

Description

The PNM6N03R9L uses advanced trench technology to provide excellent $R_{DS(on)}$, low gate charge. This device is suitable for use as a load switch or in PWM applications.

MOSFET Product Summary

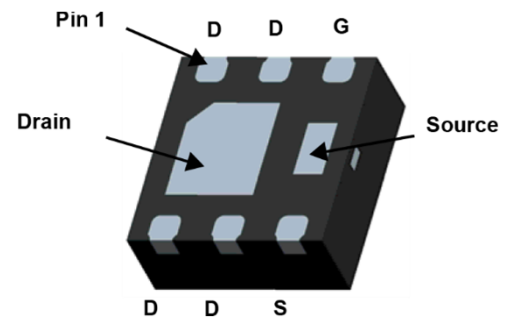
$V_{DS}(V)$	$R_{DS(on)}(m\Omega)(Typ)$	$I_D(A)$
30	6.9@ $V_{GS} = 10V$	18
	7.2@ $V_{GS} = 4.5V$	

Feature

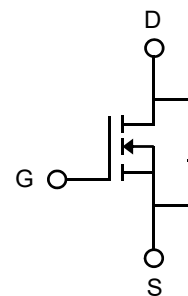
- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package

Applications

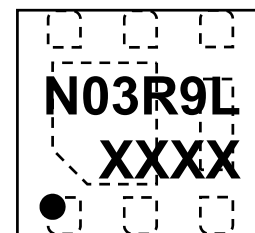
- PWM applications
- Load switch
- Power management
- DC-DC Converters
- Wireless Chargers



**DFN2020-6L
(Bottom View)**



Circuit Diagram



**Pin1
Marking (Top View)**

Absolute maximum rating@25°C

Rating		Symbol	Value	Units
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	± 16	V
Drain Current-Continuous ¹⁾	$T_C = 25^\circ C$	I_D	18	A
	$T_C = 100^\circ C$		12	
Pulsed Drain Current ²⁾		I_{DM}	72	A
Total Power Dissipation ³⁾		P_D	4.4	W
Avalanche Current ⁴⁾		I_{AS}	16	A
Avalanche Energy ⁴⁾		E_{AS}	64	mJ
Thermal Resistance , Junction-to-Case ⁵⁾		$R_{\theta JC}$	28.6	$^\circ C/W$
Thermal Resistance , Junction-to-Ambient ⁶⁾		$R_{\theta JA}$	51.9	$^\circ C/W$
Junction and Storage Temperature Range		T_J, T_{STG}	-55~+150	$^\circ C$

Electrical characteristics per line@25°C (unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0V, I _D = 250μA	30	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 30V, V _{GS} = 0V	-	-	1.0	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} = ±16V, V _{DS} = 0V	-	-	±100	nA
On Characteristics						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	0.5	0.8	1.1	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} = 10V, I _D = 8A	-	6.9	9.0	mΩ
		V _{GS} = 4.5V, I _D = 6A	-	7.2	13	
		V _{GS} = 2.5V, I _D = 7.2A	-	8.8	16	
		V _{GS} = 1.8V, I _D = 3.5A	-	13.5	20	
Dynamic Characteristics ⁶⁾						
Input Capacitance	C _{iss}	V _{DS} = 15V, V _{GS} = 0V, f = 1.0MHz	-	1370	-	pF
Output Capacitance	C _{oss}		-	114	-	
Reverse Transfer Capacitance	C _{rss}		-	97	-	
Switching Characteristics ⁶⁾						
Turn-on Delay Time	t _{d(on)}	V _{DS} = 15V, V _{GS} = 10V, R _G = 3Ω, I _D = 8A	-	3.2	-	ns
Turn-on Rise Time	t _r		-	4.2	-	
Turn-Off Delay Time	t _{d(off)}		-	51	-	
Turn-Off Fall Time	t _f		-	20	-	
Total Gate Charge	Q _g	V _{DS} = 15V, V _{GS} = 10V, I _D = 8A	-	31	-	nC
Gate-Source Charge	Q _{gs}		-	1.7	-	
Gate-Drain Charge	Q _{gd}		-	7.2	-	
Gate Resistance	R _g	V _{GS} =0V, V _{DS} =0V, f=1MHz	-	2.9	-	Ω
Drain-Source Diode Characteristics						
Diode Forward Voltage	V _{SD}	V _{GS} = 0V, I _S = 2A	-	0.7	1.2	V

