P-Channel Enhancement-Mode Vertical DMOS FETs

Ordering Information

BV_{DSS} / BV_{DGS}	$R_{DS(ON)}$ (max)	$I_{D(ON)}$ (min)	Order Number/Package TO-236AB*
-60V	10Ω	-50mA	TP0610T

Product marking for SOT-23:

T50❋

where ❋ = 2-week alpha date code

*Same as SOT-23. All units shipped on 3,000 piece carrier tape reels.

Features

- ❑ Free from secondary breakdown
- ❑ Low power drive requirement
- ❑ Ease of paralleling
- ❑ Low C_{ISS} and fast switching speeds
- ❑ Excellent thermal stability
- ❑ Integral Source-Drain diode
- ❑ High input impedance and high gain
- ❑ Complementary N- and P-channel devices

Applications

- ❑ Logic level interfaces – ideal for TTL and CMOS
- ❑ Solid state relays
- ❑ Battery operated systems
- ❑ Photo voltaic drives
- ❑ Analog switches
- ❑ General purpose line drivers
- ❑ 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

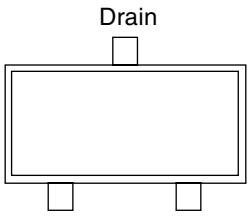
* Distance of 1.6 mm from case for 10 seconds.

Advanced DMOS Technology

These enhancement-mode (normally-off) 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's vertical DMOS FETs are ideally suited to a wide range of switching and amplifying applications where high breakdown voltage, high input impedance, low input capacitance, and fast switching speeds are desired.

Package Option



TO-236AB
(SOT-23)
top view

Note: See Package Outline section for dimensions.

11/12/01

Thermal Characteristics

Package	I_D (continuous)*	I_D (pulsed)	Power Dissipation @ T_A = 25°C	θ_{jc} °C/W	θ_{ja} °C/W	I_{DR}*	I_{DRM}
SOT-23	-120mA	-400mA	0.36W	200	350	-120mA	-400mA

* I_D (continuous) is limited by max rated T_j.

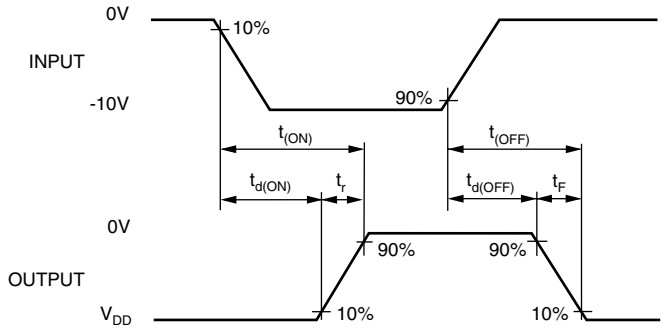
Electrical Characteristics (@ 25°C unless otherwise specified)

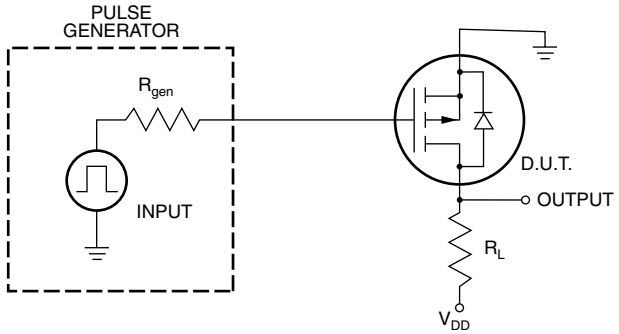
Symbol	Parameter	Min	Typ	Max	Unit	Conditions
BV_{DSS}	Drain-to-Source Breakdown Voltage	-60			V	V_{GS} = 0V, I_D = -10μA
$V_{GS(th)}$	Gate Threshold Voltage	-1.0		-2.4	V	V_{GS} = V_{DS}, I_D = -1.0mA
$\Delta V_{GS(th)}$	Change in $V_{GS(th)}$ with Temperature			6.5	mV/°C	V_{GS} = V_{DS}, I_D = -1.0mA
I_{GSS}	Gate Body Leakage			±10	nA	V_{GS} = ±20V, V_{DS} = 0V
I_{DSS}	Zero Gate Voltage Drain Current			-1	μA	V_{GS} = 0V, V_{DS} = Max Rating
				-200	μA	V_{GS} = 0V, V_{DS} = 0.8 Max Rating T_A = 125°C
$I_{D(ON)}$	ON-State Drain Current	-50			mA	V_{GS} = -4.5V, V_{DS} = -10V
$R_{DS(ON)}$	Static Drain-to-Source ON-State Resistance			25	Ω	V_{GS} = -4.5V, I_D = -25mA
				10	Ω	V_{GS} = -10V, I_D = -0.2A
$\Delta R_{DS(ON)}$	Change in $R_{DS(ON)}$ with Temperature			1.0	%/°C	V_{GS} = -10V, I_D = -0.2A
G_{FS}	Forward Transconductance	60			m℧	V_{DS} = -10V, I_D = -0.1A
C_{ISS}	Input Capacitance			60	pF	V_{GS} = 0V, V_{DS} = -25V f = 1 MHz
C_{OSS}	Common Source Output Capacitance			30		
C_{RSS}	Reverse Transfer Capacitance			10		
$t_{d(ON)}$	Turn-ON Delay Time			10	ns	V_{DD} = -25V I_D = -0.18A R_{GEN} = 25Ω
t_r	Rise Time			15		
$t_{d(OFF)}$	Turn-OFF Delay Time			15		
t_f	Fall Time			20		
V_{SD}	Diode Forward Voltage Drop			-2.0	V	V_{GS} = 0V, I_{SD} = -0.12A
t_{rr}	Reverse Recovery Time		400		ns	V_{GS} = 0V, I_{SD} = -0.4A

