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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	Die
240V	4.0Ω	600mA	DN2624N3	DN2624ND

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

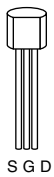
* Distance of 1.6 mm from case for 10 seconds.

Advanced DMOS Technology

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



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TO-92

Note: See Package Outline section for dimensions.

Thermal Characteristics

Package	I_D (continuous)*	I_D (pulsed)	Power Dissipation @ T_C = 25°C	θ_{jc} °C/W	θ_{ja} °C/W	I_{DR}*	I_{DRM}
TO-92	300mA	1.0A	1.0W	125	170	300mA	1.0A

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

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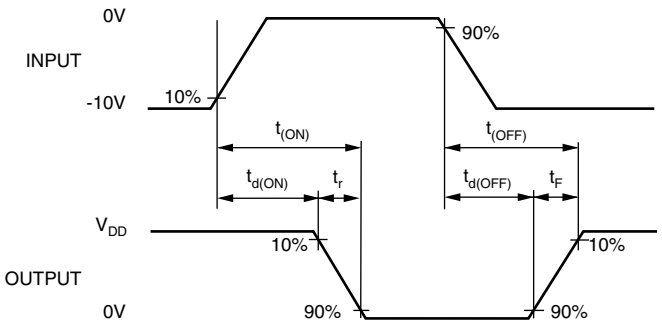
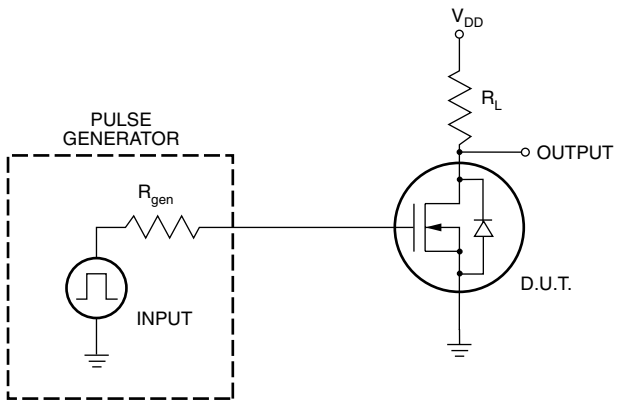
Electrical Characteristics (@ 25°C unless otherwise specified)

Symbol	Parameter	Min	Typ	Max	Unit	Conditions
BV_{DSX}	Drain-to-Source Breakdown Voltage	240			V	V_{GS} = -5V, I_D = 100μA
$V_{GS(OFF)}$	Gate-to-Source OFF Voltage	–1		–3	V	V_{DS} = 25V, I_D= 10μA
$\Delta V_{GS(OFF)}$	Change in $V_{GS(OFF)}$ with Temperature			4.5	mV	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	600			mA	V_{GS} = 0V, V_{DS} = 25V
$R_{DS(ON)}$	Static Drain-to-Source ON-State Resistance			4.0	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	400			mhos	I_D = 300mA, V_{DS} = 10V
C_{ISS}	Input Capacitance		720		pF	V_{GS} = -10V, V_{DS} = 25V
C_{OSS}	Common Source Output Capacitance		100			f = 1 MHz
C_{RSS}	Reverse Transfer Capacitance		30			
$t_{d(ON)}$	Turn-ON Delay Time		15	30	ns	V_{DD} = 25V,
t_r	Rise Time		22	44		I_D = 200mA,
$t_{d(OFF)}$	Turn-OFF Delay Time		22	44		R_{GEN} = 10Ω
t_f	Fall Time		30	60		
V_{SD}	Diode Forward Voltage Drop			1.8	V	V_{GS} = -10V, I_{SD} = 200mA
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