Notes:

1. Computed continuous current assumes the condition of T_{J_Max} while the actual continuous current depends on the thermal & electro-mechanical application board design.
2. Repetitive Rating: Pulse width limited by maximum junction temperature($T_{J_Max}=150^\circ C$).
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. This single-pulse measurement was taken under the following condition ($L=0.5mH, V_{GS}=10V, V_{DS}=30V$)while it's value is limited by $T_{J_Max}=150^\circ C$.
5. Device mounted on infinite heatsink.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum square copper pad layout.
7. Guaranteed by design, not subject to production.

Typical Characteristics

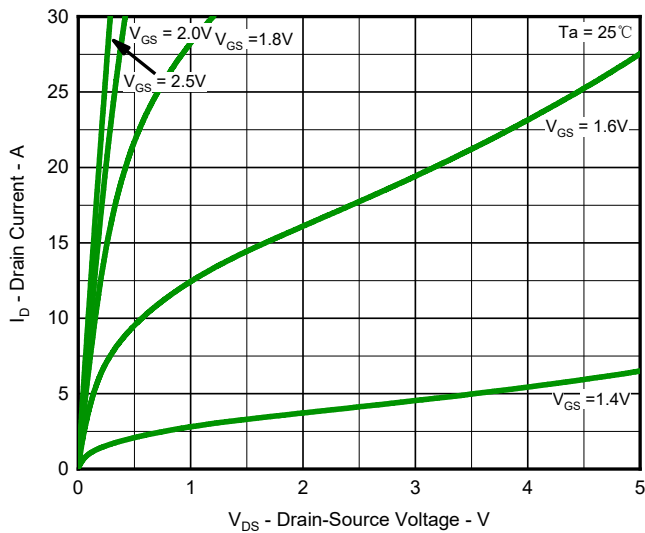


Fig.1 Output Characteristics

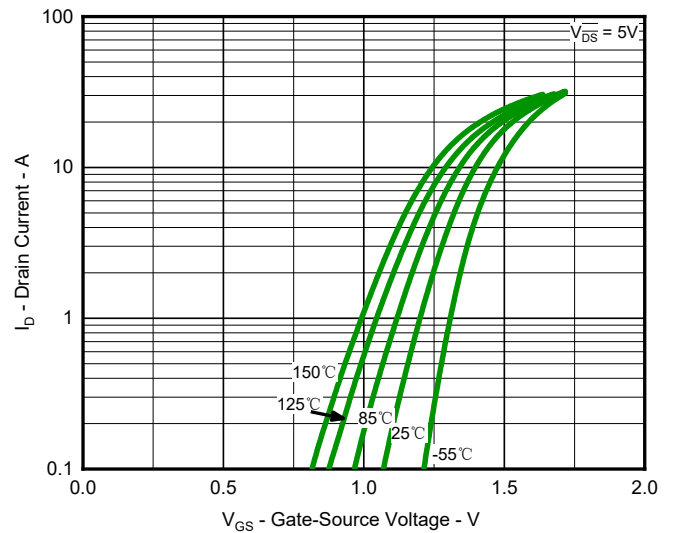


