



**LinearDimensions**  
SEMICONDUCTOR

**LND820/821/822/823**

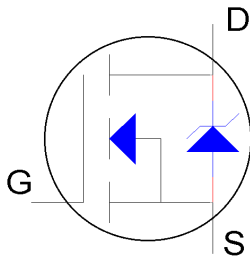
**POWER MOSFET**

## GENERAL DESCRIPTION

The LND820 series provides the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.

The TO-220 package is universally preferred for all commercial-industrial applications at power dissipation levels to approximately 50 watts. The low thermal resistance and low package cost of the TO-220 contribute to its wide acceptance throughout the industry.

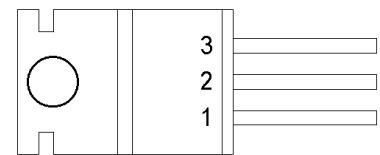
## SYMBOL



## FEATURES

- $V_{DSS} = 450V-500V$
- $R_{DS(on)} = 3.0 \Omega-4.0 \Omega$
- $I_D = 2.2A$  and  $2.5A$
- Dynamic  $dv/dt$  Rating
- Repetitive Avalanche rated
- Fast Switching
- Ease of Paralleling
- Simple Drive Requirement

## PIN DIAGRAM



TO-220



## ABSOLUTE MAXIMUM RATING

Symbol	Parameter	Max	Units
$I_D@T_C=25^{\circ}\text{C}$	Continuous Drain Current, $V_{GS}$ @ 10V	2.5	A
$I_D@T_C=100^{\circ}\text{C}$	Continuous Drain Current, $V_{GS}$ @ 10V	1.6	
$I_{DM}$	Pulsed Drain Current(1)	8.0	
$P_D @T_C=25^{\circ}\text{C}$	Power Dissipation	50	W
$I_D@T_C=25^{\circ}\text{C}$	Linear Derating Factor	0.40	W/ $^{\circ}\text{C}$
$V_{GS}$	Gate-to-Source Voltage	$\pm 20$	V
$E_{AS}$	Single Pulse Avalanche Energy(2)	210	mJ
$I_{AR}$	Avalanche Current (1)	2.5	A
$E_{AR}$	Repetitive Avalanche Energy (1)	5.0	mJ
dv/dt	Peak Diode Recovery dv/dt(3)	3.5	V/ns
$T_J$ $T_{STG}$	Operating Junction and Storage temperature Range	-55 to +150	$^{\circ}\text{C}$
	Soldering Temperature, for 10 seconds	300 (1.6mm from case)	

## THERMAL RESISTANCE

Symbol	Parameter	Min	Typ	Max	Units
$R_{\theta JC}$	Junction-to-case	-	-	2.5	$^{\circ}\text{C}/\text{W}$
$R_{\theta CS}$	Case-to-Sink, Flat, Greased Surface	-	0.50	-	
$R_{\theta JA}$	Junction-to-Ambient	-	-	62	



## ELECTRICAL CHARACTERISTICS

(T<sub>C</sub>=25°C unless otherwise specified)

