












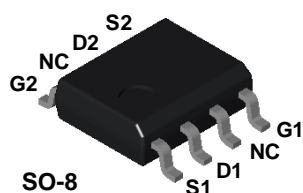


Index of /ds/NP/

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**NPDS402
NPDS403
NPDS404
NPDS406**



N-Channel General Purpose Dual Amplifier

Sourced from Process 98.

Absolute Maximum Ratings*

TA = 25°C unless otherwise noted

Symbol	Parameter	Value	Units
V_{DG}	Drain-Gate Voltage	50	V
V_{GS}	Gate-Source Voltage	50	V
I_{GF}	Forward Gate Current	10	mA
T_J, T_{stg}	Operating and Storage Junction Temperature Range	-55 to +150	°C

*These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

NOTES:

- 1) These ratings are based on a maximum junction temperature of 150 degrees C.
- 2) These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations

General Purpose Dual Amplifier

(continued)

Electrical Characteristics

TA = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Max	Units
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OFF CHARACTERISTICS

$V_{(BR)GSS}$	Gate-Source Breakdown Voltage	$I_G = 1.0 \mu A, V_{DS} = 0$	- 50		V
I_{GSS}	Gate Reverse Current	$V_{GS} = 30 V, V_{DS} = 0$		25	pA
$V_{GS(off)}$	Gate-Source Cutoff Voltage	$V_{DS} = 15 V, I_D = 1.0 nA$	- 0.5	- 2.5	V
V_{GS}	Gate-Source Voltage	$V_{DG} = 15 V, I_D = 200 \mu A$		- 2.3	V
$V_{G1 - G2}$	Voltage Gate 1-Gate 2	$I_G = 1.0 \mu A, V_{DS} = 0$	+ / - 50		V

ON CHARACTERISTICS

I_{DSS}	Zero-Gate Voltage Drain Current*	$V_{DS} = 10 V, V_{GS} = 0$	0.5	10	mA
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SMALL SIGNAL CHARACTERISTICS

g_{fs}	Common Source Forward Transconductance	$V_{DS} = 10 V, V_{GS} = 0, f = 1.0 kHz$ $V_{DS} = 15 V, I_D = 200 \mu A, f = 1.0 kHz$	2000 1000	7000 2000	$\mu mhos$ $\mu mhos$
g_{oss}	Common Source Output Conductance	$V_{DS} = 10 V, V_{GS} = 0, f = 1.0 kHz$		20	$\mu mhos$
g_{os}	Common Source Output Conductance	$V_{DS} = 15 V, I_D = 200 \mu A, f = 1.0 kHz$		2.0	$\mu mhos$
C_{iss}	Input Capacitance	$V_{DG} = 15 V, I_D = 200 \mu A,$ $f = 1.0 MHz$		8.0	pF
C_{rss}	Reverse Transfer Capacitance	$V_{DG} = 15 V, I_D = 200 \mu A,$ $f = 1.0 MHz$		3.0	pF
CMMR	Common Mode Rejection	$V_{DG} = 10 \text{ to } 20 V, I_D = 200 \mu A$	95		dB
$V_{GS1} - V_{GS2}$	Differential Match	$V_{DG} = 10 V, I_D = 200 \mu A,$ NPDS402 NPDS403 NPDS404 NPDS406		10 10 15 40	mV mV mV mV
$\Delta V_{GS1} - V_{GS2}$	Differential Drift	$V_{DG} = 10 V, I_D = 200 \mu A,$ $T_A = -55 \text{ to } 25^\circ C$ NPDS402 NPDS403 NPDS404 NPDS406 $V_{DG} = 10 V, I_D = 200 \mu A$ $T_A = 25 \text{ to } 125^\circ C$ NPDS402 NPDS403 NPDS404 NPDS406		10 25 25 80 10 25 25 80	$\mu V/^\circ C$ $\mu V/^\circ C$ $\mu V/^\circ C$ $\mu V/^\circ C$ $\mu V/^\circ C$ $\mu V/^\circ C$ $\mu V/^\circ C$ $\mu V/^\circ C$

*Pulse Test: Pulse Width ≤ 300 ms, Duty Cycle $\leq 2\%$

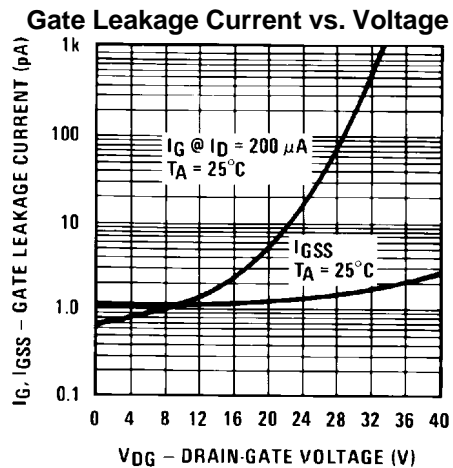
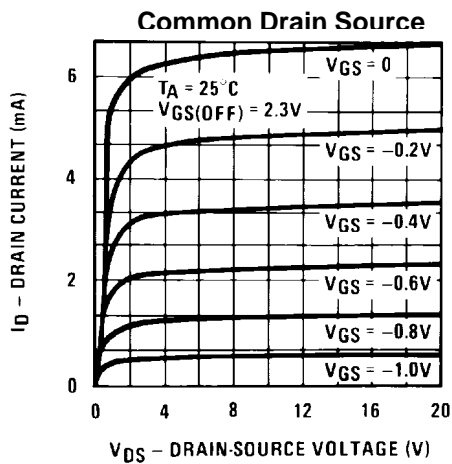
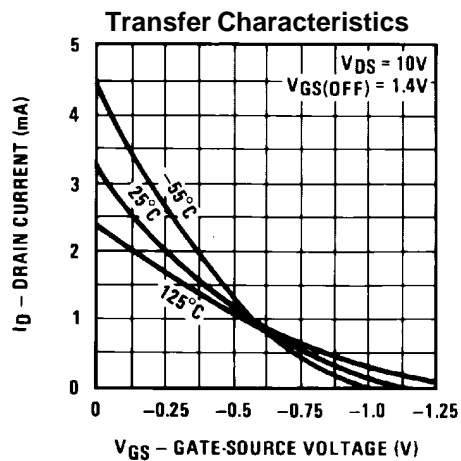
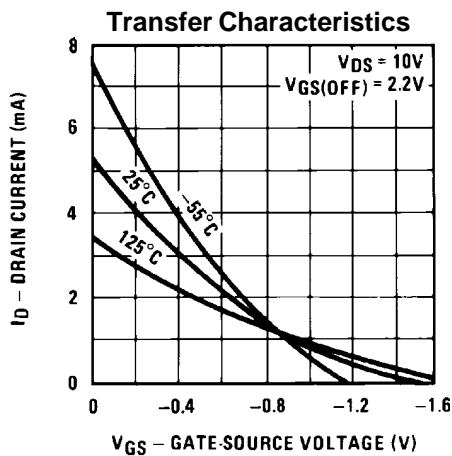
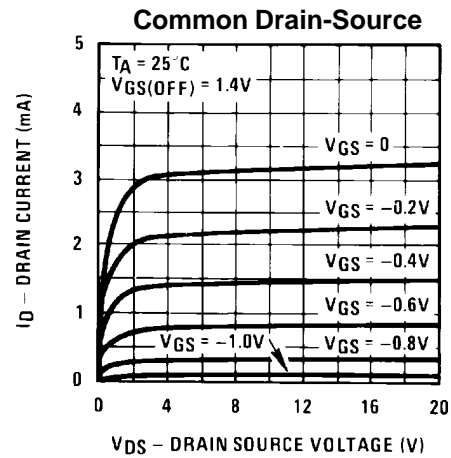
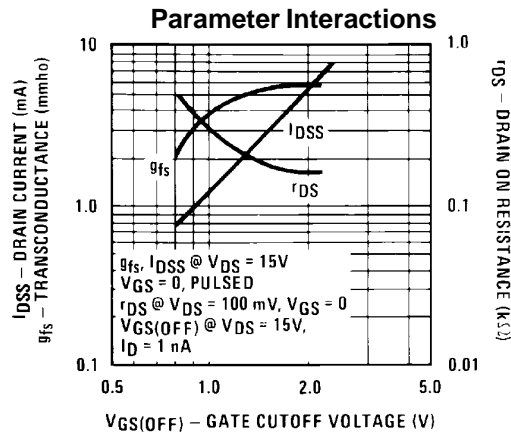
NPDS402 / NPDS403 / NPDS404 / NPDS406

