

Initial Release

N- and P-Channel Enhancement-Mode MOSFET Pair

Features

- Integrated gate-source resistor
- □ Integrated gate-source zener diode
- Low threshold
- Low on-resistance
- □ Independent N- and P-channels
- Electrically isolated N- and P-channels
- Low input capacitance
- □ Fast switching speeds
- □ Free from secondary breakdowns
- Low input and output leakage

Application

- High voltage pulsers
- Amplifiers
- Buffers
- Piezoelectric transducer drivers
- General purpose line drivers
- Logic level interfaces

Absolute Maximum Ratings*

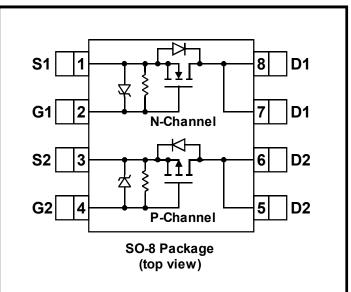
Drain-to-Source Voltage	BV _{DSS}
Drain-to-Gate Voltage	BV _{DGS}
Operating and Storage Temperature	-55°C to +150°C
Soldering Temperature*	300°C

*Distance of 1.6mm from case for 10 seconds.

General Description

The Supertex TC6320TG consists of a high voltage low threshold N-channel and P-channel MOSFET in an SO-8 package. Both MOSFETs have integrated gate-source resistors and gate-source zener diode clamps which are desired for high voltage pulser applications. TC6320TG, a complementary high-speed, high voltage, gate-clamped N- and P-channel MOSFET pair in a single SO-8 package. The TC6320TG offers 200V breakdown voltage, 2.0A output peak current and low input capacitance. The 2.0A output current capability will minimize rise and fall times. The low input capacitance will minimize propagation delay times and also rise and fall times. The MOSFETs have integrated gate-source resistors and gate-source zener diode clamps that are desired for high voltage pulser applications saving board space and improving performance. It is specifically designed for applications in medical ultrasound transmitters and nondestructive evaluation in materials flaw detection, but it can also be used as an efficient buffer.

Package Option



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.

BV _{DSS}	BV _{DGS}) (max)	Order Number / Package		
N-Channel	P-Channel	N-Channel	P-Channel	SO-8		
200V	-200V	7.0Ω	8.0Ω	TC6320TG		

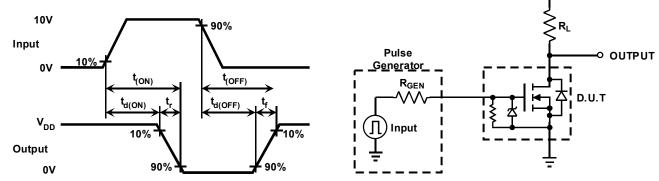
N-Channel Electrical Characteristics (at T_A=25°C unless otherwise specified)

Symbol	Parameter	Min	Тур	Max	Units	Conditions
BV _{DSS}	Drain-to-Source	200			V	V _{GS} =0V, I _D =2mA
	Breakdown Voltage					
V _{GS(th)}	Gate Threshold Voltage	1.0		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	V _{GS} =V _{DS} , I _D =1mA
R _{GS}	Gate-Source Shunt Resistor	10		50	KΩ	I _{GS} =100μΑ
ΔR_{GS}	Change in R _{GS} with Temperature			TBD	%/°C	I _{GS} =100μA
Vz _{GS}	Gate-Source Zener Voltage	13.2		25	V	I _{GS} =2mA
ΔVz_{GS}	Change in Vz _{GS} with Temperature			TBD	mV/°C	I _{GS} =2mA
I _{DSS}	Zero Gate Voltage Drain Current			10	μA	V _{GS} =0V, V _{DS} =Max Rating
				1.0	mA	V _{GS} =0V, V _{DS} =0.8 Max
						Rating, T _A =125°C
I _{D(ON)}	On-State Drain Current	1.0			Α	V _{GS} =4.5V, V _{DS} =25V
		2.0				V _{GS} =10V, V _{DS} =25V
$R_{DS(ON)}$	Static Drain-to-Source			8.0	Ω	V _{GS} =4.5V, I _D =150mA
	ON-State Resistance			7.0		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	400			mmho	V _{DS} =25V, I _D =200mA
CISS	Input Capacitance			110		V _{GS} =0V, V _{DS} =25V
C _{OSS}	Common Source Output Capacitance			60	pF	f=1MHz
C _{RSS}	Reverse Transfer Capacitance			23		
t _{d(ON)}	Turn-ON Delay Time			10		V _{DD} =25V,
t _r	Rise Time			15	ns	I _D =1.0A
t _{d(OFF)}	Turn-Off Delay Time			20		R_{GEN} =25 Ω
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 DC parameters 100% tested at 25°C unless otherwise stated. (Pulsed test: 300µs pulse at 2% duty cycle.) 2) All AC parameters sample tested.

