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

Low Threshold DMOS Technology

The Supertex TC2320TG consist of a high voltage low threshold N-channel 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.

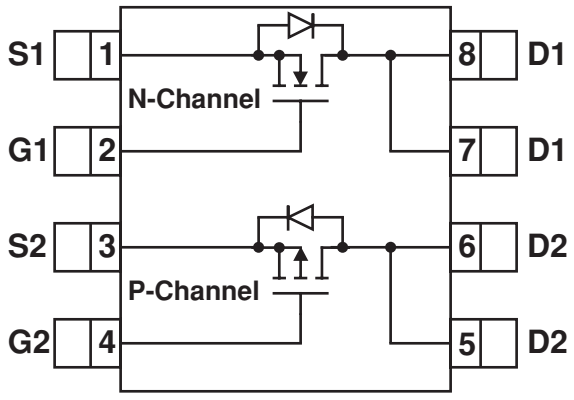
Supertex's vertical DMOS FETs are ideally suited to a wide range of switching and amplifying applications where very low threshold voltage, high breakdown voltage, high input impedance, low input capacitance, and fast switching speeds are desired.

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.

Package Option



SO-8 Package
(top view)

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

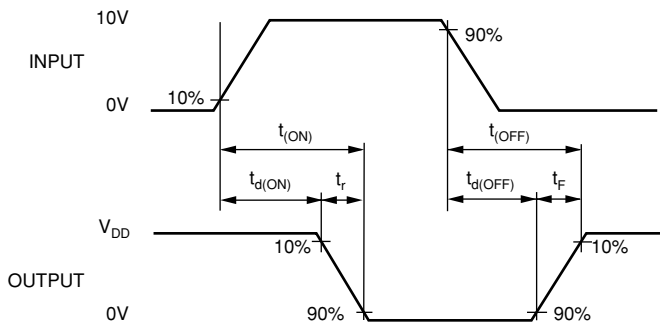
Symbol	Parameter	Min	Typ	Max	Unit	Conditions
BV_{DSS}	Drain-to-Source Breakdown Voltage	200			V	I_D = 100μA, V_{GS} = 0V
$V_{GS(th)}$	Gate Threshold Voltage	0.6		2.0	V	V_{GS} = V_{DS}, I_D = 1mA
$\Delta V_{GS(th)}$	Change in $V_{GS(th)}$ with Temperature			-4.5	mV/°C	I_D = 1mA, V_{GS} = V_{DS}
I_{GSS}	Gate Body Leakage			100	nA	V_{GS} = ±20V, V_{DS} = 0V
I_{DSS}	Zero Gate Voltage Drain Current			1.0	μA	V_{GS} = 0V, V_{DS} = 100V
				10.0	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	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 ON-State Resistance			8.0	Ω	V_{GS} = 4.5V, I_D = 150mA
				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			m℧	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	ns	V_{DD} = 25V I_D = 150mA R_{GEN} = 25Ω
t_r	Rise Time			15		
$t_{d(OFF)}$	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

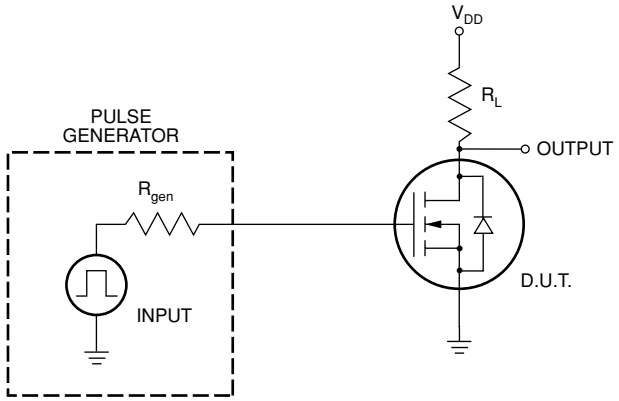
Notes:

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)

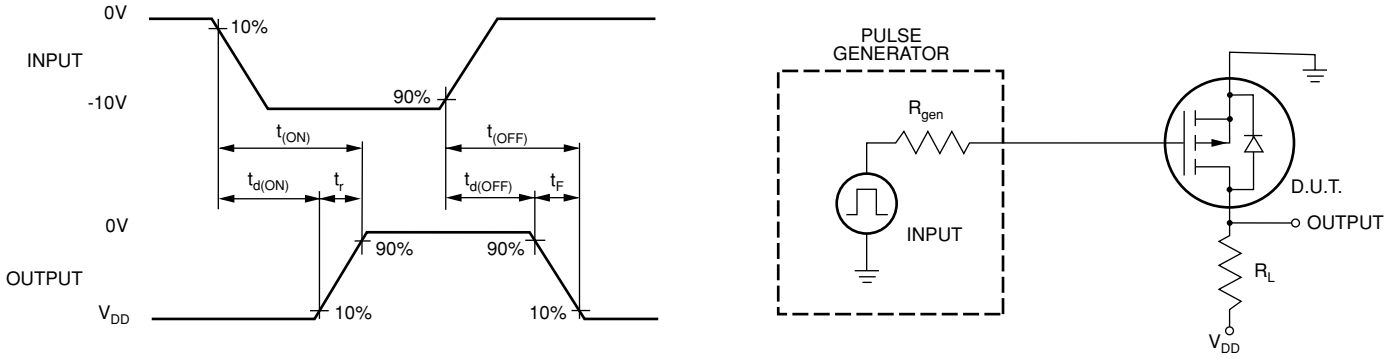
Symbol	Parameter	Min	Typ	Max	Unit	Conditions
BV_{DSS}	Drain-to-Source Breakdown Voltage	-200			V	V_{GS} = 0V, I_D = -2mA
$V_{GS(th)}$	Gate Threshold Voltage	-1.0		-2.4	V	V_{GS} = V_{DS}, I_D= -1mA
$\Delta V_{GS(th)}$	Change in $V_{GS(th)}$ with Temperature			4.5	mV/°C	V_{GS} = V_{DS}, I_D= -1mA
I_{GSS}	Gate Body Leakage			-100	nA	V_{GS} = ± 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°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
$\Delta R_{DS(ON)}$	Change in $R_{DS(ON)}$ with Temperature			1.7	%/°C	V_{GS} = -10V, I_D = -200mA
G_{FS}	Forward Transconductance	100	250		m℧	V_{DS} = -25V, I_D = -200mA
C_{ISS}	Input Capacitance		75	125	pF	V_{GS} = 0V, V_{DS} = -25V f = 1 MHz
C_{OSS}	Common Source Output Capacitance		20	85		
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°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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