N-Channel Depletion-Mode Vertical DMOS FETs

Ordering Information

BV_{DSX} / BV_{DGX}	$R_{DS(ON)}$ (max)	I_{DSS} (min)	Order Number / Package	
			TO-243AA*	Die**
250V	6.0Ω	300mA	DN3525N8	DN3525NW

* Same as SOT-89. Products shipped on 2000 piece carrier tape reels.
** Die in wafer form.

Product marking for TO-243AA:

DN5C✳

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

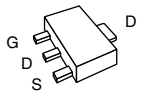
- ❏ Normally-on switches
- ❏ Solid state relays
- ❏ Converters
- ❏ Linear amplifiers
- ❏ Constant current sources
- ❏ Power supply circuits
- ❏ Telecom

Advanced DMOS Technology

These low threshold 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)

Note: See Package Outline section for dimensions.

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

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-243AA	360mA	600mA	1.6W†	15	78†	360mA	600mA

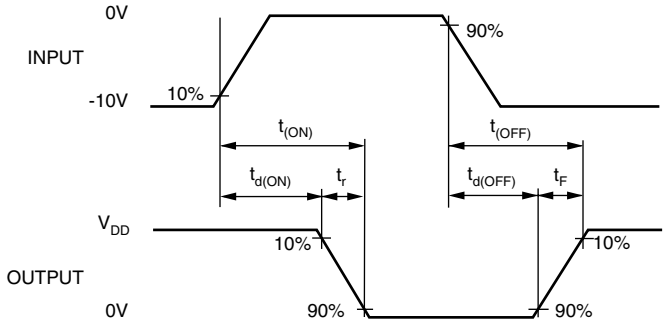
* I_D (continuous) is limited by max rated T_j.
† Mounted on FR5 board, 25mm x 25mm x 1.57mm. Significant P_D increase possible on ceramic substrate.

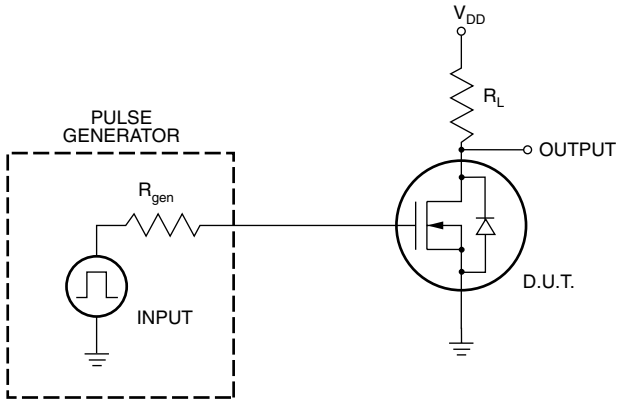
Electrical Characteristics (@ 25°C unless otherwise specified)

Symbol	Parameter	Min	Typ	Max	Unit	Conditions
BV_{DSX}	Drain-to-Souce Breakdown Voltage	250			V	V_{GS} = -5.0V, I_D = 100μA
$V_{GS(OFF)}$	Gate-to-Source OFF Voltage	-1.5		-3.5	V	V_{DS} = 15V, I_D = 1.0mA
$\Delta V_{GS(OFF)}$	Change in $V_{GS(OFF)}$ with Temperature			4.5	mV/°C	V_{DS} = 15V, I_D = 1.0mA
I_{GSS}	Gate Body Leakage Current			100	nA	V_{GS} = ±20V, V_{DS} = 0V
$I_{D(OFF)}$	Drain-to-Source Leakage Current			1.0	μA	V_{GS} = -5.0V, V_{DS} = Max Rating
				1.0	mA	V_{GS} = -5.0V, V_{DS} = 0.8 Max Rating T_A = 125°C
I_{DSS}	Saturated Drain-to-Source Current	300			mA	V_{GS} = 0V, V_{DS} = 15V
$R_{DS(ON)}$	Static Drain-to-Source ON-State Resistance			6.0	Ω	V_{GS} = 0V, I_D = 200mA
$\Delta R_{DS(ON)}$	Change in $R_{DS(ON)}$ with Temperature			1.1	%/°C	V_{GS} = 0V, I_D = 200mA
G_{FS}	Forward Transconductance	225			mℑ	I_D = 150mA, V_{DS}=10V
C_{ISS}	Input Capacitance		270	350	pF	V_{GS} = -5.0V, V_{DS} = 25V, f =1.0Mhz
C_{OSS}	Common Source Output Capacitance		20	60		
C_{RSS}	Reverse Transfer Capacitance		5.0	20		
$t_{d(ON)}$	Turn-ON Delay Time			20	ns	V_{DD} = 25V, I_D = 150mA, R_{GEN} = 25Ω, V_{GS} = 0V to -10V
t_r	Rise Time			25		
$t_{d(OFF)}$	Turn-OFF Delay Time			25		
t_f	Fall Time			40		
V_{SD}	Diode Forward Voltage Drop			1.8	V	V_{GS} = -5.0V, I_{SD} = 150mA
t_{rr}	Reverse Recovery Time		800		ns	V_{GS} = -5.0V, I_{SD} = 150mA

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.

