N-Channel Depletion-Mode Vertical DMOS FETs

Ordering Information

BV_{DSX} / BV_{DGX}	$R_{DS(ON)}$ (max)	I_{DSS} (min)	Order Number / Package	
			TO-92	TO-243AA*
300V	12Ω	200mA	DN2530N3	DN2530N8

* Same as SOT-89. Product shipped on 2000 piece carrier tape reels.

Product marking for TO-243AA:
DN5T❋
Where ❋ = 2-week alpha date code

Features

- ❏ High input impedance
- ❏ Low input capacitance
- ❏ Fast switching speeds
- ❏ Low on resistance
- ❏ Free from secondary breakdown
- ❏ Low input and output leakage

Applications

- ❏ Normally-on switches
- ❏ Solid state relays
- ❏ Converters
- ❏ Linear amplifiers
- ❏ Constant current sources
- ❏ Power supply circuits
- ❏ Telecom

Absolute Maximum Ratings

Drain-to-Source Voltage	BV_{DSX}
Drain-to-Gate Voltage	BV_{DGX}
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.

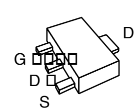
Advanced DMOS Technology

Not recommended for new designs. Please use DN3535 or DN3545 instead.

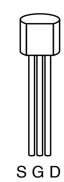
These depletion-mode (normally-on) transistors utilize an advanced vertical DMOS structure and Supertex's well-proven silicon-gate manufacturing process. This combination produces devices with the power handling capabilities of bipolar transistors and with the high input impedance and positive temperature 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 high breakdown voltage, high input impedance, low input capacitance, and fast switching speeds are desired.

Package Options



TO-243AA
(SOT-89)



TO-92

Note: See Package Outline section for dimensions.

12/13/01

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}
TO-92	175mA	500mA	0.74W	125	170	175mA	500mA
TO-243AA	200mA	500mA	1.6†	15	78†	200mA	500mA

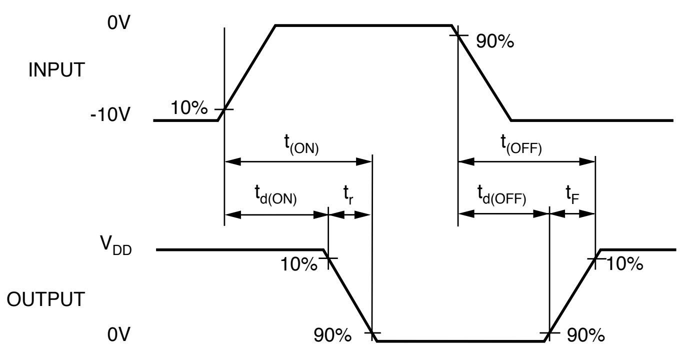
* I_D (continuous) is limited by max rated T_j.
† Mounted on FR4 board, 25mm x 25mm x 1.57mm. Significant P_D increase possible on ceramic substrate.

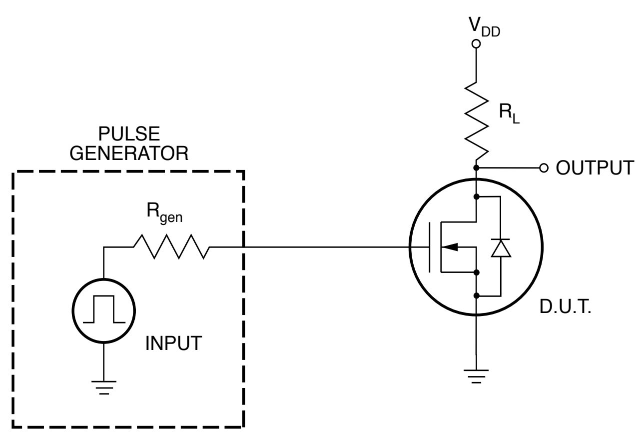
Electrical Characteristics (@ 25°C unless otherwise specified)