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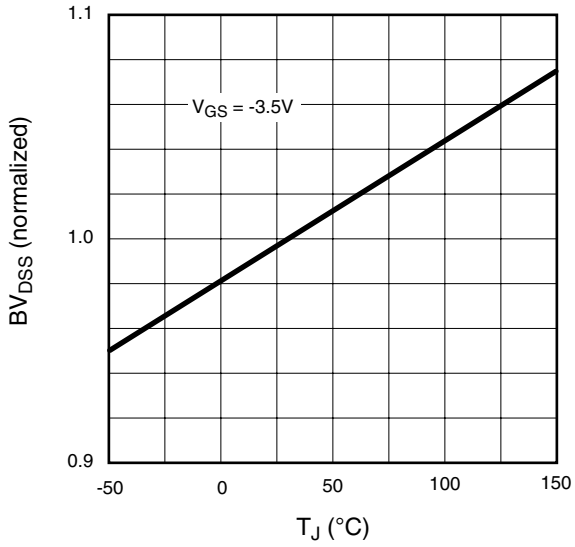
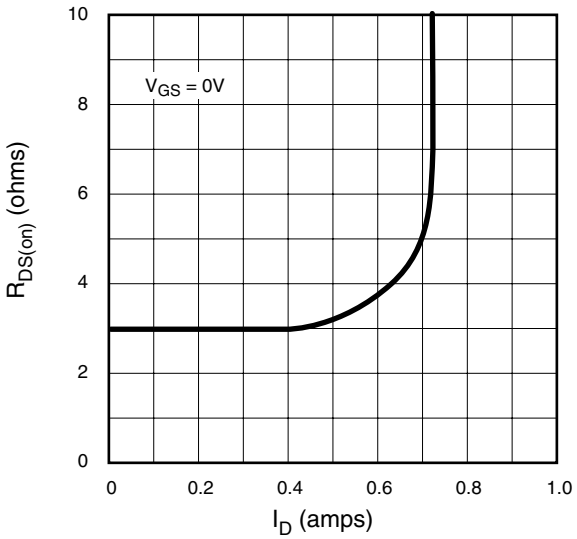
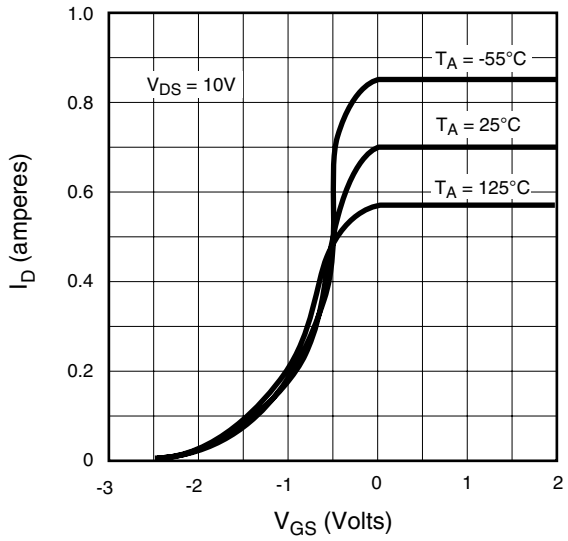
BV$_{DSS}$ Variation with Temperature



