



TP07L

Low Threshold

Objective

T-39-17



**P-Channel Enhancement-Mode
Vertical DMOS FETs**

Ordering Information

BV _{DSS} / BV _{DGS}	R _{DS(ON)} (max)	I _{D(ON)} (min)	V _{GS(th)} (max)	Order Number / Package	
				TO-92	DICE†
-20V	3.0Ω	-0.35A	-1.3V	TP0702N3	TP0702ND

† MIL visual screening available

Features

- ☐ Low threshold —1.0V max
- ☐ On resistance guaranteed at V_{GS} = 2, 3, and 5 volts
- ☐ High input impedance
- ☐ Low input capacitance —130 pF typical
- ☐ Fast switching speeds
- ☐ Low on resistance
- ☐ Free from secondary breakdown
- ☐ Low input and output leakage

Applications

- ☐ Logic level interface
- ☐ Solid state relays
- ☐ Battery operated systems
- ☐ Photo voltaic drive
- ☐ Analog switches
- ☐ General purpose line driver
- ☐ Telecom switches

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 1.6 mm from case for 10 seconds.

Low Threshold DMOS Technology

These low threshold enhancement-mode (normally-off) power transistors utilize a 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 Vertical DMOS Power 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 Options

(Note 1)



TO-92

Note 1: See Package Outline section for discrete pinouts.

Thermal Characteristics

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Package	I_D (continuous)*	I_D (pulsed)	Power Dissipation @ $T_C = 25^\circ\text{C}$	θ_{JA} $^\circ\text{C/W}$	θ_{JA} $^\circ\text{C/W}$	I_{DR}^*	I_{DRM}
TO-92	-0.35A	-0.40A	1W	125	170	-0.035A	0.75A

* I_D (continuous) is limited by max rated T_J .Electrical Characteristics (@ 25°C unless otherwise specified)

(Notes 1 and 2)

Symbol	Parameter	Min	Typ	Max	Unit	Conditions
BV_{DSS}	Drain-to-Source Breakdown Voltage	-20			V	$V_{GS} = 0, I_D = -1\text{mA}$
$V_{GS(th)}$	Gate Threshold Voltage	-0.7		-1.3	V	$V_{GS} = V_{DS}, I_D = -1.0\text{mA}$
$\Delta V_{GS(th)}$	Change in $V_{GS(th)}$ with Temperature			-4.5	mV/ $^\circ\text{C}$	$V_{GS} = V_{DS}, I_D = -1.0\text{mA}$
I_{GSS}	Gate Body Leakage			-100	nA	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$
I_{DSS}	Zero Gate Voltage Drain Current			-100	nA	$V_{DS} = 20\text{V}, V_{GS} = 0\text{V}$
				-100	μA	$V_{DS} = 0.8 \text{ Max Rating}, V_{GS} = 0\text{V}, T_A = 125^\circ\text{C}$
$I_{D(ON)}$	ON-State Drain Current	-0.35			A	$V_{GS} = V_{DS} = 5\text{V}$
$R_{DS(ON)}$	Static Drain-to-Source ON-State Resistance			10.0	Ω	$V_{GS} = 2\text{V}, I_D = -30\text{mA}$
				5.0		$V_{GS} = 3\text{V}, I_D = -120\text{mA}$
				3.0		$V_{GS} = 5\text{V}, I_D = -250\text{mA}$
G_{FS}	Forward Transconductance	80			mS	$V_{DS} = 5\text{V}, I_D = -250\text{mA}$
C_{ISS}	Input Capacitance		130	200	pF	$V_{GS} = 0\text{V}, V_{DS} = -20\text{V}, f = 1\text{MHz}$
C_{OSS}	Common Source Output Capacitance		70	125	pF	
C_{RSS}	Reverse Transfer Capacitance		30	60	pF	
$t_{d(ON)}$	Turn-ON Delay Time			20	ns	$V_{DD} = 20\text{V}, I_D = -250\text{mA}, R_S = 50\Omega$
t_r	Rise Time			20	ns	
$t_{d(OFF)}$	Turn-OFF Delay Time			30	ns	
t_f	Fall Time			20	ns	
V_{SD}	Diode Forward Voltage Drop			-1.0	V	$V_{GS} = 0\text{V}, I_{SD} = -250\text{mA}$

Notes:

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

Switching Waveforms and Test Circuit

