

N-Channel Depletion-Mode MOSFET

Ordering Information

| BV _{DSX} / | R _{DS(ON)} | I _{DSS} | Order Number / Package | | | | Product marking for TO-243AA | | |
|---------------------|---------------------|------------------|------------------------|-----------|----------|--|----------------------------------|--|--|
| BV _{DGX} | (max) | (min) | TO-92 | TO-243AA* | Die | | LN1E* | | |
| 500V | 1.0KΩ | 1.0mA | LND150N3 | LND150N8 | LND150ND | | Where * = 2-week alpha date code | | |

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

Features

- ESD gate protection
- Free from secondary breakdown
- Low power drive requirement
- Ease of paralleling

ApplicationsSolid state relays

Converters

Normally-on switches

Power supply circuits

Constant current sources

Input protection circuits

Drain-to-Source Voltage

Drain-to-Gate Voltage

Gate-to-Source Voltage

Soldering Temperature*

- Excellent thermal stability
- Integral source-drain diode
- $\hfill\square$ High input impedance and low $C_{\rm ISS}$

Advanced DMOS Technology

The LND1 is a high voltage N-channel depletion mode (normallyon) transistor utilizing Supertex's lateral DMOS technology. The gate is ESD protected.

The LND1 is ideal for high voltage applications in the areas of normally-on switches, precision constant current sources, voltage ramp generation and amplification.

Package Options



* Distance of 1.6 mm from case for 10 seconds.

Operating and Storage Temperature

Absolute Maximum Ratings

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 $\mathsf{BV}_{\mathsf{DSX}}$

BV_{DGX} ±20V

300°C

-55°C to +150°C

Thermal Characteristics

| Package | I _D (continuous)* | l _p (pulsed) | Power Dissipation @T _A = 25°C | θ _{jc} °C/W | θ _{ja} °C/W | I _{DR} | I _{DRM} * |
|----------|------------------------------|-------------------------|---------------------------------------------|-------------------------|-------------------------|-----------------|--------------------|
| TO-92 | 30mA | 30mA | 0.74W | 125 | 170 | 30mA | 30mA |
| TO-243AA | 30mA | 30mA | 1.2W [†] | 15 | 78 [†] | 30mA | 30mA |

* I_{D} (continuous) is limited by max rated T_{f} .

† Mounted on FR4 Board, 25mm x 25mm x 1.57mm. Significant Pp increase possible on ceramic substrate.

Electrical Characteristics (@ 25°C unless otherwise specified)

| Symbol | Parameter | Min | Тур | Max | Unit | Conditions | | |
|----------------------|--------------------------------------------|-----|------|------|-------|-------------------------------------------------------------------|--|--|
| BV _{DSX} | Drain-to-Source Breakdown Voltage | | | | V | V _{GS} = -10V, I _D = 1.0mA | | |
| V _{GS(OFF)} | Gate-to-Source OFF Voltage | | | -3.0 | V | $V_{DS} = 25V, I_{D} = 100nA$ | | |
| $\Delta V_{GS(OFF)}$ | Change in $V_{GS(OFF)}$ with Temperature | | | 5.0 | mV/°C | $V_{DS} = 25V, I_{D} = 100nA$ | | |
| I _{GSS} | Gate Body Leakage Current | | | 100 | nA | $V_{GS} = \pm 20V, V_{DS} = 0V$ | | |
| I _{D(OFF)} | Drain-to-Source Leakage Current | | | 100 | nA | $V_{GS} = -10V, V_{DS} = 450V$ | | |
| | | | | 100 | μA | $V_{GS} = -10V$, $V_{DS} = 0.8V$ max rating $T_A = 125^{\circ}C$ | | |
| I _{DSS} | Saturated Drain-to-Source Current | 1.0 | | 3.0 | mA | $V_{GS} = 0V, V_{DS} = 25V$ | | |
| R _{DS(ON)} | Static Drain-to-Source ON-State Resistance | | 850 | 1000 | Ω | $V_{GS} = 0V, I_{D} = 0.5mA$ | | |
| $\Delta R_{DS(ON)}$ | Change in RDS(ON) with Temperature | | | 1.2 | %/°C | $V_{GS} = 0V, I_{D} = 0.5mA$ | | |
| G _{FS} | Forward Transconductance | | 2.0 | | mΩ | $V_{GS} = 0V, I_{D} = 1.0mA$ | | |
| C _{ISS} | Input Capacitance | | 7.5 | 10 | | | | |
| C _{OSS} | Output Capacitance | | 2.0 | 3.5 | pF | $V_{GS} = -10V, V_{DS} = 25V$ | | |
| C _{RSS} | Reverse Transfer Capacitance | | 0.5 | 1.0 | | | | |
| t _{d(ON)} | Turn-ON Delay Time | | 0.09 | | | | | |
| tr | Rise Time | | 0.45 | | | $V_{DD} = 25V, I_D = 1.0mA,$ $R_{GEN} = 25\Omega$ | | |
| t _{d(OFF)} | Turn-OFF Delay Time | | 0.1 | | μs | | | |
| t _f | Fall Time | | 1.3 | | | | | |
| V _{SD} | Diode Forward Voltage Drop | | | 0.9 | V | V _{GS} = -10V, I _{SD} = 1.0mA | | |
| t _{rr} | Reverse Recovery Time | | 200 | | ns | V _{GS} = -10V, I _{SD} = 1.0mA | | |

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







Power Dissipation vs. Ambient Temperature



Thermal Response Characteristics



Typical Performance Curves









Capacitance vs. Drain-to-Source Voltage





 I_D vs. R_{SOURCE} 1.4 P 1.2 25° Ċ ± LND1 25°C 1.0 I_D (milliamps) R_{SOURCE} 0.8 0.6 0.4 0.2 0.0 100 10 1K 10K 100K R_{SOURCE} (ohms)

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



Gate Drive Dynamic Characteristics



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