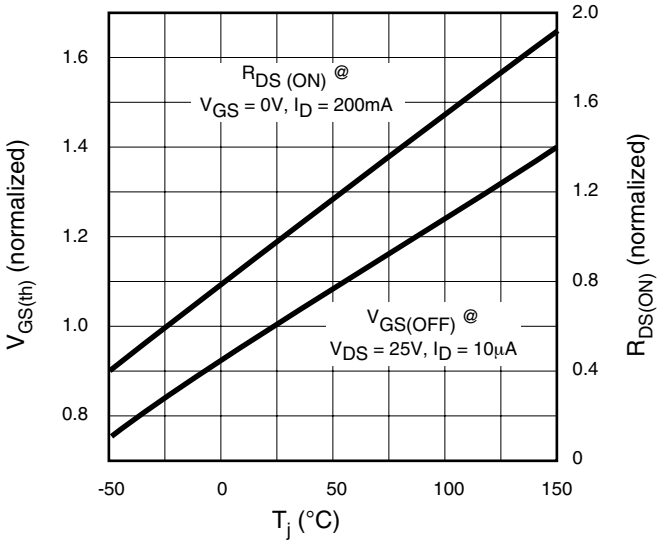
On-Resistance vs. Drain Current



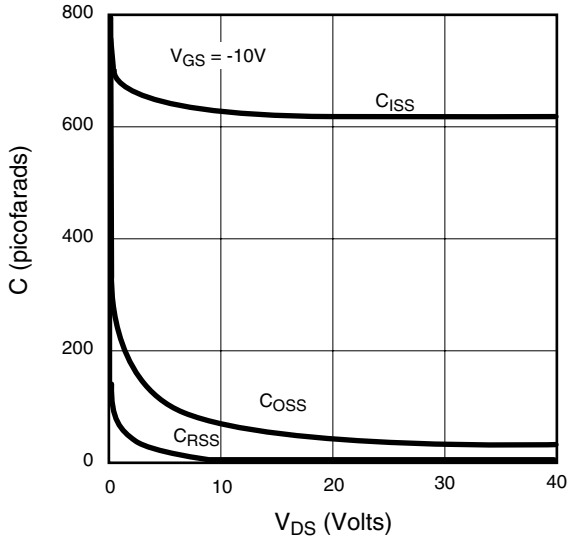
Transfer Characteristics



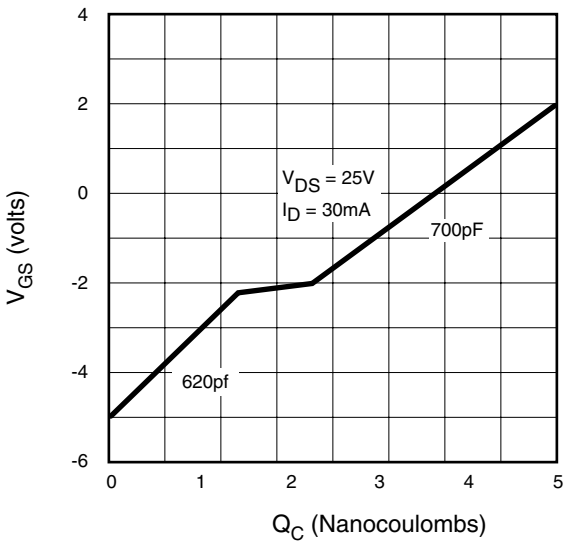
$V_{(th)}$ and R_{DS} Variation with Temperature