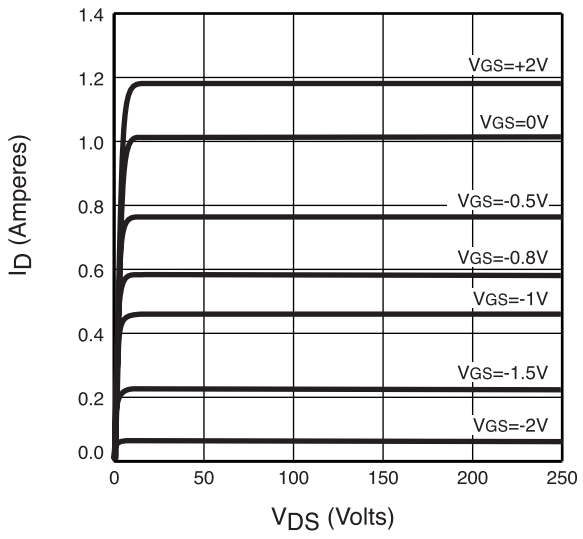
Switching Waveforms and Test Circuit



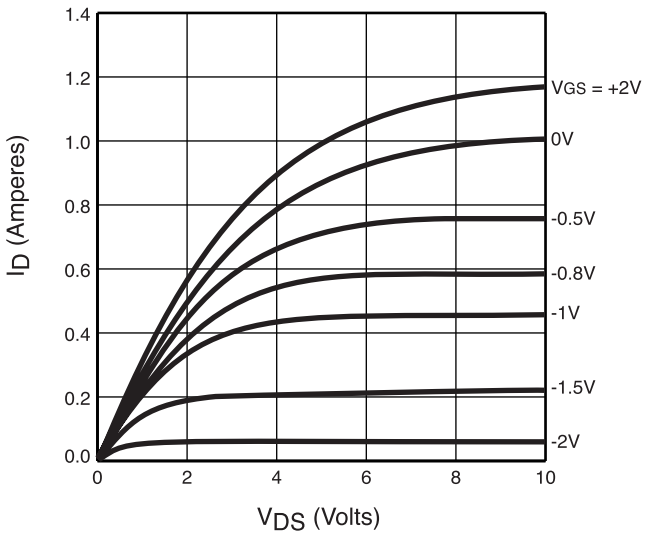


Typical Performance Curves

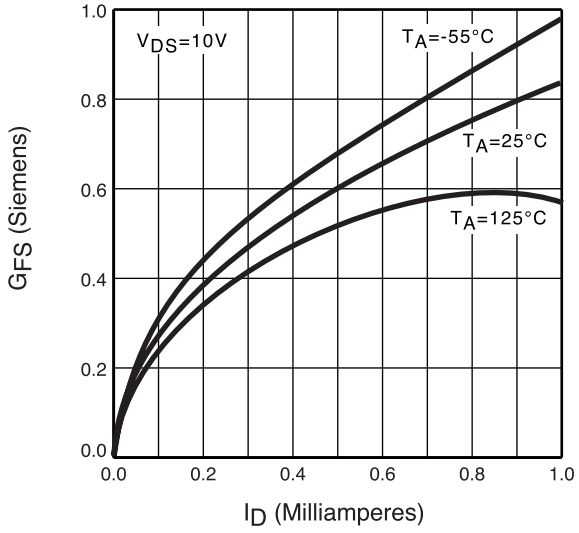
Output Characteristics