Fig.2 Typical Transfer Characteristic

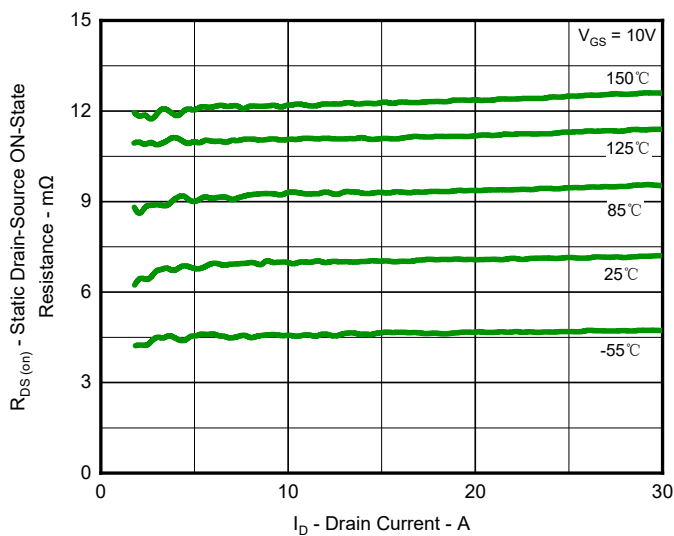


Fig.3 Typical On-Resistance vs Drain Current and Temperature

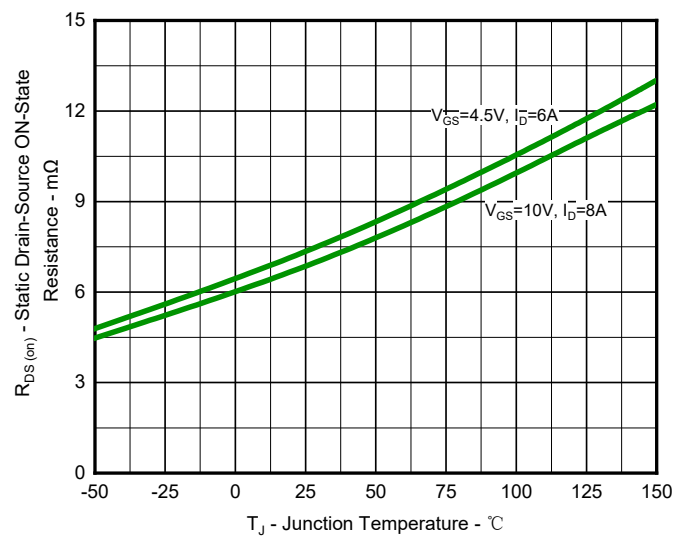


Fig.4 On-Resistance Variation with Temperature

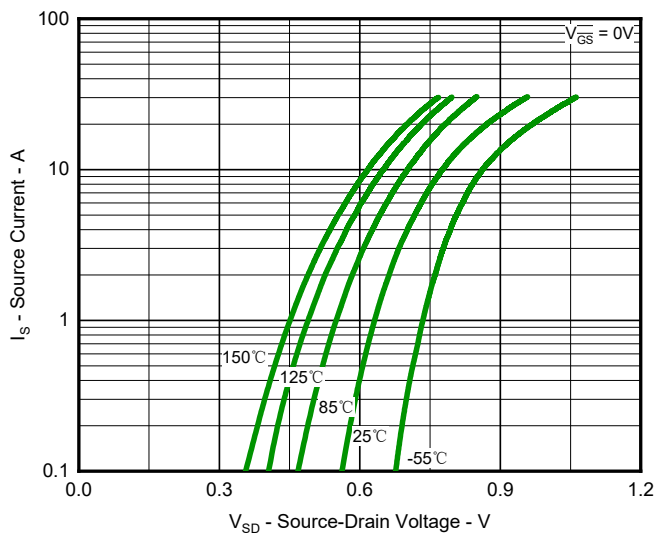