Capacitance Vs. Drain-to-Source Voltage



Gate Drive Dynamic Characteristics



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Typical Performance Curves

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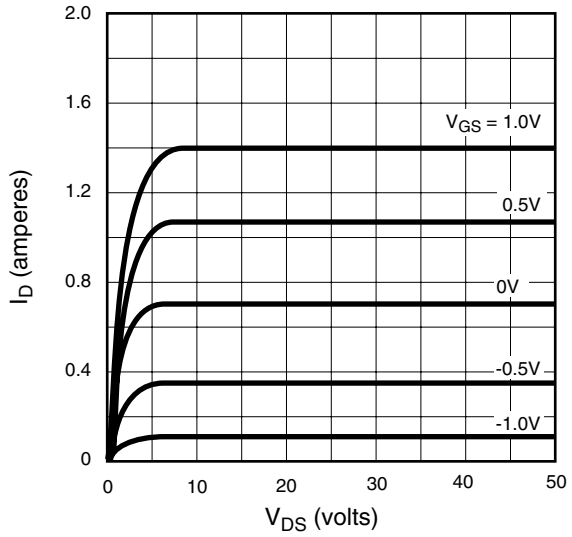
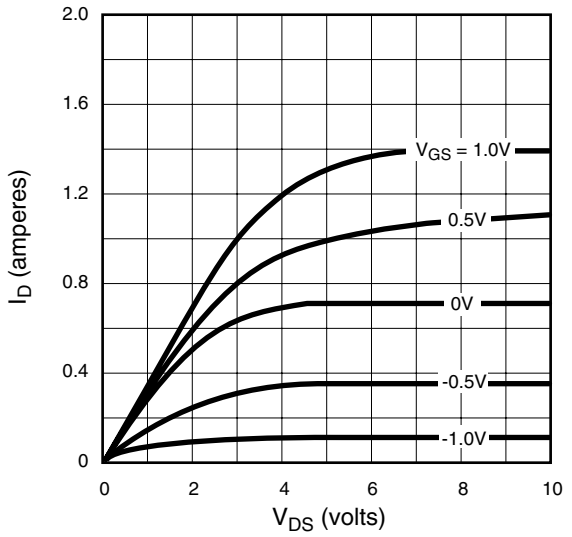
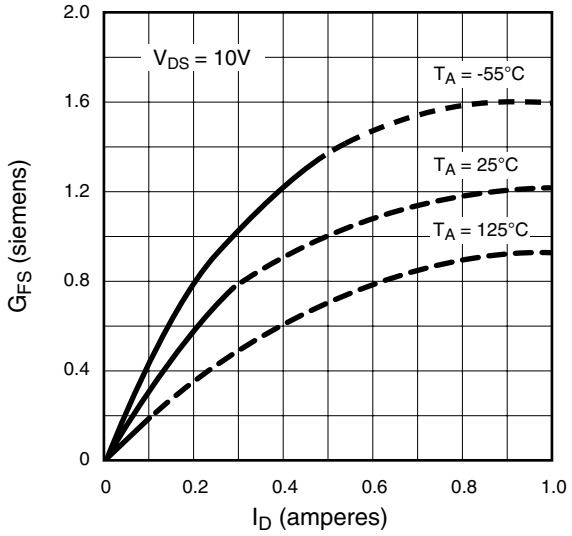
Output Characteristics



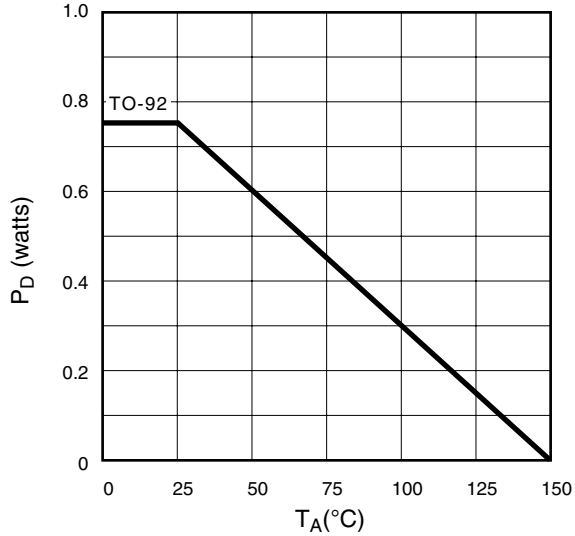
Saturation Characteristics



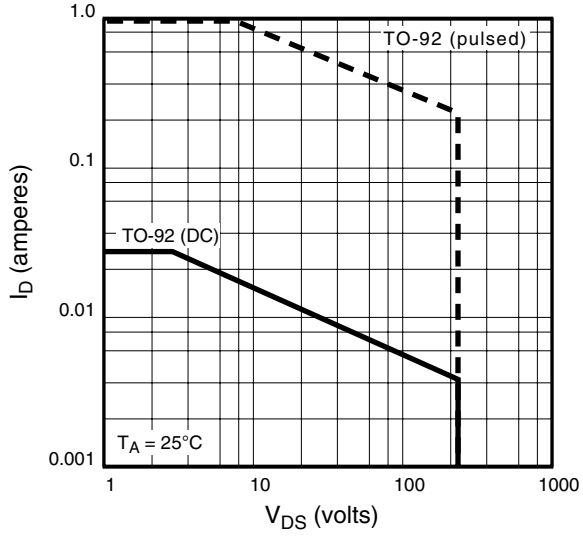
Transconductance vs. Drain Current



Power Dissipation vs. Temperature



Maximum Rated Safe Operating Area



Thermal Response Characteristics