N-Channel Switching Waveforms and Test Circuit



V_{DD}

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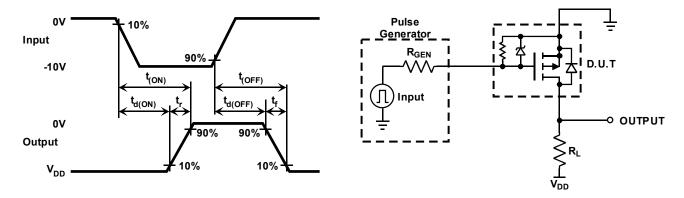
P-Channel Electrical Characteristics (at T _A =25°C unless otherwise specified)						
Symbol	Parameter	Min	Тур	Max	Units	Conditions
BV _{DSS}	Drain-to-Source	-200			V	V _{GS} =0V, I _D =-2mA
	Breakdown Voltage					
V _{GS(th)}	Gate Threshold Voltage	-1.0		-2.4	V	$V_{GS}=V_{DS}$, $I_{D}=-1mA$
$\Delta V_{GS(th)}$	Change in $V_{GS(th)}$ with Temperature			4.5	mV/°C	$V_{GS}=V_{DS}$, $I_{D}=-1mA$
R_{GS}	Gate-Source Shunt Resistor	10		50	KΩ	I _{GS} =-100μA
ΔR_{GS}	Change in R _{GS} with Temperature			TBD	%/°C	I _{GS} =-100μA
Vz _{GS}	Gate-Source Zener Voltage	13.2		25	V	I _{GS} =-2mA
$\Delta V_{GS(th)}$	Change in Vz _{GS} with Temperature			TBD	mV/°C	I _{GS} =-2mA
I _{DSS}	Zero Gate Voltage Drain Current			-10	μA	V _{GS} =0V, V _{DS} =Max Rating
				-1.0	mA	V_{GS} =0V, V_{DS} =0.8 Max
						Rating, T _A =125°C
I _{D(ON)}	On-State Drain Current	-1.0			Α	V _{GS} =-4.5V, V _{DS} =-25V
		-2.0				V _{GS} =-10V, V _{DS} =-25V
R _{DS(ON)}	Static Drain-to-Source			10	Ω	V _{GS} =-4.5V, I _D =-150mA
	ON-State Resistance			8.0		V _{GS} =-10V, I _D =-1.0A
$\Delta R_{DS(ON)}$	Change in R _{DS(ON)} with Temperature			1.0	%/°C	V _{GS} =-10V, I _D =-200mA
G _{FS}	Forward Transconductance	400			mmho	V _{DS} =-25V, I _D =-200mA
C _{ISS}	Input Capacitance			200		V _{GS} =0V, V _{DS} =-25V
C _{OSS}	Common Source Output Capacitance			55	pF	f=1MHz
	Reverse Transfer Capacitance			30		
t _{d(ON)}	Turn-ON Delay Time			10		V _{DD} =-25V,
t _r	Rise Time			15	ns	I _D =-1.0A
t _{d(OFF)}	Turn-Off Delay Time			20		R_{GEN} =25 Ω
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 DC parameters 100% tested at 25°C unless otherwise stated. (Pulsed test: 300µs pulse at 2% duty cycle.)

2) All AC parameters sample tested.

P-Channel Switching Waveforms and Test Circuit



1/22/03



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