General Purpose Dual Amplifier

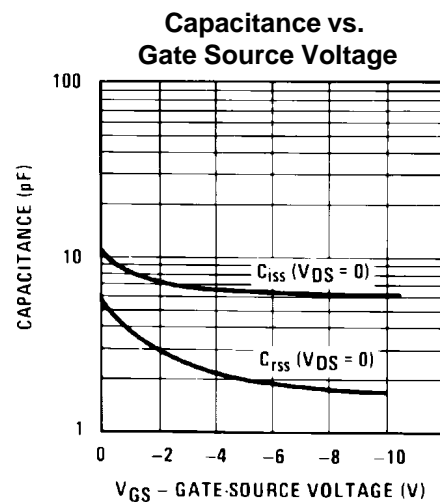
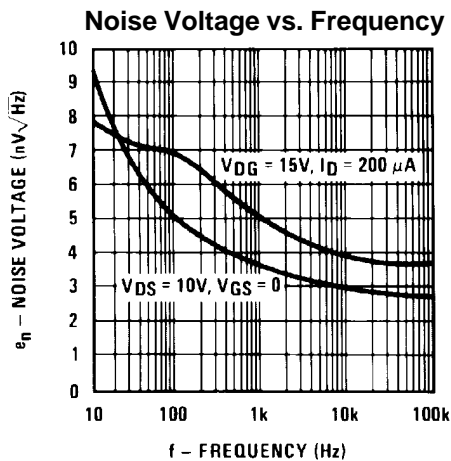
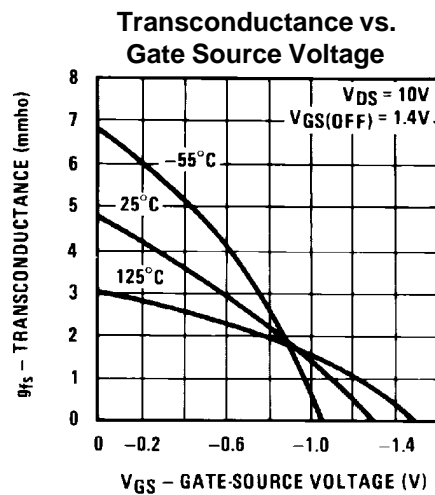
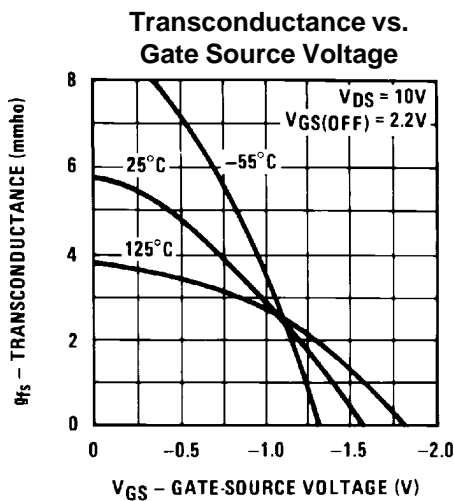
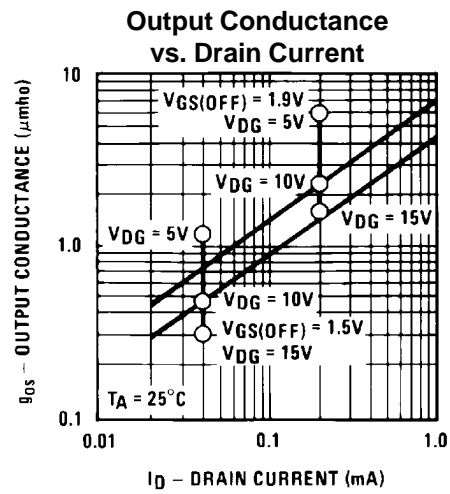
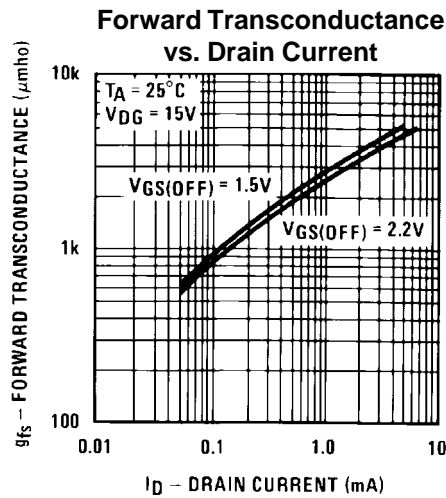
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NPDS402 / NPDS403 / NPDS404 / NPDS406

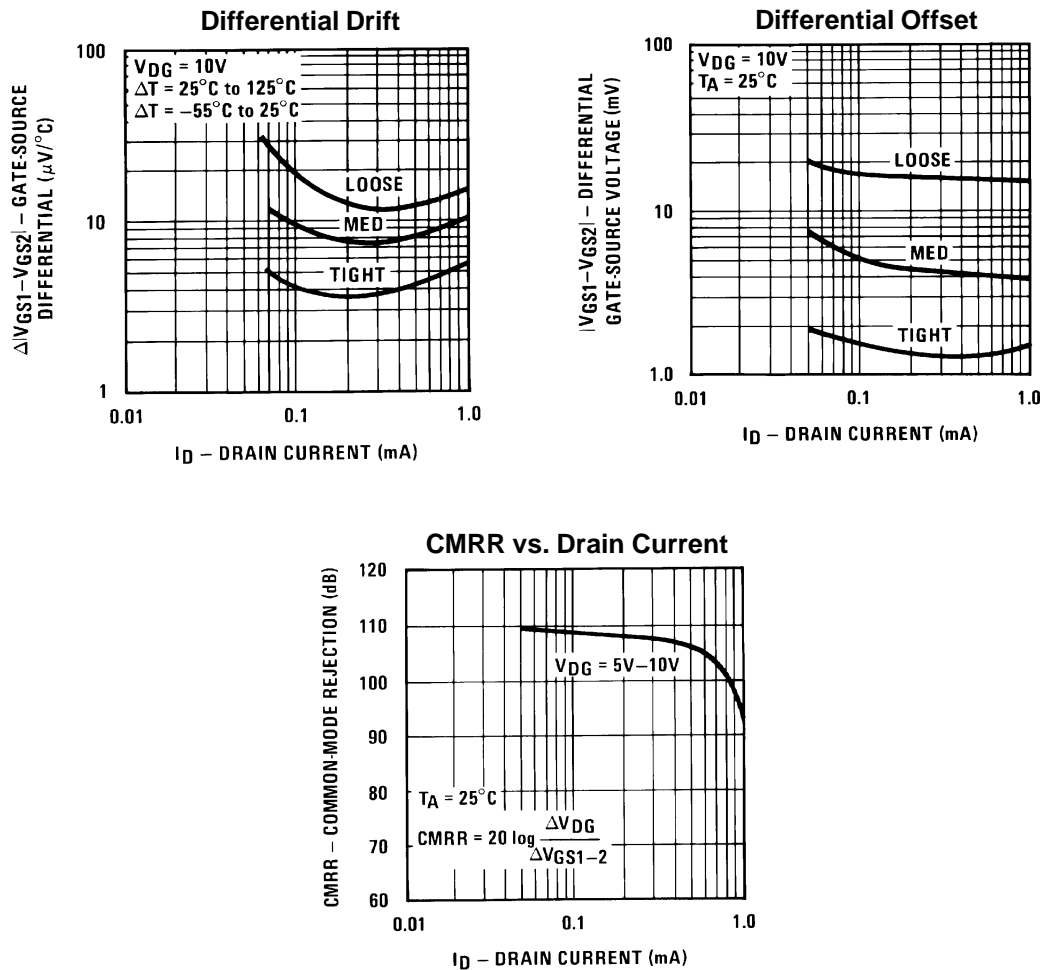
Typical Characteristics (continued)



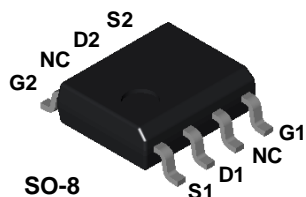
Typical Characteristics (continued)



Typical Characteristics (continued)



NPDS5565 NPDS5566



N-Channel General Purpose Dual Amplifier

Sourced from Process 96.