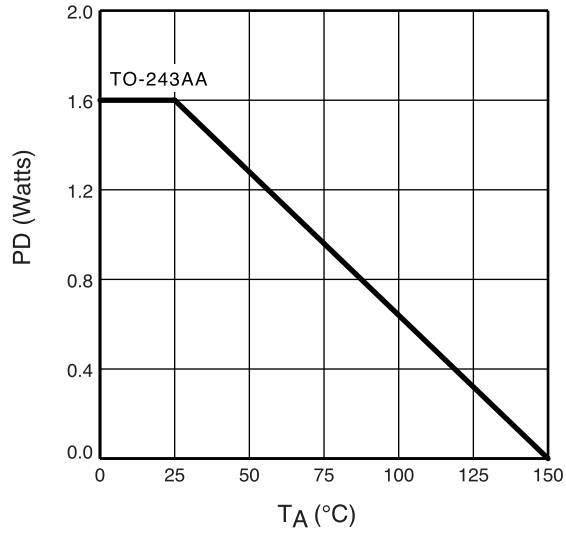
Saturation Characteristics



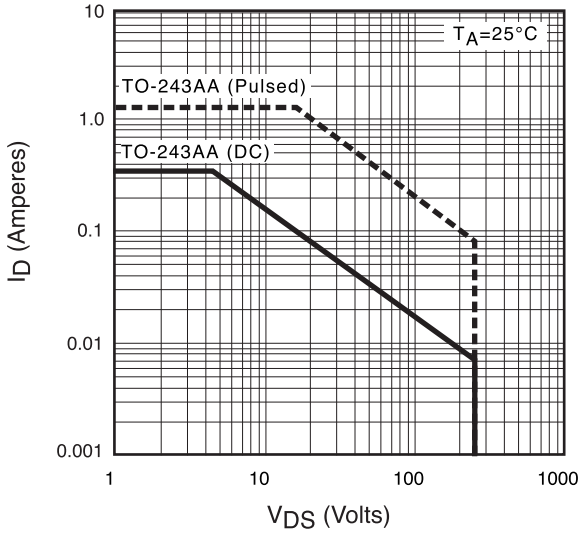
Transconductance vs. Drain Current



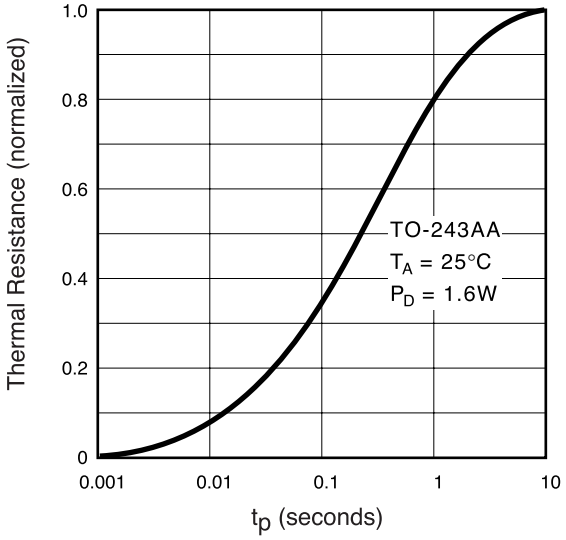
Power Dissipation vs. Ambient Temperature



