _{DSS}	Zero Gate Voltage Drain Current			1.0	μΑ	$V_{GS} = 0V, V_{DS} = 100V$
				10.0	μΑ	$V_{GS} = 0V, V_{DS} = Max Rating$
				1.0	mA	$V_{GS} = 0V, V_{DS} = 0.8$ Max Rating $T_A = 125^{\circ}C$
I _{D(ON)}	ON-State Drain Current	0.6			A	$V_{GS} = 4.5 V, V_{DS} = 25 V$
		1.2				$V_{GS} = 10V, V_{DS} = 25V$
R _{DS(ON)}	Static Drain-to-Source ON-State Resistance			8.0	Ω	$V_{GS} = 4.5 V, I_{D} = 150 mA$
				7.0	Ω	V _{GS} = 10V, I _D = 1.0A
$\Delta R_{DS(ON)}$	Change in R _{DS(ON)} with Temperature			1.0	%/°C	$V_{GS} = 4.5V, I_{D} = 150mA$
G _{FS}	Forward Transconductance	150			mប	$V_{DS} = 25V, I_{D} = 200mA$
C _{ISS}	Input Capacitance			110	pF	V _{GS} = 0V, V _{DS} = 25V, f = 1MHz
C _{OSS}	Common Source Output Capacitance			60		
C _{RSS}	Reverse Transfer Capacitance			23		
t _{d(ON)}	Turn-ON Delay Time			20		\/
t _r	Rise Time			15	ns	$v_{DD} = 25V$ $I_D = 150mA$ $R_{GEN} = 25\Omega$
t _{d(OFF)}	Turn-OFF Delay Time			25		
t _f	Fall Time			25		
V _{SD}	Diode Forward Voltage Drop			1.8	V	$I_{SD} = 200 \text{mA}, V_{GS} = 0 \text{V}$
t _{rr}	Reverse Recovery Time		300		ns	$I_{SD} = 200 \text{mA}, V_{GS} = 0 \text{V}$

Notes:

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

2.All A.C. parameters sample tested.

Switching Waveforms and Test Circuit





P-Channel Electrical Characteristics (@ 25°C unless otherwise specified)

Symbol	Parameter	Min	Тур	Мах	Unit	Conditions
BV _{DSS}	Drain-to-Source Breakdown Voltage	-200			V	$V_{GS} = 0V, I_D = -2mA$
V _{GS(th)}	Gate Threshold Voltage	-1.0		-2.4	V	$V_{GS} = V_{DS}, I_{D} = -1mA$
$\Delta V_{GS(th)}$	Change in $V_{GS(th)}$ with Temperature			4.5	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	μΑ	$V_{GS} = 0V, V_{DS} = Max Rating$
				-1.0	mA	$V_{GS} = 0V, V_{DS} = 0.8$ Max Rating $T_A = 125^{\circ}C$
I _{D(ON)}	ON-State Drain Current	-0.25	-0.7		A	$V_{GS} = -4.5V, V_{DS} = -25V$
		-0.75	-2.1			$V_{GS} = -10V, V_{DS} = -25V$
R _{DS(ON)}	Static Drain-to-Source		10	15	Ω	$V_{GS} = -4.5V, I_{D} = -100mA$
	ON-State Resistance		8.0	12		$V_{GS} = -10V, I_{D} = -200mA$
$\Delta R_{DS(ON)}$	Change in R _{DS(ON)} with Temperature			1.7	%/°C	$V_{GS} = -10V, I_{D} = -200mA$
G _{FS}	Forward Transconductance	100	250		mប	$V_{DS} = -25V, I_{D} = -200mA$
C _{ISS}	Input Capacitance		75	125		
C _{OSS}	Common Source Output Capacitance		20	85	pF	$V_{GS} = 0V, V_{DS} = -25V$ f = 1 MHz
C _{RSS}	Reverse Transfer Capacitance		10	35		
t _{d(ON)}	Turn-ON Delay Time			10	ns	
t _r	Rise Time			15		
t _{d(OFF)}	Turn-OFF Delay Time			20]	
t _f	Fall Time			15		
V _{SD}	Diode Forward Voltage Drop			-1.8	V	$V_{GS} = 0V, I_{SD} = -0.5A$
t _{rr}	Reverse Recovery Time		300		ns	$V_{GS} = 0V, I_{SD} = -0.5A$

Notes:

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

Switching Waveforms and Test Circuit





09/17/02

©2002 Supertex Inc. All rights reserved. Unauthorized use or reproduction prohibited.