

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

Absolute Maximum Ratings*

- General purpose line drivers
- Logic level interfaces

Drain-to-Source Voltage

Drain-to-Gate Voltage

Gate-to-Source Voltage

Soldering Temperature*

*Distance of 1.6mm from case for 10 seconds

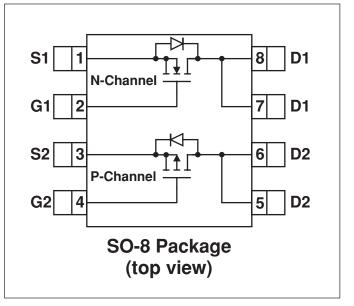
Operating and Storage Temperature

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



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 $\mathsf{BV}_{\mathsf{DSS}}$

 $\mathsf{BV}_{\mathsf{DGS}}$

±20V

300°C

-55°C to +150°C

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

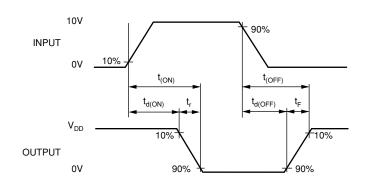
Symbol	Parameter	Min	Тур	Max	Unit	Conditions
BV _{DSS}	Drain-to-Source Breakdown Voltage	200			V	$I_{D} = 100 \mu A, V_{GS} = 0 V$
V _{GS(th)}	Gate Threshold Voltage	0.6		2.0	V	$V_{GS} = V_{DS}, I_D = 1mA$
$\Delta V_{GS(th)}$	Change in V _{GS(th)} with Temperature			-4.5	mV/°C	$I_D = 1mA, V_{GS} = V_{DS}$
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 Ratin $T_A = 125^{\circ}C$
I _{D(ON)}	ON-State Drain Current	0.6			A	$V_{GS} = 4.5V, V_{DS} = 25V$
		1.2				$V_{GS} = 10V, V_{DS} = 25V$
R _{DS(ON)}	Static Drain-to-Source			8.0	Ω	V _{GS} = 4.5V, I _D = 150mA
	ON-State Resistance			7.0	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		
C _{OSS}	Common Source Output Capacitance			60	pF	$V_{GS} = 0V, V_{DS} = 25V, f = 1MHz$
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} = 200mA, V_{GS} = 0V
t _{rr}	Reverse Recovery Time		300		ns	I _{SD} = 200mA, V _{GS} = 0V

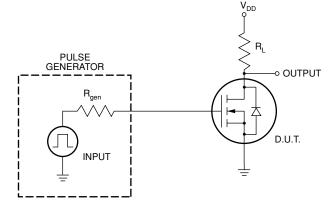
Notes:

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





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

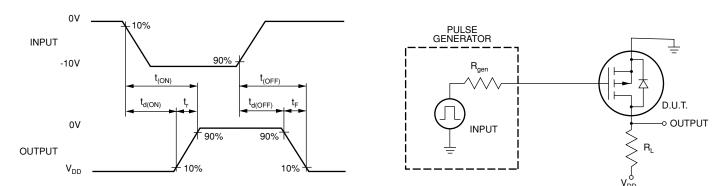
Symbol	Parameter	Min	Тур	Мах	Unit	Conditions
BV _{DSS}	Drain-to-Source Breakdown Voltage	-200			V	$V_{GS} = 0V, I_D = -2mA$
V _{GS(th)}	Gate Threshold Voltage	-1.0		-2.4	V	$V_{GS} = V_{DS}, I_{D} = -1mA$
$\Delta V_{GS(th)}$	Change in $V_{\text{GS}(\text{th})}$ with Temperature			4.5	mV/°C	$V_{GS} = V_{DS}, I_{D} = -1mA$
I _{GSS}	Gate Body Leakage			-100	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$
I _{DSS}	Zero Gate Voltage Drain Current			-10	μA	$V_{GS} = 0V, V_{DS} = Max Rating$
				-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 ON-State Resistance		10	15	Ω	V _{GS} = -4.5V, I _D = -100mA
			8.0	12		$V_{GS} = -10V, I_{D} = -200mA$
$\Delta R_{\text{DS(ON)}}$	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	рF	$V_{GS} = 0V, V_{DS} = -25V$ f = 1 MHz
C _{RSS}	Reverse Transfer Capacitance		10	35		
t _{d(ON)}	Turn-ON Delay Time			10	ns	
t _r	Rise Time			15	115	
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°C unless otherwise stated. (Pulse test: 300µs pulse, 2% duty cycle.)

2.All A.C. parameters sample tested.

Switching Waveforms and Test Circuit



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