Fig.5 Diode Forward Voltage vs. Current

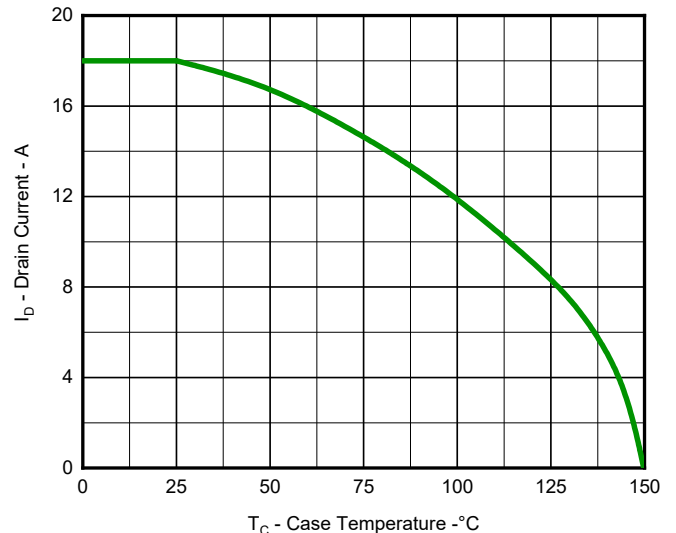
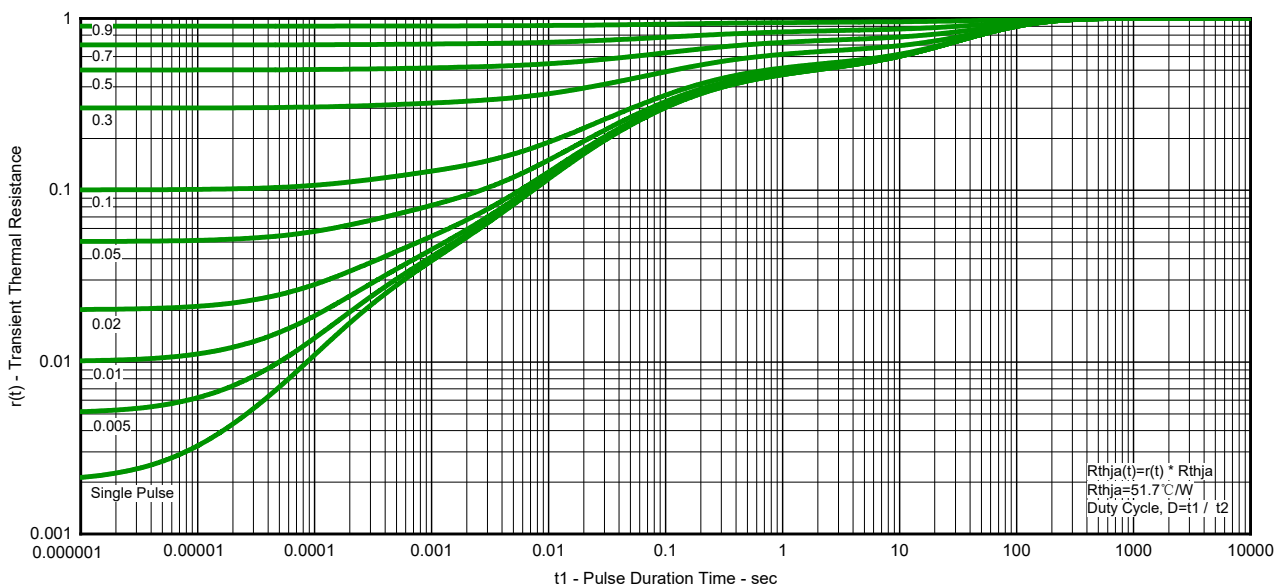
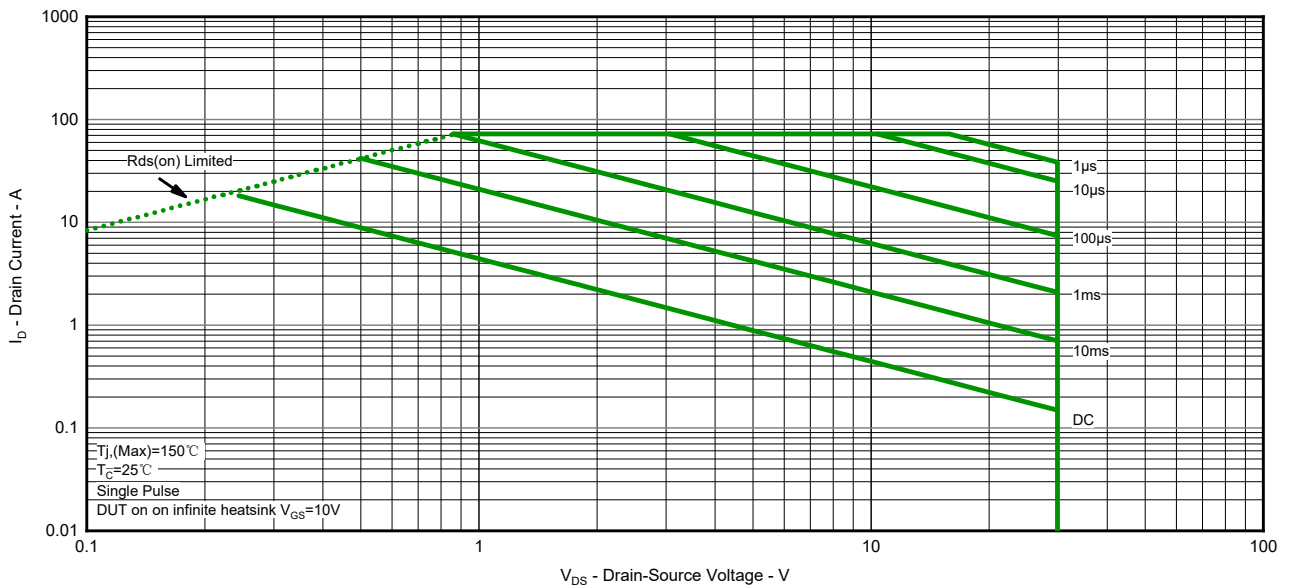
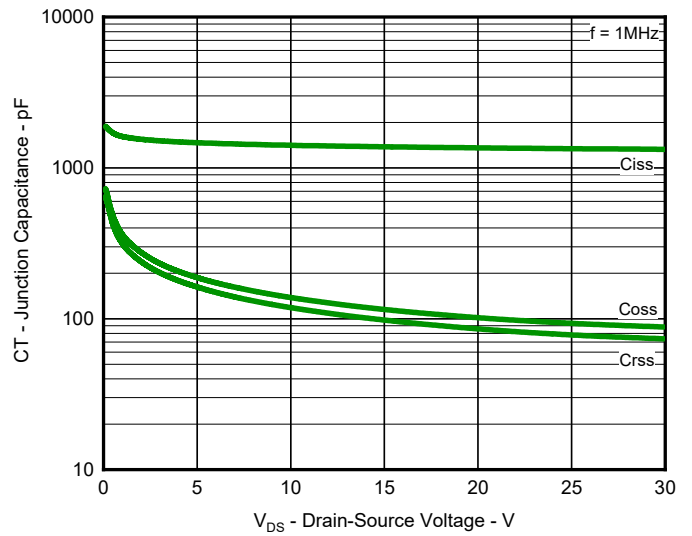
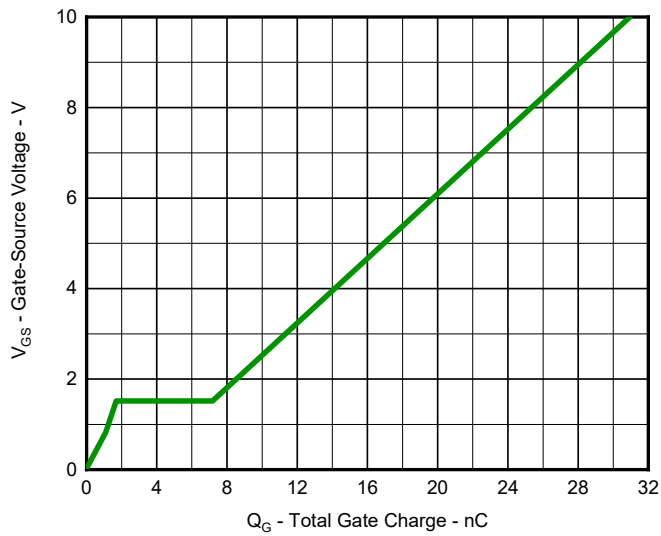
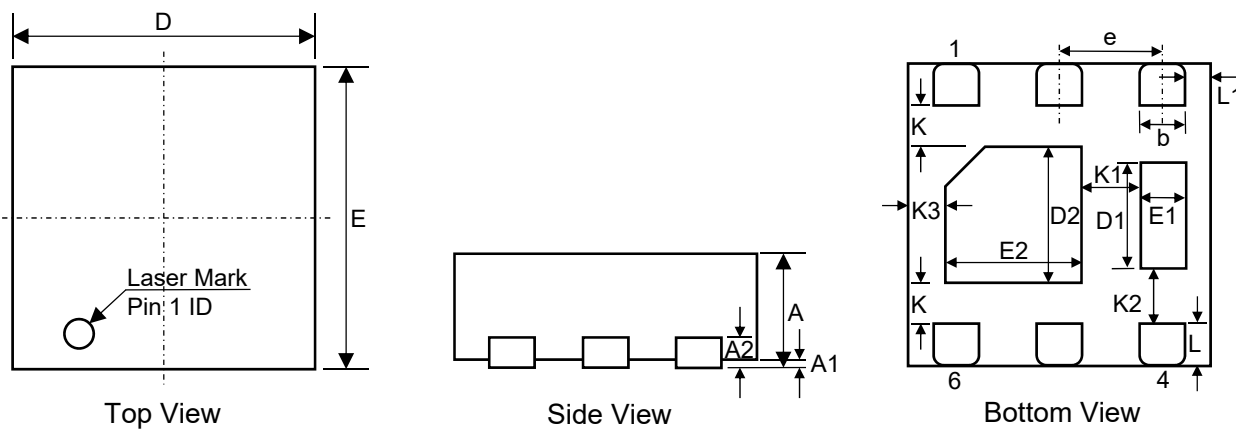