Absolute Maximum Ratings*

TA = 25°C unless otherwise noted

Symbol	Parameter	Value	Units
V_{DG}	Drain-Gate Voltage	40	V
V_{GS}	Gate-Source Voltage	40	V
I_{GF}	Gate Current	10	mA
T_J, T_{stg}	Operating and Storage Junction Temperature Range	-55 to +150	°C

*These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

NOTES:

- 1) These ratings are based on a maximum junction temperature of 150 degrees C.
- 2) These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

General Purpose Dual Amplifier

(continued)

Electrical Characteristics

TA = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Max	Units
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OFF CHARACTERISTICS

$V_{(BR)GSS}$	Gate-Source Breakdown Voltage	$I_G = 1.0 \mu A, V_{DS} = 0$	- 40		V
I_{GSS}	Gate Reverse Current	$V_{GS} = 20 V, V_{DS} = 0$ $V_{GS} = 20 V, V_{DS} = 0, T_A = 150 ^\circ C$		100 200	pA μA
$V_{GS(off)}$	Gate-Source Cutoff Voltage	$V_{DS} = 15 V, I_D = 1.0 nA$	- 0.5	- 3.0	V
$V_{GS(f)}$	Forward Gate-Source Voltage	$V_{DS} = 0, I_D = 2.0 mA$		1.0	V
$V_{G1 - G2}$	Voltage Gate 1 - Gate 2	$V_{DS} = 0, I_G = + / - 1.0 \mu A$	+ / - 40		V

ON CHARACTERISTICS

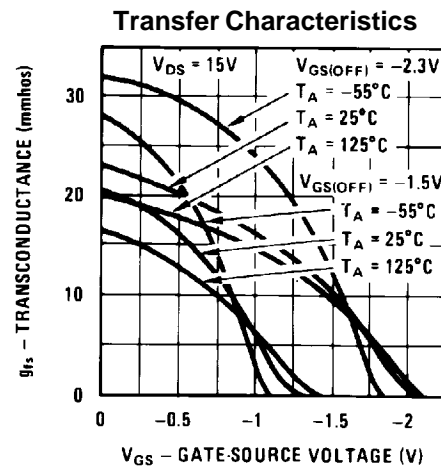
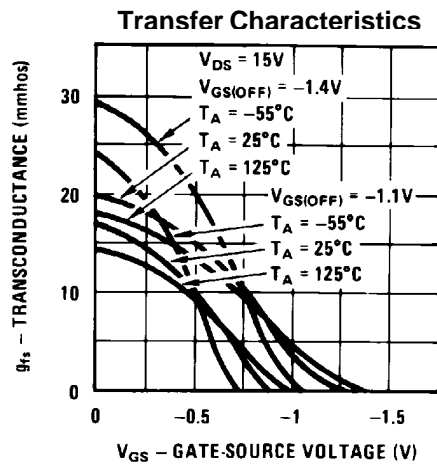
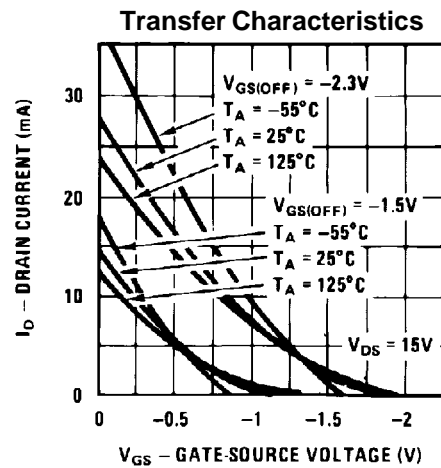
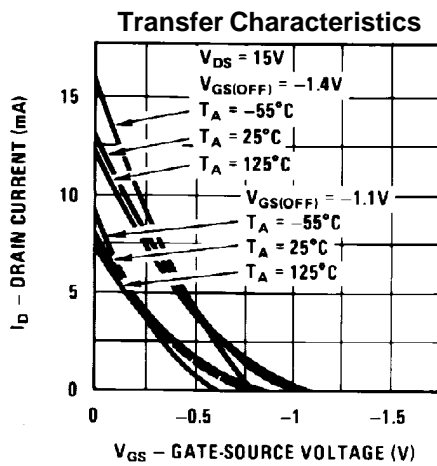
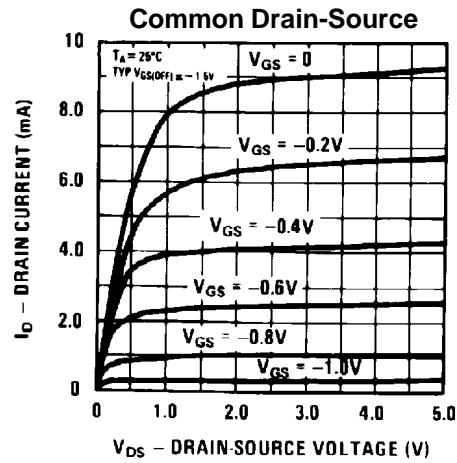
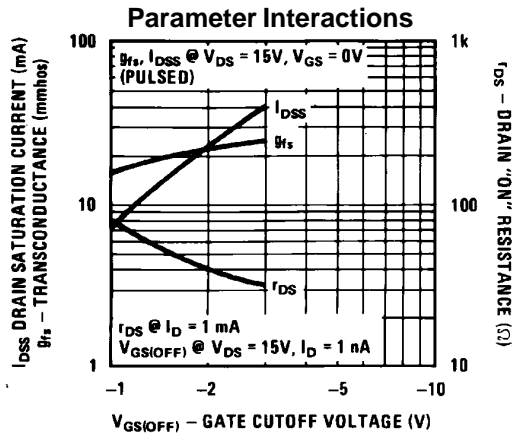
I_{DSS}	Zero-Gate Voltage Drain Current*	$V_{DS} = 15 V, V_{GS} = 0$	5.0	30	mA
$r_{DS(on)}$	Drain-Source On Resistance	$I_D = 1.0 mA, V_{GS} = 0$		100	Ω

SMALL SIGNAL CHARACTERISTICS

g_{fs}	Common Source Forward Transconductance	$V_{DS} = 15 V, I_D = 2.0 mA, f = 1.0 kHz$ $V_{DS} = 15 V, I_D = 2.0 mA,$ $f = 100 MHz$	7500 7000	12,500	$\mu mhos$ $\mu mhos$
g_{oss}	Common Source Output Conductance	$V_{DS} = 15 V, I_D = 2.0 mA, f = 1.0 kHz$		45	$\mu mhos$
C_{iss}	Input Capacitance	$V_{DG} = 15 V, I_D = 2.0 mA, f = 1.0 MHz$		12	pF
C_{rss}	Reverse Transfer Capacitance	$V_{DS} = 15 V, I_D = 2.0 mA, f = 1.0 kHz$		3.0	pF
e_n	Equivalent Short-Circuit Input Noise Voltage	$V_{DG} = 15 V, I_D = 2.0 mA, f = 10 Hz$		50	nV/ \sqrt{Hz}
NF	Noise Figure	$V_{DG} = 15 V, I_D = 2.0 mA, f = 10 Hz$ $R_G = 1.0 m\Omega$		1.0	dB
$I_{DSS1} - I_{DSS2}$	I_{DSS} Match	$V_{DS} = 15 V, V_{GS} = 0$		5.0	%
$g_{fs1} - g_{fs2}$	g_{fs} Match	$V_{DS} = 15 V, I_D = 2.0 mA, f = 1.0 kHz$		10	%
$V_{GS1} - V_{GS2}$	Differential Match	$V_{DG} = 15 V, I_D = 2.0 mA,$ NPDS5565 NPDS5566		10 20	mV mV
$\Delta V_{GS1} - V_{GS2}$	Differential Drift	$V_{DS} = 10 V, V_{GS} = 0, f = 1.0 kHz$ $T_A = 25 \text{ to } 125 ^\circ C$ NPDS5565 NPDS5566 $V_{DG} = 15 V, I_D = 2.0 mA,$ $T_A = -55 \text{ to } 25 ^\circ C$ NPDS5565 NPDS5566		25 50 25 50	$\mu V/^\circ C$ $\mu V/^\circ C$ $\mu V/^\circ C$ $\mu V/^\circ C$