Symbol	Parameter	Conditions	Min	Typ	Max	Units	
V <sub>(BR)DSS</sub>	Drain-to-source Breakdown Voltage	LND-820/822	V <sub>GS</sub> =0V, I <sub>D</sub> = 250μA	500	-	-	V
		LND821/823		450			
ΔV <sub>(BR)DSS</sub> / ΔT <sub>J</sub>	Breakdown Voltage Temp. Coefficient		Reference to 25°C I <sub>D</sub> =1mA	-	0.59	-	V/°C
I <sub>D(on)</sub>	On-State Drain Current(Note 2)	LND820/821	V <sub>GS</sub> > I <sub>D(on)</sub> x R <sub>DS(on)Max</sub> , V <sub>GS</sub> =10V	2.5	-	-	A
		LND821/823		2.2			
R <sub>DS(ON)</sub>	Static Drain-to-Source On-Resistace	LND820/821	V <sub>GS</sub> = 0V, I <sub>D</sub> = 1.5A(4)			3.0	Ω
		LND822/823				4.0	
V <sub>GS(th)</sub>	Gate Threshold Voltage		V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	2.0	-	4.0	V
g <sub>fs</sub>	Forward Transconductance		V <sub>DS</sub> =50V, I <sub>D</sub> = 1.5A(4)	1.5	-	-	S
I <sub>DSS</sub>	Drain-to-source Leakage Current (T <sub>C</sub> =125°C)		V <sub>DS</sub> =500V, V <sub>GS</sub> = 0V	-		25	μA
			V <sub>DS</sub> = 400V, V <sub>GS</sub> = 0V	-		250	μA
I <sub>GSS</sub>	Gate-to-Source Forward Leakage		V <sub>GS</sub> = -20V	-	-	100	nA
	Gate-to-Source Reverse Leakage		V <sub>GS</sub> = -20V	-	-	-100	
Q <sub>g</sub>	Total Gate Charge		I <sub>D</sub> =2.1A V <sub>DS</sub> =400V V <sub>GS</sub> = 10V (4)	-	-	24	nC
Q <sub>qs</sub>	Gate-to-Source Charge			-	-	3.3	
	Gate-to-drain("Miller") Charge			-	-	13	
t <sub>d(on)</sub>	Turn-on Delay Time		V <sub>DD</sub> = 250V		8.0		ns
t <sub>r</sub>	Rise time		I <sub>D</sub> = 2.1A	-	8.6		
t <sub>d(off)</sub>	Turn-off Delay time		R <sub>G</sub> = 18Ω	-	33		
t <sub>f</sub>	Fall time		R <sub>D</sub> = 100Ω (4)	-	16		
L <sub>D</sub>	Internal Drain Inductance		Between lead 6mm (0.25 in.)	-	4.5		nH
L <sub>S</sub>	Input Source Inductance		From package and center of die contact	-	7.5		
C <sub>iss</sub>	Input Capacitance		V <sub>GS</sub> = 0V V <sub>DS</sub> = 25V F = 1.0 MHz	-	360		pF
C <sub>oss</sub>	Output Capacitance			-	92		
C <sub>rss</sub>	Reverse Transfer Capacitance			-	37		



## SOURCE-DRAIN RATING AND CHARACTERISTICS

Symbol	Parameter	Conditions	Min	Typ	Max	Units
$I_S$	Continuous Source Current	MOSFET symbol showing the integral reverse p-n junction diode	-	-	2.5	A
$I_{SM}$	Pulsed Source Current (Body Diode) (1)		-	-	8.0	
$V_{SD}$	Diode Forward Voltage	$T_J=25^{\circ}\text{C}$ , $I_S=2.5\text{A}$ , $V_{GS}=0\text{V}$ (4)	-	-	1.6	V
$t_{rr}$	Reverse Recovery Time	$T_J=25^{\circ}\text{C}$ , $I_F=2.1\text{A}$ , $di/dt=100\text{A}/\mu\text{s}$ (4)	-	-	520	nS
$Q_{rr}$	Reverse Recovery Charge		-	0.70	1.4	$\mu\text{C}$
$t_{ON}$	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by $L_S+L_D$ )				

Notes : 1 : Repetitive rating : pulse width limited by max. junction temperature

2 :  $V_{DD}=50\text{V}$ , starting  $T_J=25^{\circ}\text{C}$ ,  $L=60\text{mH}$   $R_G=25\Omega$ ,  $I_{AS}=2.5\text{A}$

3 :  $I_{SD} \leq 2.5\text{A}$ ,  $di/dt \leq 50\text{ A}/\mu\text{s}$ ,  $V_{DD} \leq V_{(BR)DSS}$ ,  $T_J \leq 150^{\circ}\text{C}$

4 : Pulse width  $\leq 300\mu\text{s}$ ; duty cycle  $\leq 2\%$