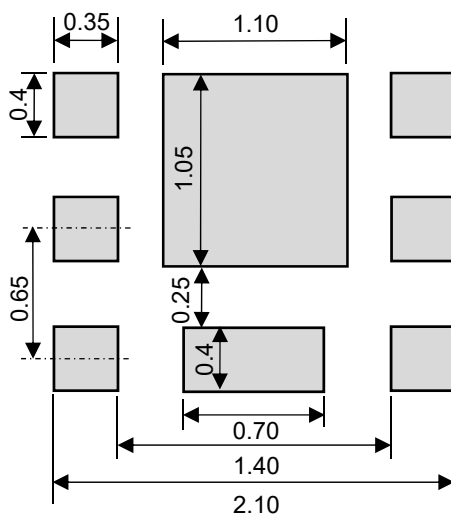
Fig.6 Maximum Drain Current vs. Case Temperature



Product Dimension (DFN2020-6L)



Dim	Millimeters		Inches		Dim	Millimeters		Inches	
	Min	Max	Min	Max		Min	Max	Min	Max
A	0.50	0.60	0.028	0.031	E2	0.80	1.00	0.031	0.039
A1	0.00	0.05	0.000	0.002	e	0.65 BSC.		0.026 BSC.	
A2	0.152 Ref.		0.006 Ref.		K	0.275 Ref.		0.011 Ref.	
b	0.25	0.35	0.010	0.014	K1	0.35 Ref.		0.014 Ref.	
D	1.90	2.10	0.075	0.083	K2	0.47 Ref.		0.019 Ref.	
D1	0.46	0.66	0.018	0.026	K3	0.25 Ref.		0.010 Ref.	
D2	0.85	1.05	0.033	0.041	L	0.20	0.30	0.008	0.012
E	1.90	2.10	0.075	0.083	L1	0.20 Ref.		0.008 Ref.	
E1	0.20	0.40	0.008	0.016					



Suggested PCB Layout

Unit: mm

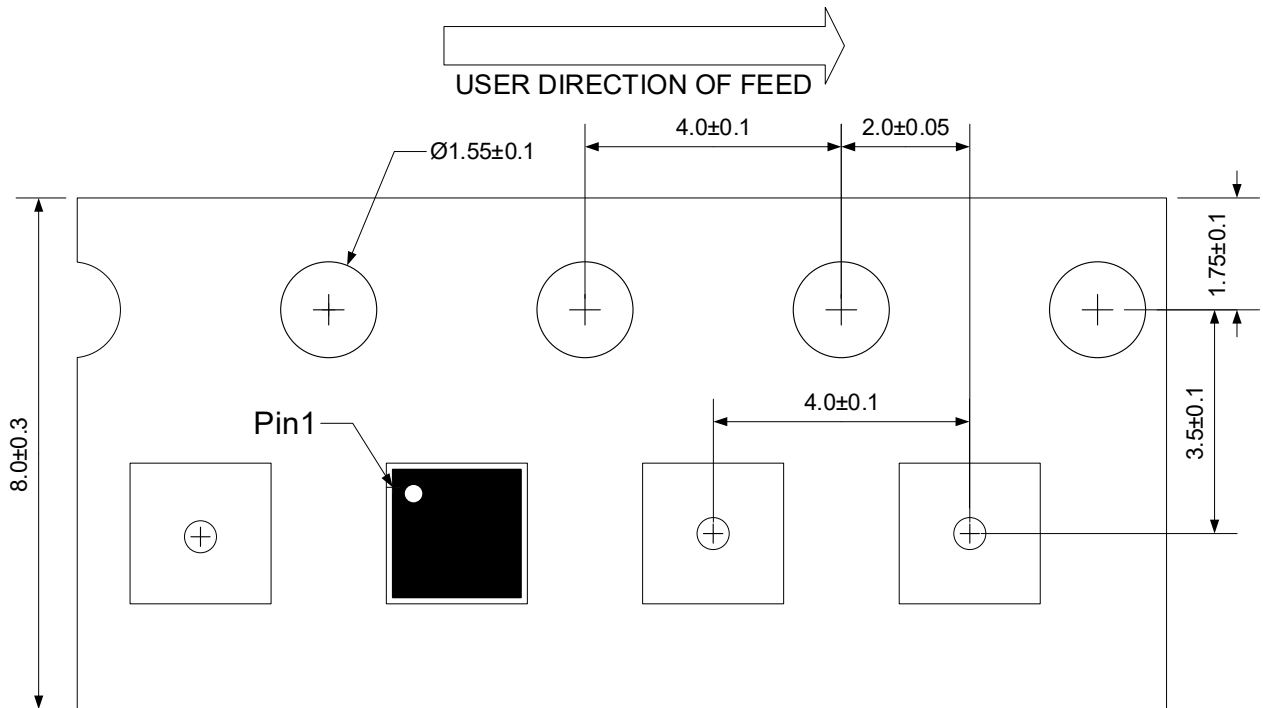
N-Channel MOSFET

PNM6N03R9L

Ordering Information

Package	Reel	Shipping
DFN2020-6L	7"	3000 / Tape & Reel

Load With Information



Unit:mm

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