Symbol	Parameter	Min	Typ	Max	Unit	Conditions
BV_{DSX}	Drain-to-Source Breakdown Voltage	300			V	V_{GS} = -5V, I_D = 100µA
$V_{GS(OFF)}$	Gate-to-Source OFF Voltage	–1.0		–3.5	V	V_{DS} = 25V, I_D= 10µA
$\Delta V_{GS(OFF)}$	Change in $V_{GS(OFF)}$ with Temperature			4.5	mV/°C	V_{DS} = 25V, I_D= 10µA
I_{GSS}	Gate Body Leakage Current			100	nA	V_{GS} = ± 20V, V_{DS} = 0V
$I_{D(OFF)}$	Drain-to-Source Leakage Current			10	µA	V_{GS} = -10V, V_{DS} = Max Rating
				1	mA	V_{GS} = -10V, V_{DS} = 0.8 Max Rating T_A = 125°C
I_{DSS}	Saturated Drain-to-Source Current	200			mA	V_{GS} = 0V, V_{DS} = 25V
$R_{DS(ON)}$	Static Drain-to-Source ON-State Resistance			12	Ω	V_{GS} = 0V, I_D = 150mA
$\Delta R_{DS(ON)}$	Change in $R_{DS(ON)}$ with Temperature			1.1	%/°C	V_{GS} = 0V, I_D = 150mA
G_{FS}	Forward Transconductance	300			m℧	I_D = 150mA, V_{DS} = 10V
C_{ISS}	Input Capacitance			300	pF	V_{GS} = -10V, V_{DS} = 25V f = 1 MHz
C_{OSS}	Common Source Output Capacitance			30		
C_{RSS}	Reverse Transfer Capacitance			5		
$t_{d(ON)}$	Turn-ON Delay Time			10	ns	V_{DD} = 25V, I_D = 150mA, 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			1.8	V	V_{GS} = -10V, I_{SD} = 150mA
t_{rr}	Reverse Recovery Time		600		ns	V_{GS} = -10V, I_{SD} = 1A

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.