NPDS5565 / NPDS5566

Typical Characteristics (continued)

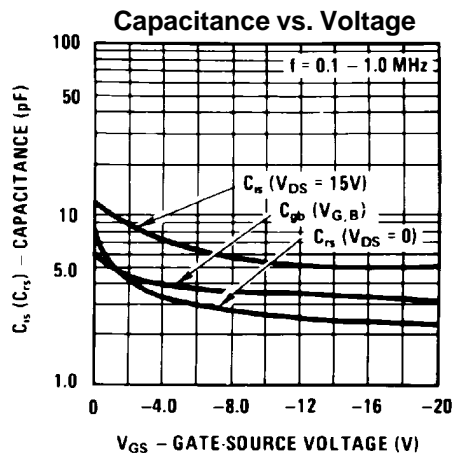
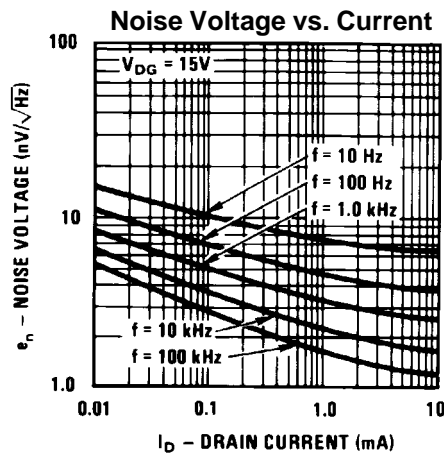
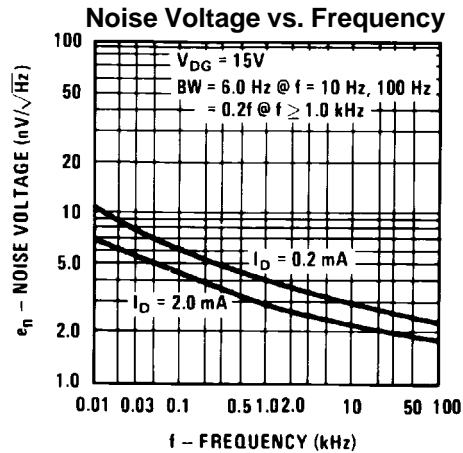
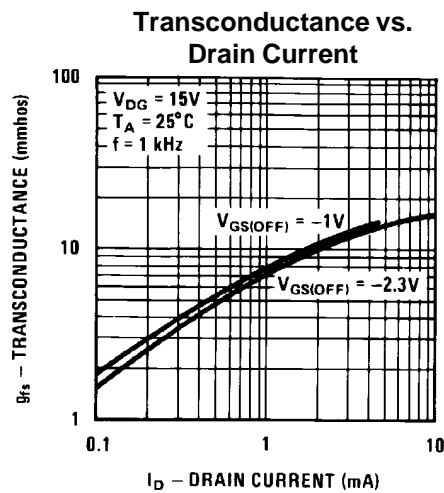
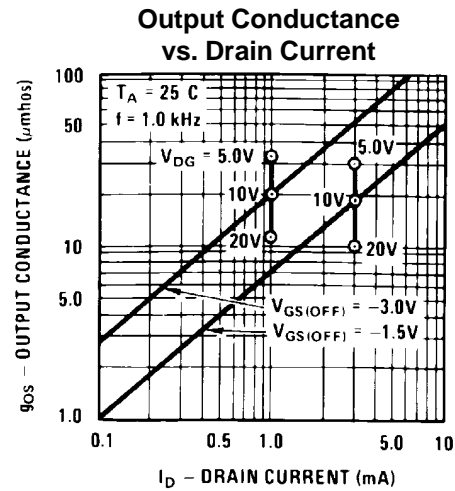
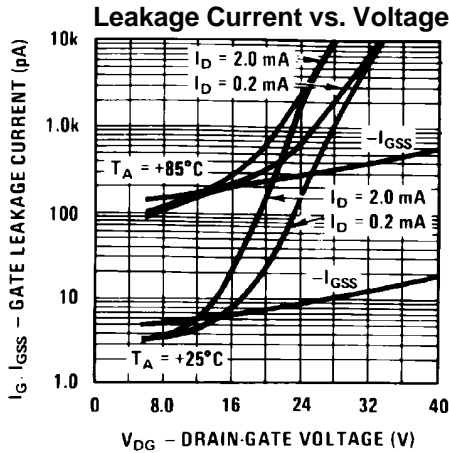


General Purpose Dual Amplifier

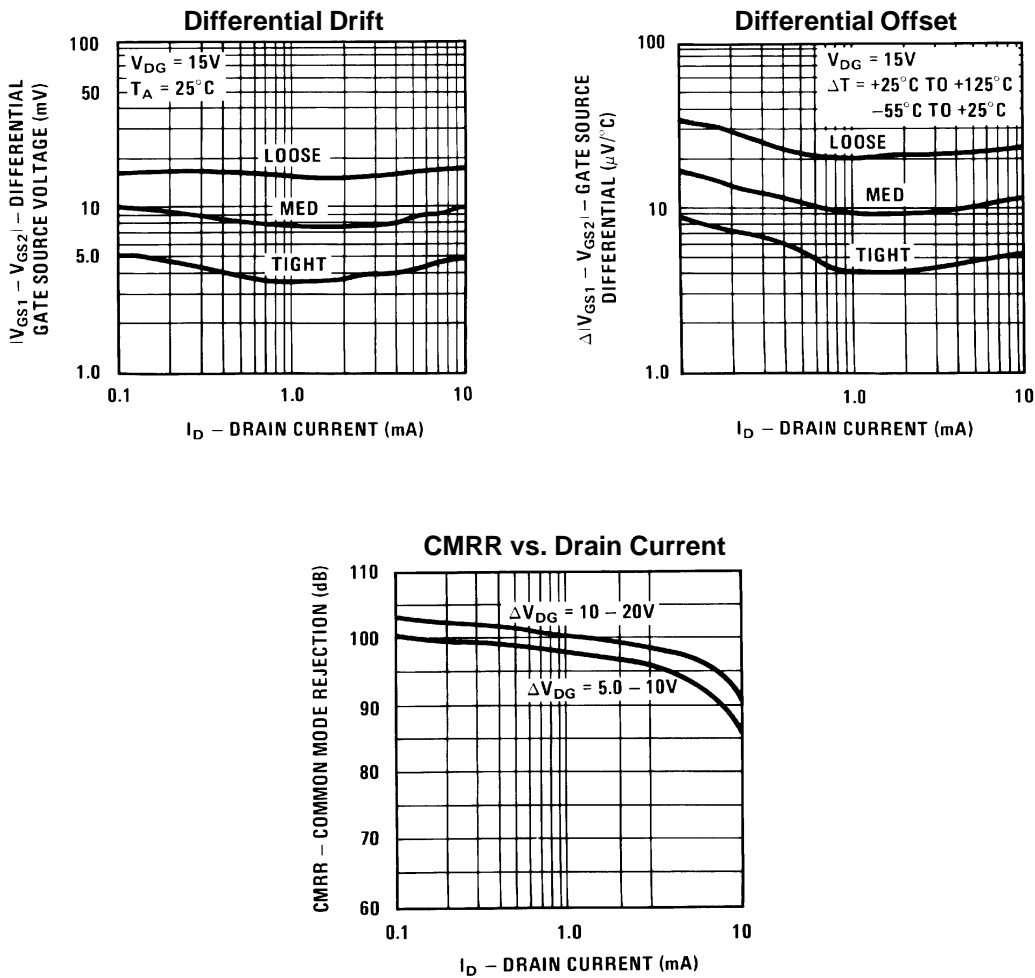
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NPDS5565 / NPDS5566

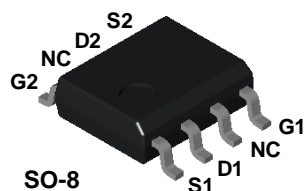
Typical Characteristics (continued)



Typical Characteristics (continued)



NPDS5911 NPDS5912



N-Channel General Purpose Dual Amplifier

Sourced from Process 93.