Maximum Rated Safe Operating Area

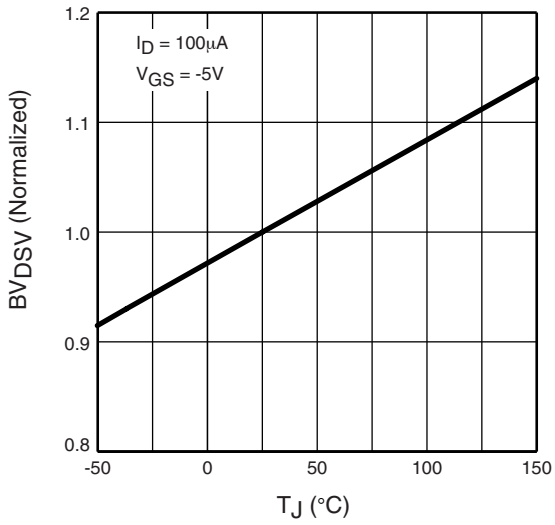


Thermal Response Characteristics

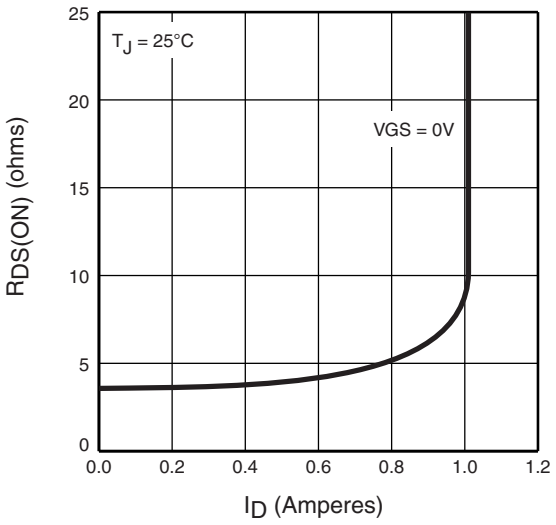


Typical Performance Curves

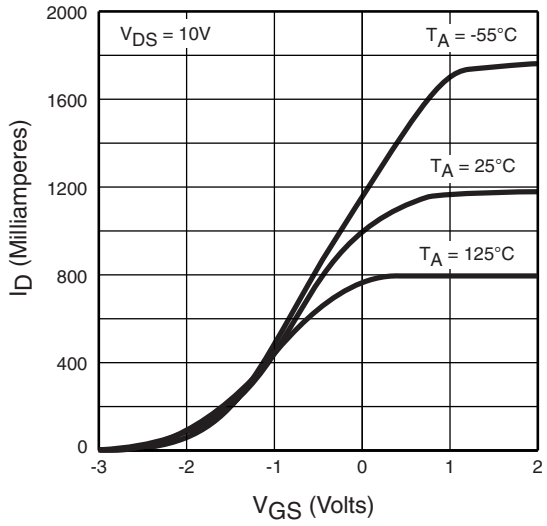
BV_{DSV} Variation with Temperature



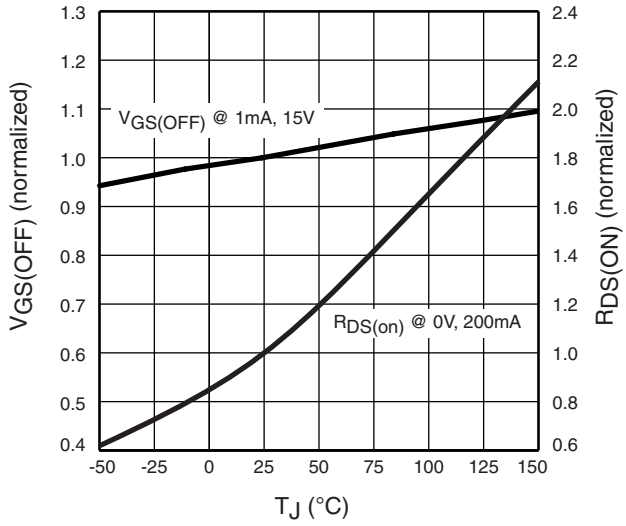
On Resistance vs. Drain Current



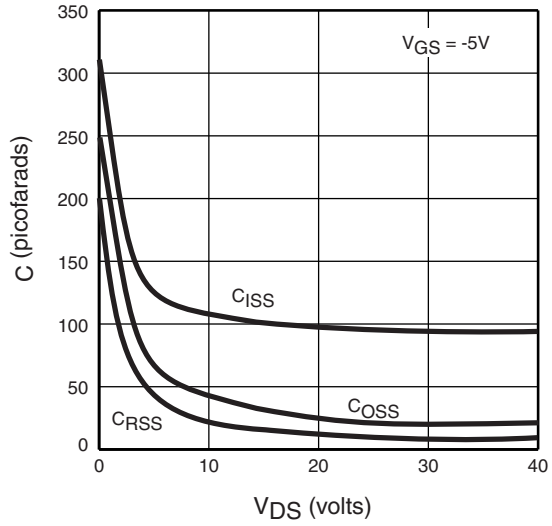
Transfer Characteristics



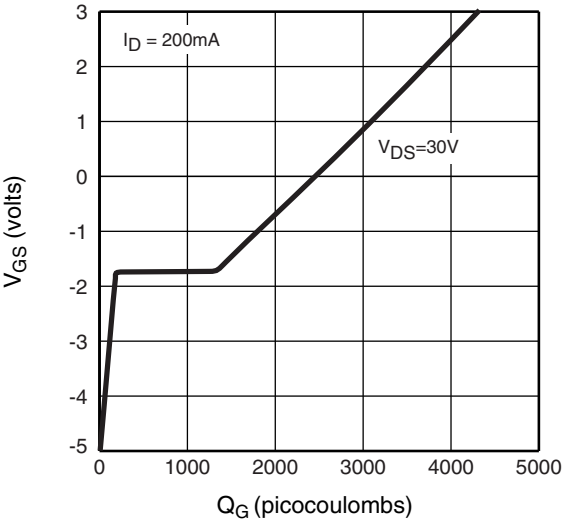
$V_{GS(OFF)}$ and $R_{DS(ON)}$ w/ Temperature



Capacitance vs. Drain Source Voltage



Gate Drive Dynamic Characteristics



12/13/010

Supertex inc.

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