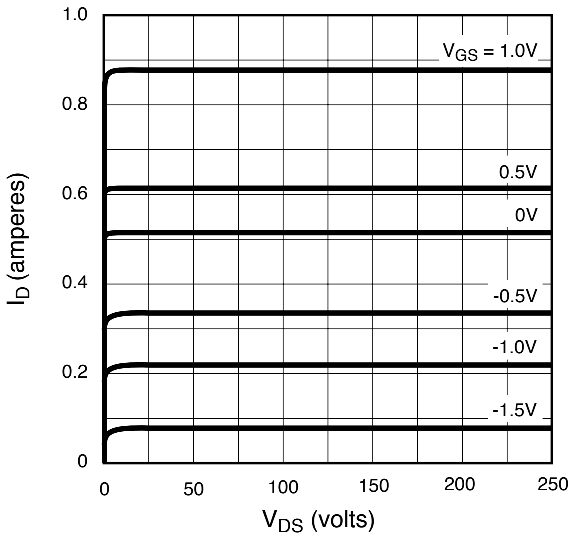
Switching Waveforms and Test Circuit



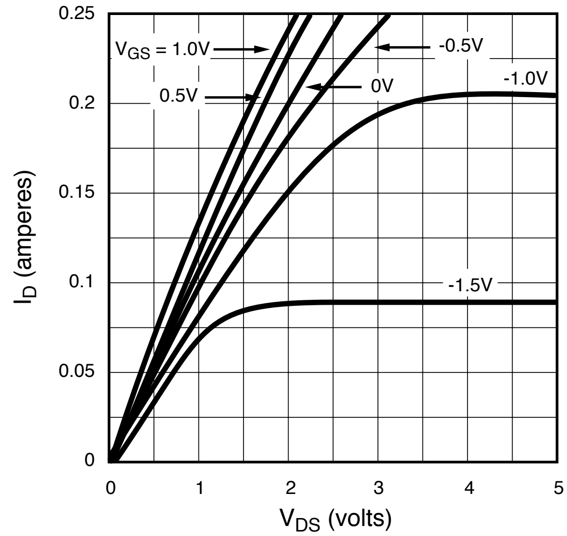


Typical Performance Curves

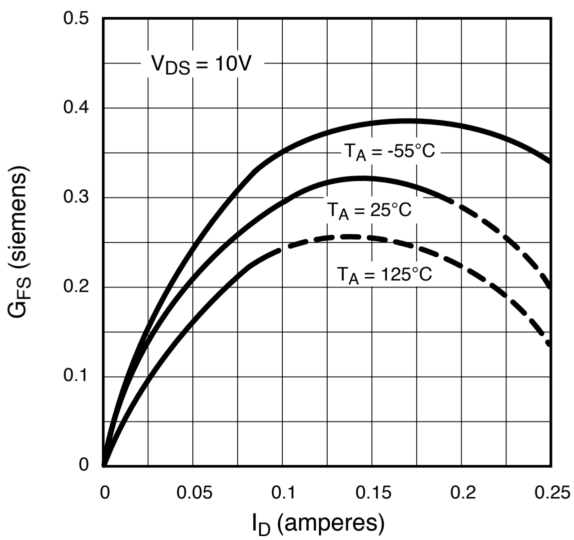
Output Characteristics



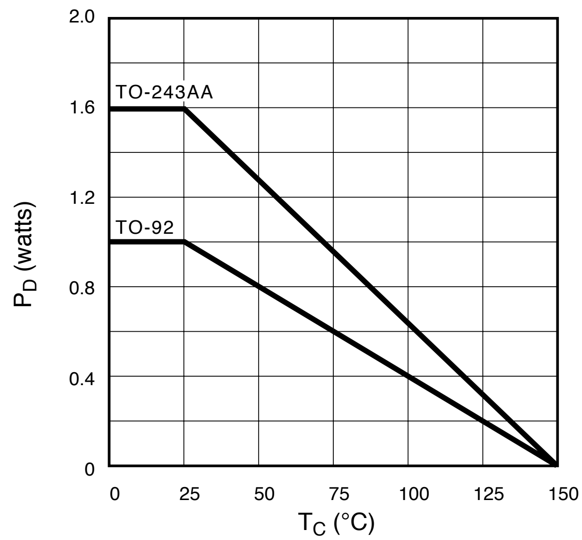
Saturation Characteristics



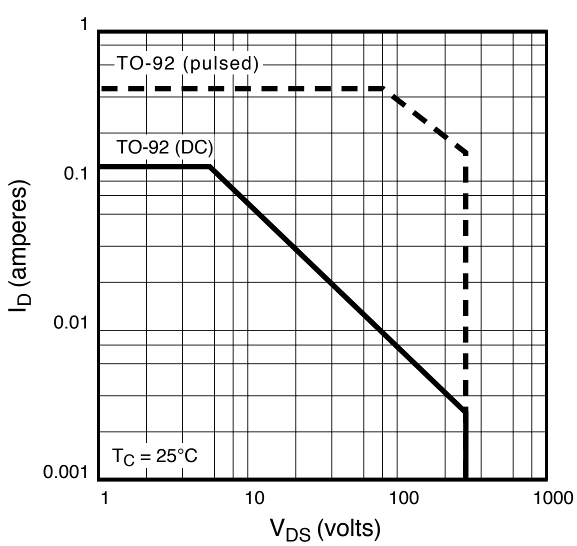
Transconductance vs. Drain Current



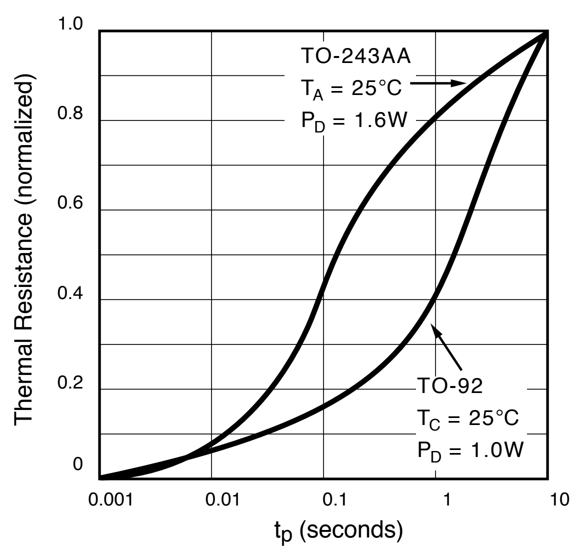
Power Dissipation vs. Case Temperature