Absolute Maximum Ratings*

TA = 25°C unless otherwise noted

Symbol	Parameter	Value	Units
V_{DG}	Drain-Gate Voltage	25	V
V_{GS}	Gate-Source Voltage	25	V
I_{GF}	Forward Gate Current	10	mA
T_J, T_{stg}	Operating and Storage Junction Temperature Range	-55 to +150	°C

*These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

NOTES:

- 1) These ratings are based on a maximum junction temperature of 150 degrees C.
- 2) These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

General Purpose Dual Amplifier

(continued)

Electrical Characteristics

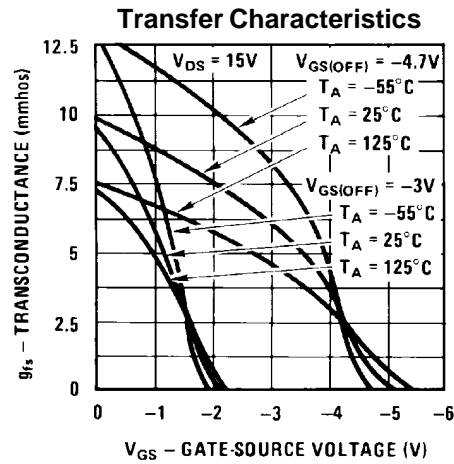
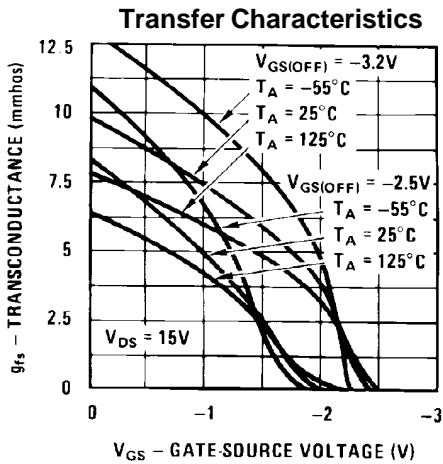
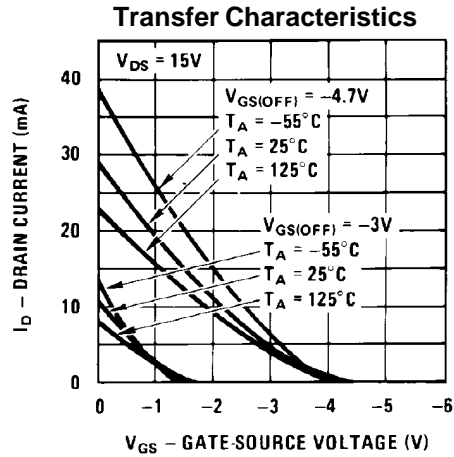
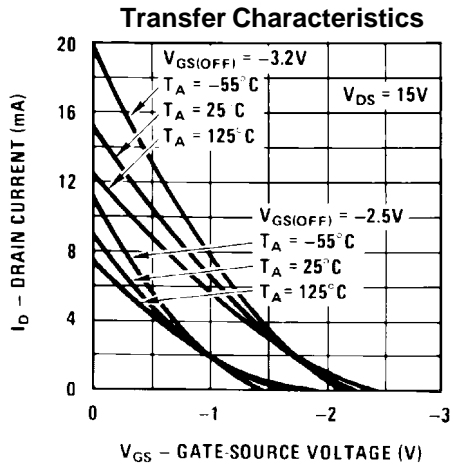
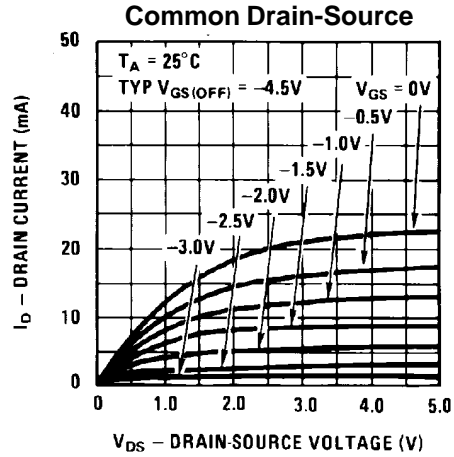
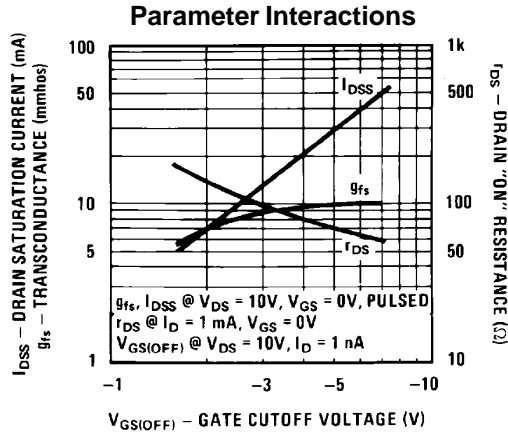
TA = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Max	Units
OFF CHARACTERISTICS					
$V_{(BR)GSS}$	Gate-Source Breakdown Voltage	$I_G = 1.0 \mu A, V_{DS} = 0$	- 25		V
I_{GSS}	Gate Reverse Current	$V_{GS} = 15 V, V_{DS} = 0$ $V_{GS} = 15 V, V_{DS} = 0, T_A = 150 ^\circ C$		100 250	pA nA
$V_{GS(off)}$	Gate-Source Cutoff Voltage	$V_{DS} = 10 V, I_D = 1.0 nA$	- 1.0	- 5.0	V
V_{GS}	Gate-Source Voltage	$V_{DG} = 10 V, I_D = 5.0 mA$	- 0.3	- 4.0	V
$V_{G1 - G2}$	Voltage Gate 1 - Gate 2	$V_{DS} = 0, I_G = + / - 1.0 \mu A$	+ / - 25		V
ON CHARACTERISTICS					
I_{DSS}	Zero-Gate Voltage Drain Current*	$V_{DS} = 10 V, V_{GS} = 0$	7.0	40	mA
SMALL SIGNAL CHARACTERISTICS					
g_{fs}	Common Source Forward Transconductance	$V_{DS} = 10 V, I_D = 5.0mA, f = 1.0 kHz$ $V_{DS} = 10 V, I_D = 5.0 mA, f = 100 MHz$	5000 5000	10,000 10,000	$\mu mhos$ $\mu mhos$
g_{oss}	Common Source Output Conductance	$V_{DS} = 10 V, I_D = 5.0mA, f = 1.0 kHz$ $V_{DS} = 10V, I_D = 5.0mA, f = 100 MHz$		100 150	$\mu mhos$ $\mu mhos$
C_{iss}	Input Capacitance	$V_{DG} = 10 V, I_D = 5.0mA, f = 1.0 MHz$		5.0	pF
C_{rss}	Reverse Transfer Capacitance	$V_{DS} = 10 V, I_D = 5.0mA, f = 1.0 kHz$		1.2	pF
e_n	Equivalent Short-Circuit Input Noise Voltage	$V_{DG} = 10 V, I_D = 5.0 mA, f = 10 kHz$		20	nV/ \sqrt{Hz}
NF	Noise Figure	$V_{DG} = 10 V, I_D = 5.0 mA, f = 10 kHz$ $R_G = 100 k\Omega$		1.0	dB
$I_{DSS1} - I_{DSS2}$	I_{DSS} Match	$V_{DS} = 10 V, V_{GS} = 0$		5.0	%
$g_{fs1} - g_{fs2}$	g_{fs} Match	$V_{DS} = 10 V, I_D = 5.0mA, f = 1.0 kHz$		5.0	%
$g_{oss1} - g_{oss2}$	g_{oss} Match	$V_{DS} = 10 V, I_D = 5.0mA, f = 1.0 kHz$		20	$\mu mhos$
$I_{G1} - I_{G2}$	I_G Match	$V_{DS} = 10 V, I_D = 5.0mA, T_A = 125^\circ C$		20	nA
$V_{GS1} - V_{GS2}$	Differential Match	$V_{DG} = 10 V, I_D = 5.0 mA,$ NPDS5911 NPDS5912		10 15	mV mV
$\Delta V_{GS1} - V_{GS2}$	Differential Drift	$V_{DG} = 10 V, V_{GS} = 0, I_D = 5.0 mA,$ $T_A = 25 \text{ to } 125 ^\circ C$ NPDS5911 NPDS5912 $V_{DG} = 10 V, I_D = 5.0 mA,$ $T_A = -55 \text{ to } 25 ^\circ C$ NPDS5911 NPDS5912		20 40 20 40	$\mu V/^\circ C$ $\mu V/^\circ C$ $\mu V/^\circ C$ $\mu V/^\circ C$