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.

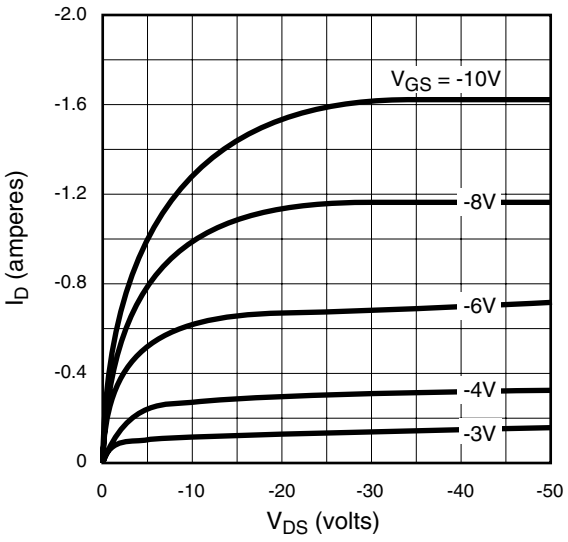
Switching Waveforms and Test Circuit



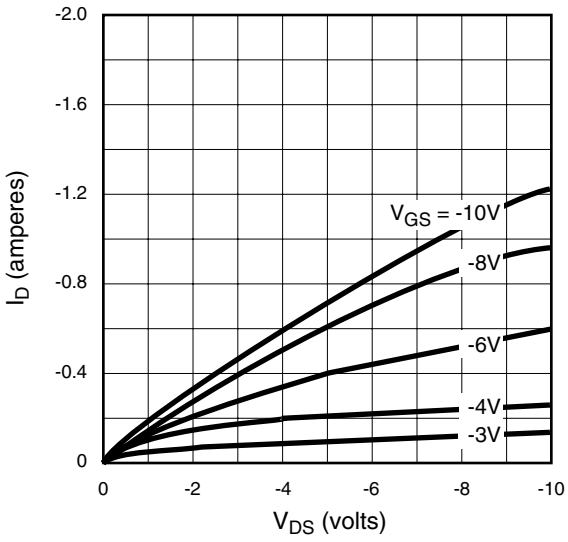


Typical Performance Curves

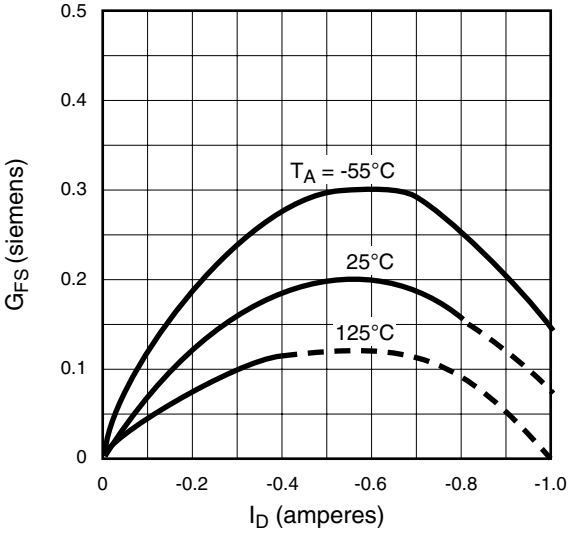
Output Characteristics



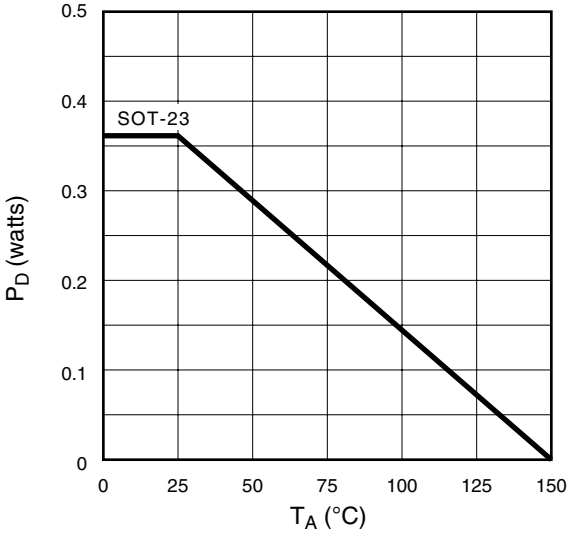
Saturation Characteristics



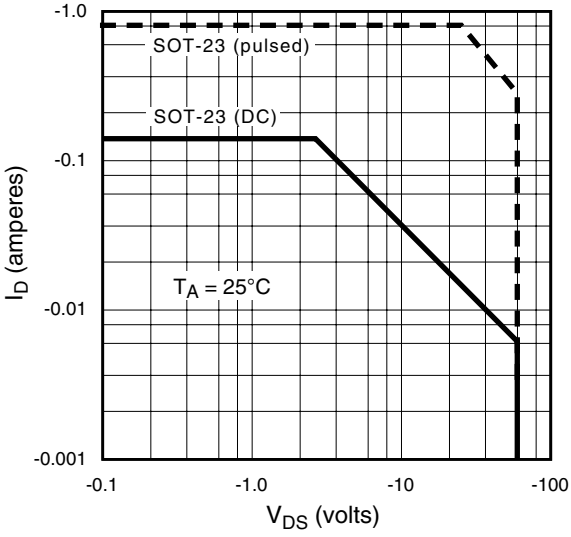