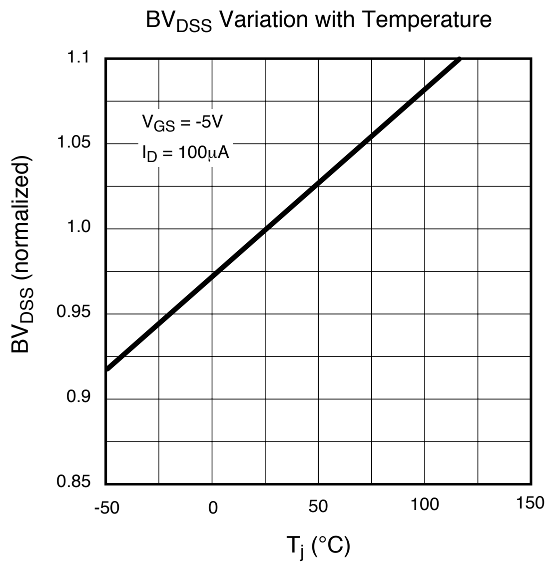
Maximum Rated Safe Operating Area

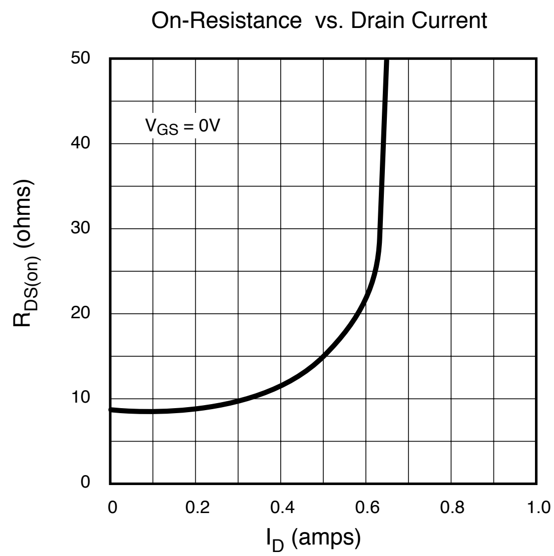


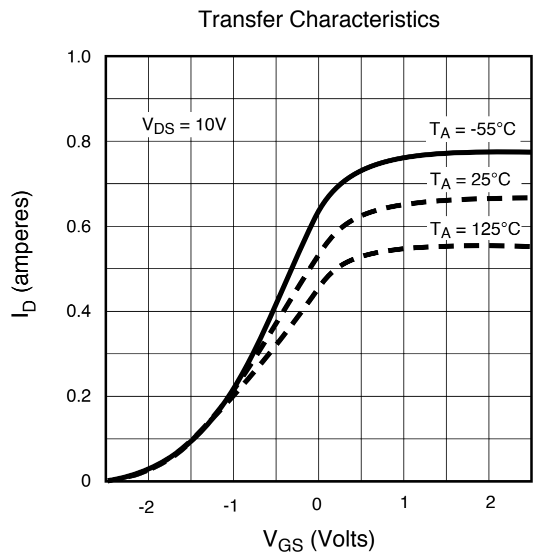
Thermal Response Characteristics

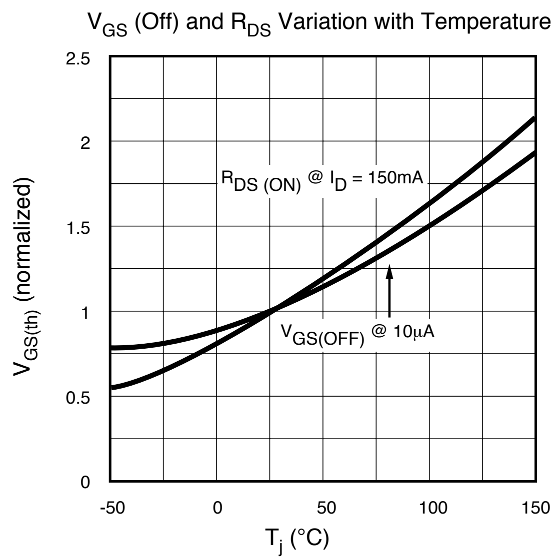


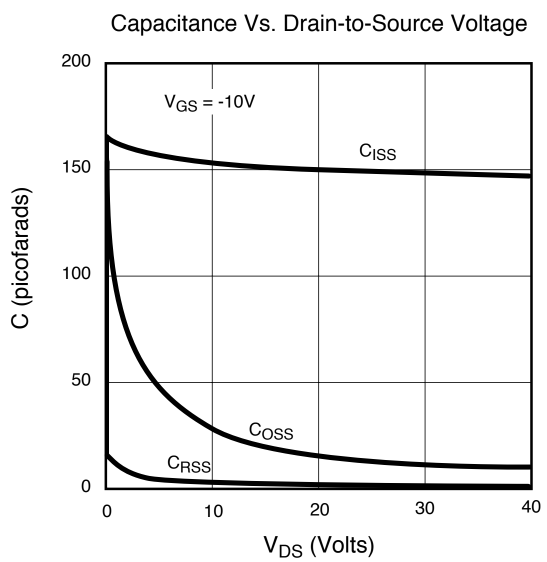
Typical Performance Curves

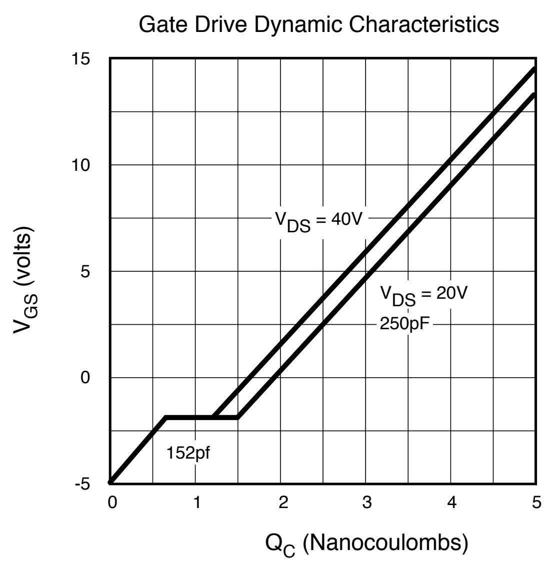












12/13/01

Supertex inc.
1235 Bordeaux Drive, Sunnyvale, CA 94089
TEL: (408) 744-0100 • FAX: (408) 222-4895
www.supertex.com