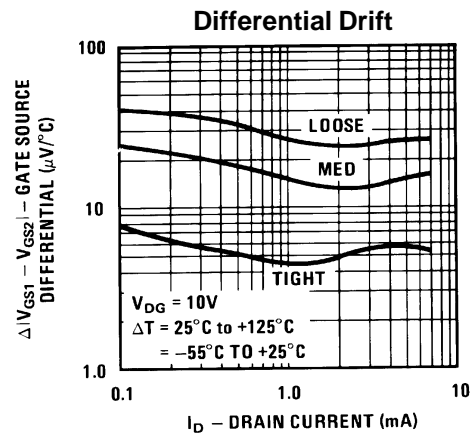
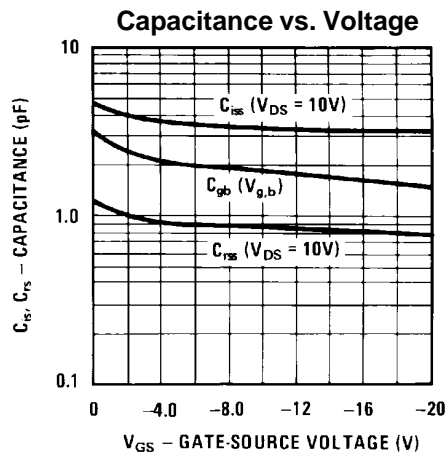
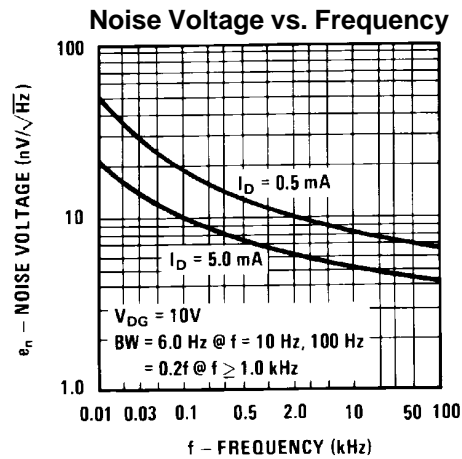
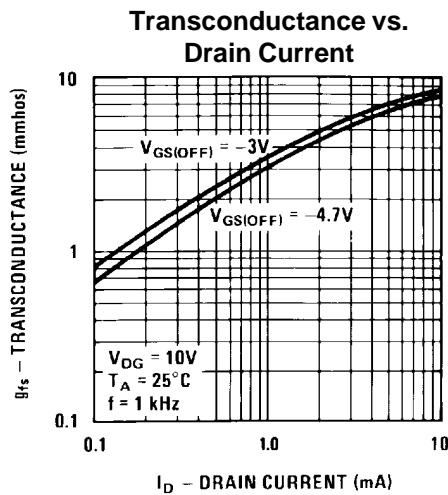
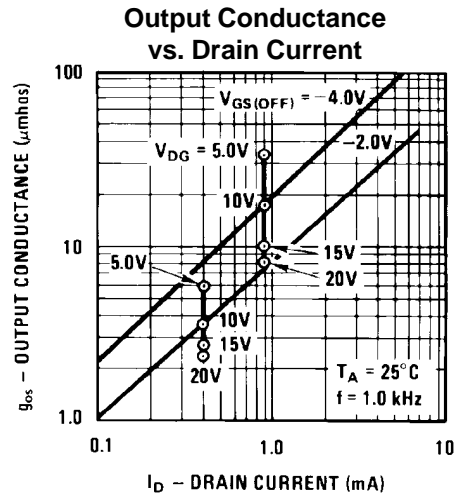
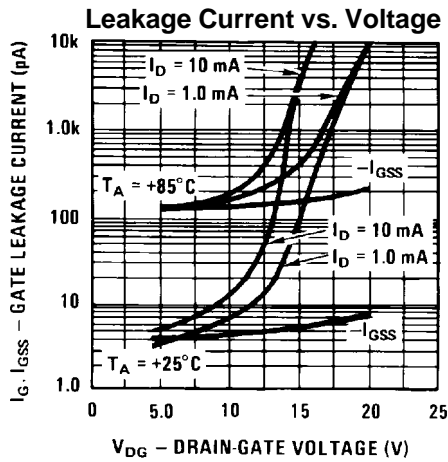
*Pulse Test: Pulse Width ≤ 300 ms, Duty Cycle $\leq 2\%$

NPDS5911 / NPDS5912

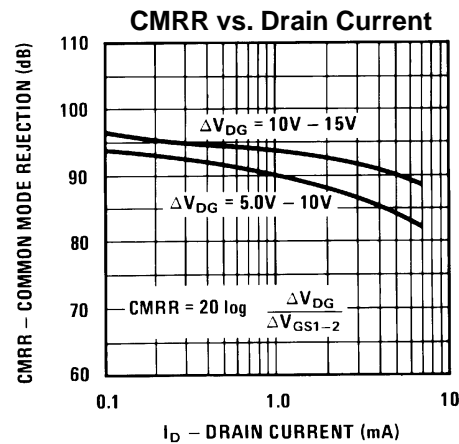
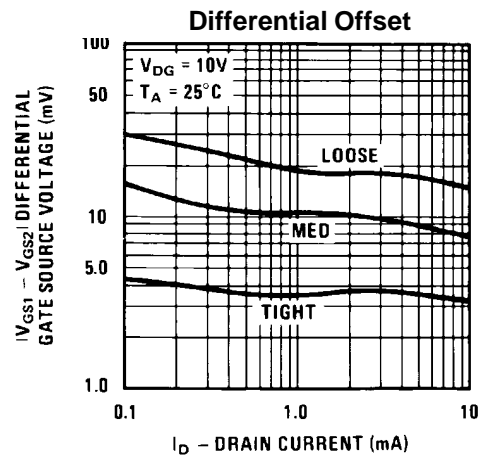
Typical Characteristics (continued)



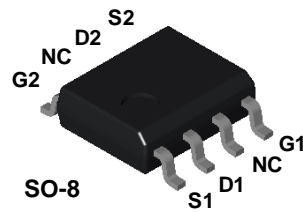
Typical Characteristics (continued)



Typical Characteristics (continued)



**NPDS8301
NPDS8302
NPDS8303**



N-Channel General Purpose Dual Amplifier

Sourced from Process 83.