Transconductance vs. Drain Current



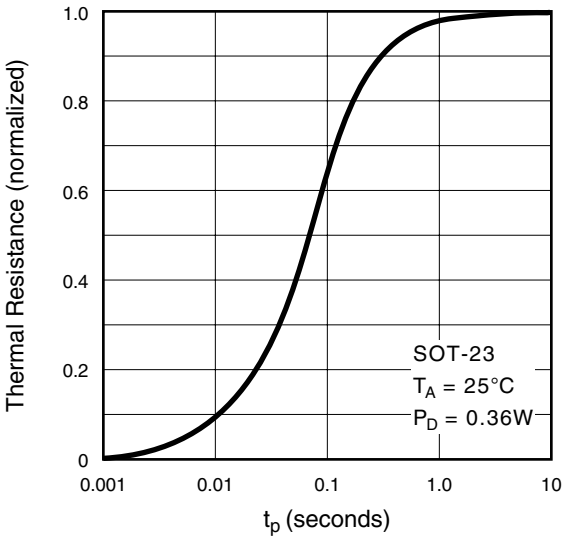
Power Dissipation vs. Temperature



Maximum Rated Safe Operating Area

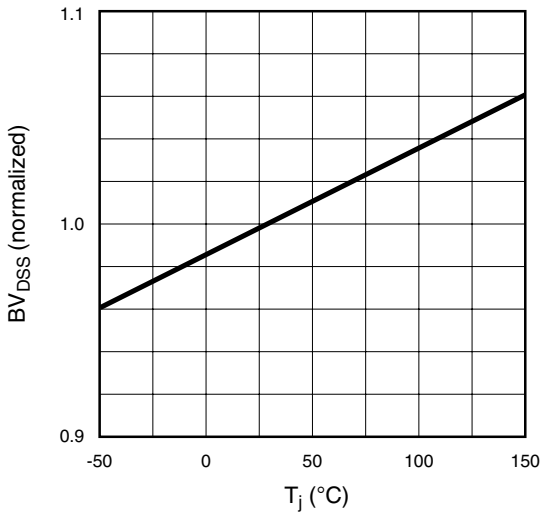


Thermal Response Characteristics

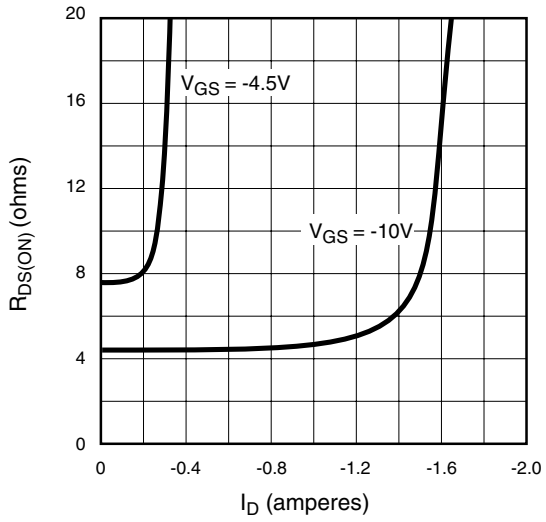


Typical Performance Curves

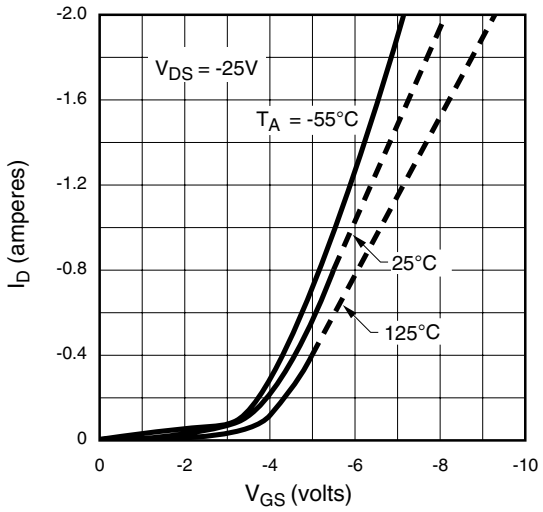
BV_{DSS} Variation with Temperature