Absolute Maximum Ratings*

TA = 25°C unless otherwise noted

Symbol	Parameter	Value	Units
V _{DG}	Drain-Gate Voltage	40	V
V _{GS}	Gate-Source Voltage	40	V
I _{GF}	Forward Gate Current	10	mA
T _J , T _{stg}	Operating and Storage Junction Temperature Range	-55 to +150	°C

*These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

NOTES:

- 1) These ratings are based on a maximum junction temperature of 150 degrees C.
- 2) These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

General Purpose Dual Amplifier

(continued)

Electrical Characteristics

TA = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Max	Units
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OFF CHARACTERISTICS

$V_{(BR)GSS}$	Gate-Source Breakdown Voltage	$I_G = 1.0 \mu A, V_{DS} = 0$	- 40		V
I_{GSS}	Gate Reverse Current	$V_{GS} = 20 V, V_{DS} = 0$		100	pA
$V_{GS(off)}$	Gate-Source Cutoff Voltage	$V_{DS} = 20 V, I_D = 1.0 nA$	- 0.5	- 3.5	V
V_{GS}	Gate-Source Voltage	$V_{DS} = 20 V, I_D = 200 \mu A$	- 0.3	- 3.5	V

ON CHARACTERISTICS

I_{DSS}	Zero-Gate Voltage Drain Current*	$V_{DS} = 20 V, V_{GS} = 0$	0.5	6.0	mA
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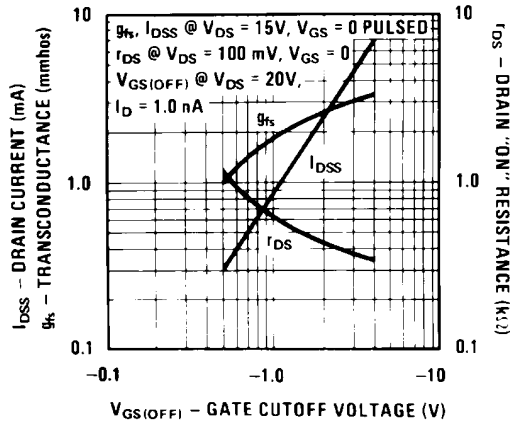
SMALL SIGNAL CHARACTERISTICS

g_{fs}	Common Source Forward Transconductance	$V_{DS} = 20 V, V_{GS} = 0, f = 1.0 kHz$ $V_{DS} = 20 V, I_D = 200 \mu A, f = 1.0 kHz$	1000 700	4000 1200	$\mu mhos$ $\mu mhos$
g_{oss}	Common Source Output Conductance	$V_{DS} = 20 V, I_D = 200 \mu A, f = 1.0 kHz$		20	$\mu mhos$
g_{os}	Common Source Output Conductance	$V_{DS} = 20 V, I_D = 200 \mu A, f = 1.0 kHz$		5.0	$\mu mhos$
$V_{GS1} - V_{GS2}$	Differential Match	$V_{DS} = 20 V, I_D = 200 \mu A$ NPDS8301 NPDS8302 NPDS8303		5.0 10 15	mV mV mV
$\Delta V_{GS1} - V_{GS2}$	Differential Drift	$V_{DS} = 20 V, I_D = 200 \mu A, T_A = 25 \text{ to } 85^\circ C$ NPDS8301 NPDS8302 NPDS8303		10 15 25	$\mu V/^\circ C$ $\mu V/^\circ C$ $\mu V/^\circ C$

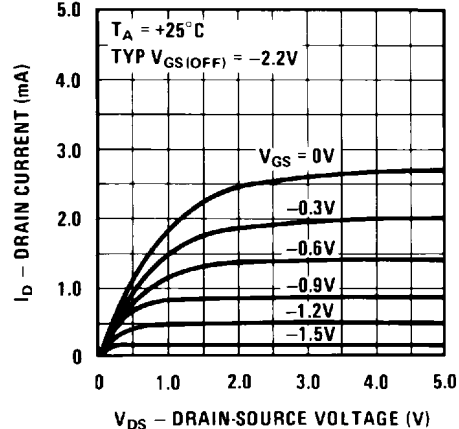
*Pulse Test: Pulse Width ≤ 300 ms, Duty Cycle $\leq 2\%$

Typical Characteristics

Parameter Interactions



Common Drain-Source



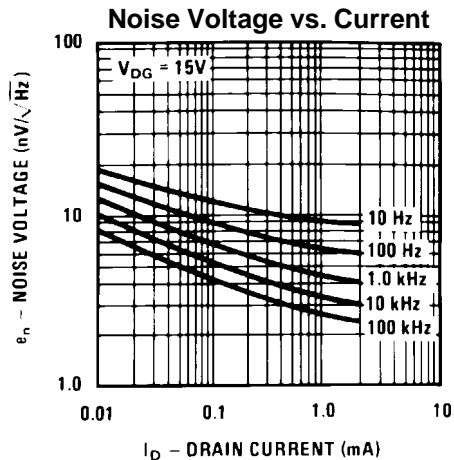
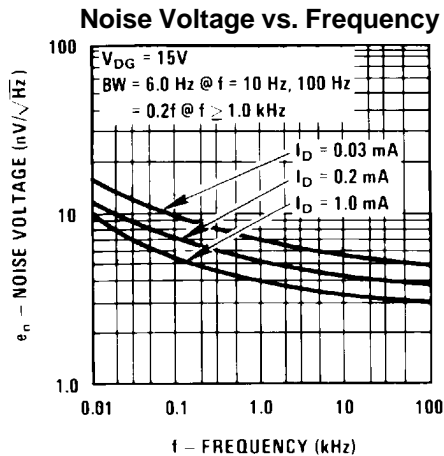
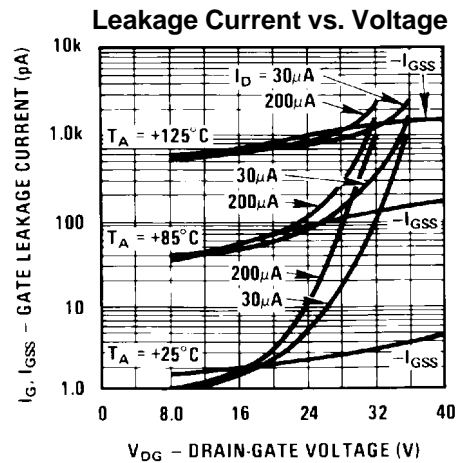
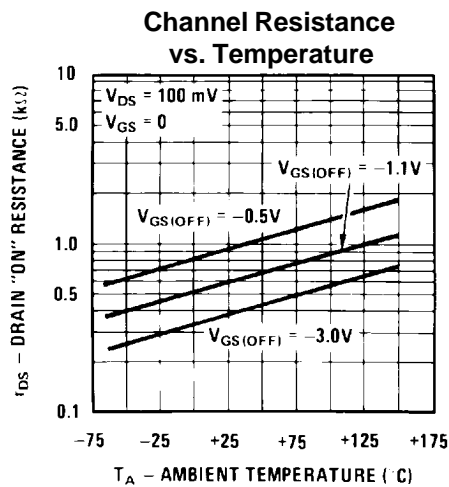
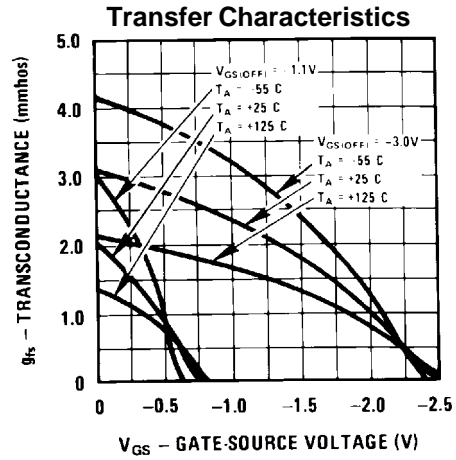
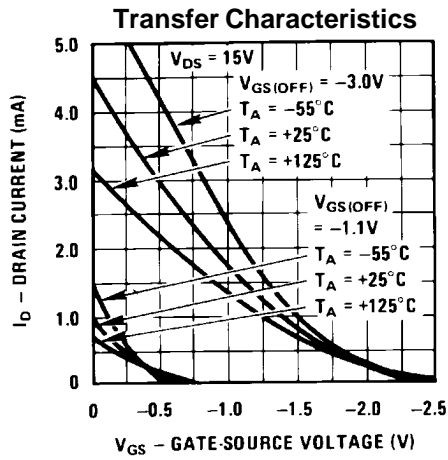
NPDS8301 / NPDS8302 / NPDS8303

General Purpose Dual Amplifier

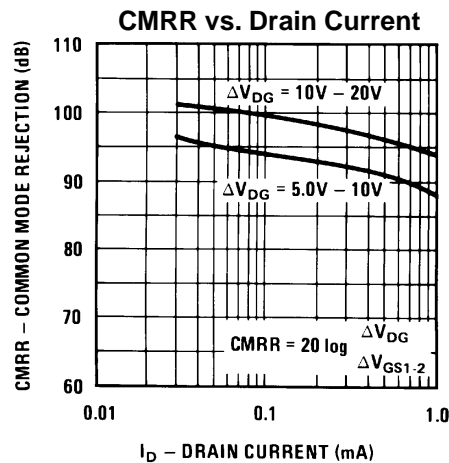
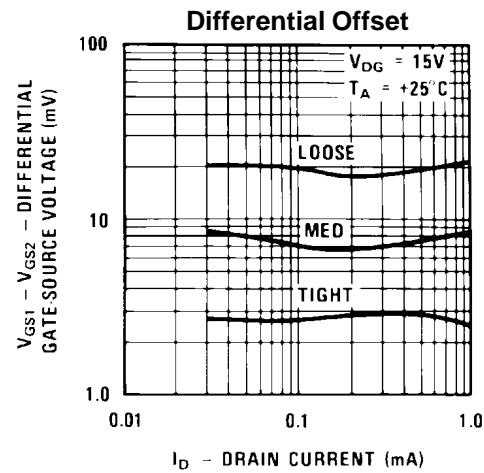
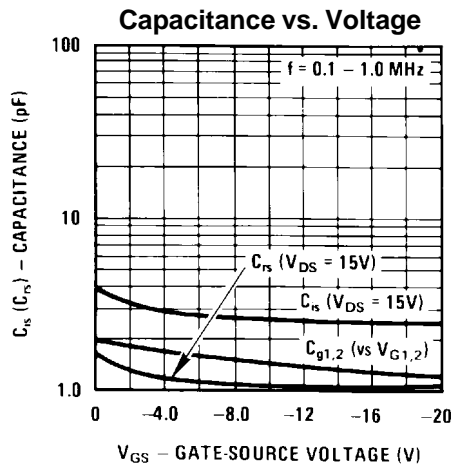
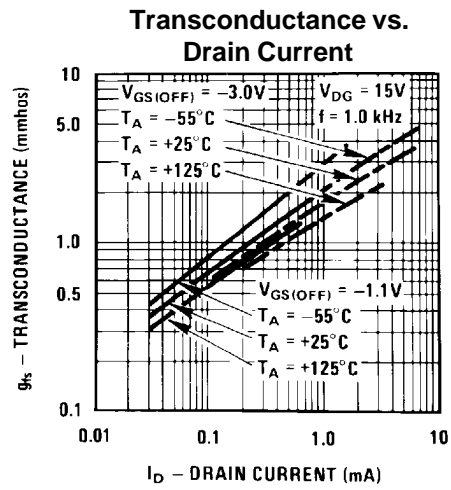
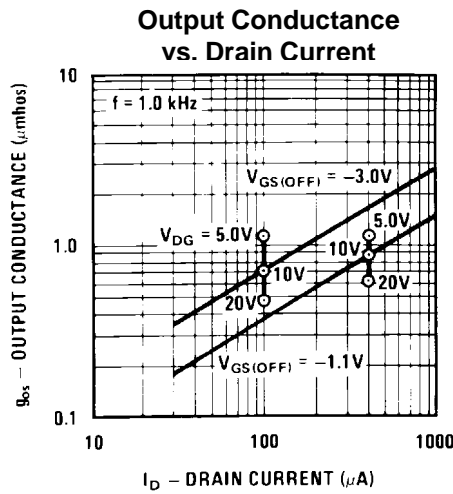
(continued)

NPDS8301 / NPDS8302 / NPDS8303

Typical Characteristics (continued)



Typical Characteristics (continued)



NPN EPITAXIAL

**MIN $h_{FE} = 750$ | $I_C = -1.5$ and $-2.0A$ DC
MONOLITHIC CONSTRUCTION WITH
BUILT-IN BASE-EMITTER RESISTORS**

- ### ABSOLUTE MAXIMUM RATINGS

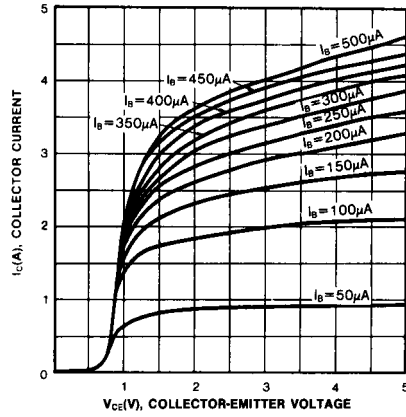
1. Emitter 2. Collector 3. Base



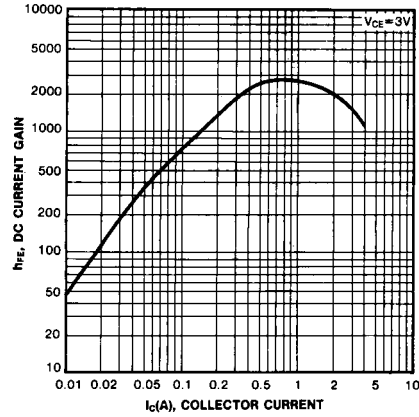
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NPN EPITAXIAL MJE800/801/803 SILICON DARLINGTON TRANSISTOR

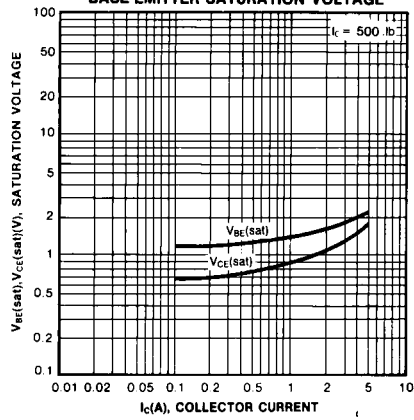
STATIC CHARACTERISTIC



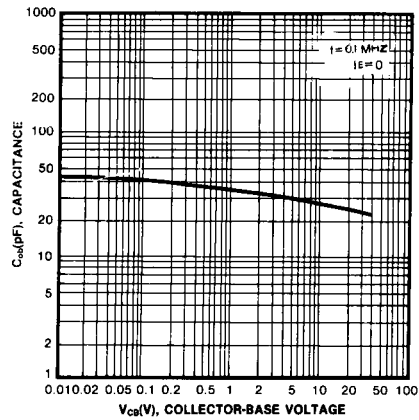
DC CURRENT GAIN



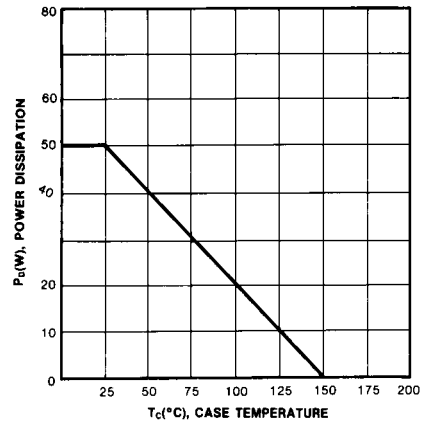
**COLLECTOR-EMITTER SATURATION VOLTAGE
BASE-EMITTER SATURATION VOLTAGE**



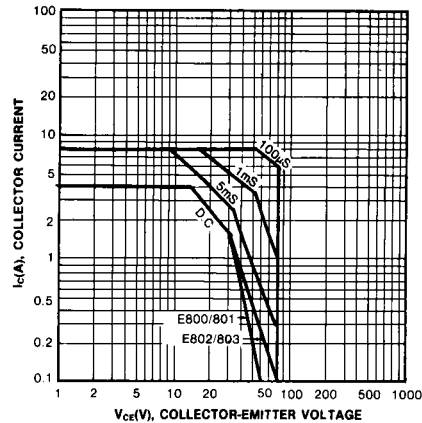
COLLECTOR OUTPUT CAPACITANCE



POWER DERATING



SAFE OPERATING AREA



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