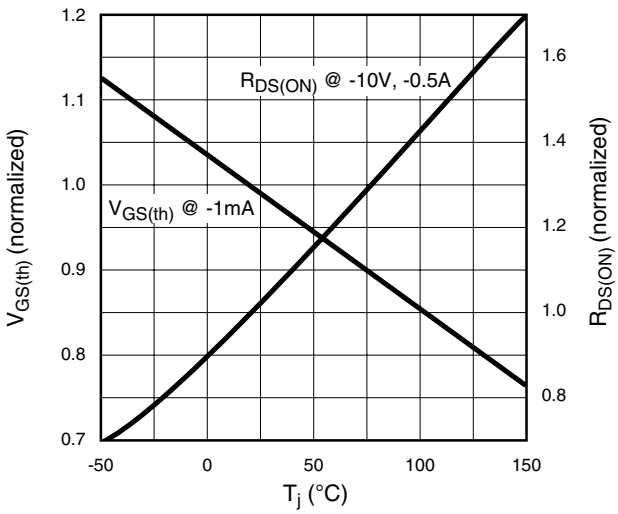
On-Resistance vs. Drain Current



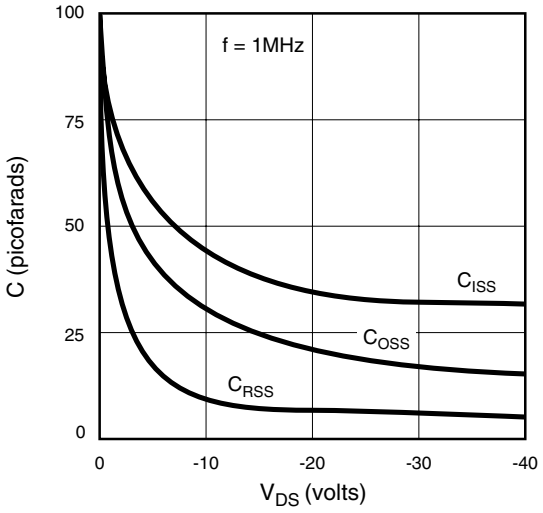
Transfer Characteristics



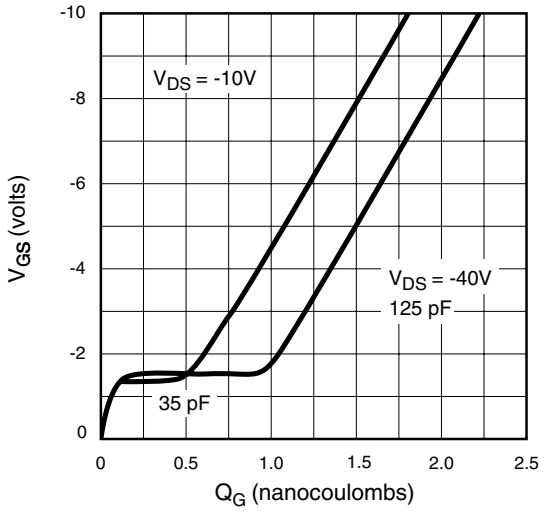
$V_{GS(th)}$ and $R_{DS(ON)}$ Variation with Temperature



Capacitance vs. Drain-to-Source Voltage



Gate Drive Dynamic Characteristics



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