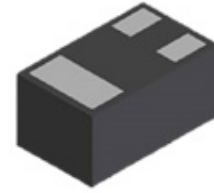
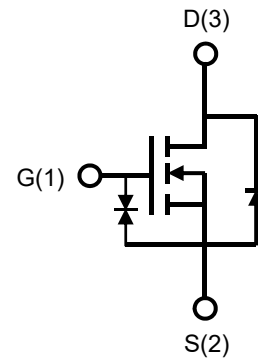


Description

The PNM3FD20V1EL uses split gate trench technology to provide excellent $R_{DS(on)}$ low gate charge. This device is suitable for power management and high efficiency applications at high switching frequencies applications.



**DFN1006-3L
(Bottom View)**



Circuit Diagram



Marking (Top View)

MOSFET Product Summary		
$V_{DS}(V)$	$R_{DS(on)}(m\Omega)$	$I_D(A)$
20	145 @ $V_{GS} = 4.5V$	1.2
	173 @ $V_{GS} = 2.5V$	

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

Absolute maximum rating@25°C

Rating		Symbol	Value	Units
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	± 8	V
Drain Current-Continuous ¹⁾	$T_C=25^\circ C$	I_D	1.2	A
	$T_C=100^\circ C$		0.8	
Pulsed Drain Current ²⁾		I_{DM}	4.0	A
Total Power Dissipation ³⁾		P_D	0.5	W
Thermal Resistance , Junction-to-Case ⁴⁾		$R_{\theta JC}$	22.5	$^\circ C/W$
Thermal Resistance , Junction-to-Ambient ⁴⁾		$R_{\theta JA}$	100	$^\circ C/W$
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}	$V_{GS} = 0V, I_D = 250\mu A$	20	23.7	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 20V, V_{GS} = 0V$	-	-	1.0	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS} = \pm 8V, V_{DS} = 0V$	-	-	± 10	μA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	0.45	0.66	0.9	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS} = 4.5V, I_D = 0.65A$	-	145	250	m Ω
		$V_{GS} = 2.5V, I_D = 0.45A$	-	173	300	
		$V_{GS} = 1.8V, I_D = 0.25A$	-	216	450	
Dynamic Characteristics⁵⁾						
Input Capacitance	C_{iss}	$V_{DS} = 10V, V_{GS} = 0V,$ $f = 1.0MHz$	-	16	-	pF
Output Capacitance	C_{oss}		-	15.6	-	
Reverse Transfer Capacitance	C_{rss}		-	4.1	-	
Switching Characteristics⁵⁾						
Turn-on Delay Time	$t_{d(on)}$	$V_{DS} = 6V, V_{GS} = 4.5V,$ $R_G = 50\Omega, R_L = 12\Omega,$ $I_D = 0.5A$	-	121.4	-	ns
Turn-on Rise Time	t_r		-	322.7	-	
Turn-Off Delay Time	$t_{d(off)}$		-	1086.7	-	
Turn-Off Fall Time	t_f		-	910.7	-	
Total Gate Charge	Q_g	$V_{DS} = 10V, V_{GS} = 4.5V,$ $I_D = 0.5A$	-	0.8	-	nC
Gate-Source Charge	Q_{gs}		-	0.2	-	
Gate-Drain Charge	Q_{gd}		-	0.3	-	
Drain-Source Diode Characteristics						
Diode Forward Voltage	V_{SD}	$V_{GS} = 0V, I_S = 0.1A$	-	0.75	1.0	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. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper pad layout.
5. Guaranteed by design, not subject to production.

Typical Characteristics

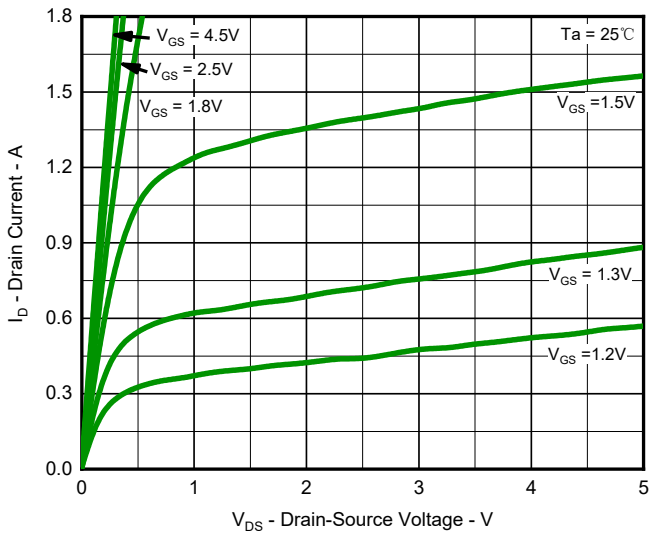


Fig.1 Output Characteristics

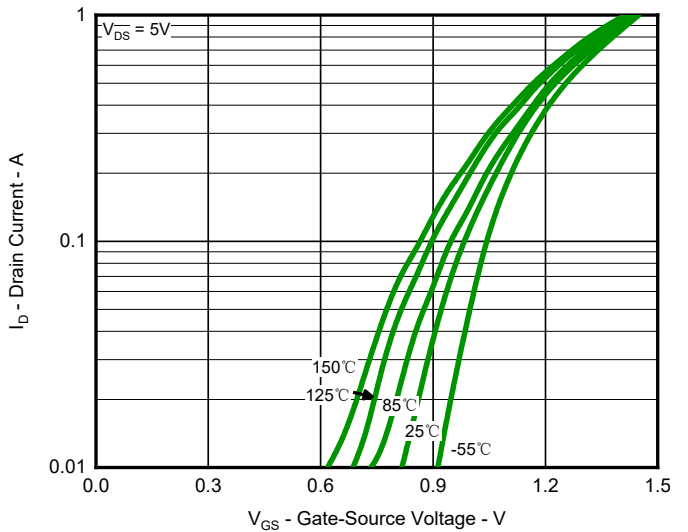


Fig.2 Typical Transfer Characteristic

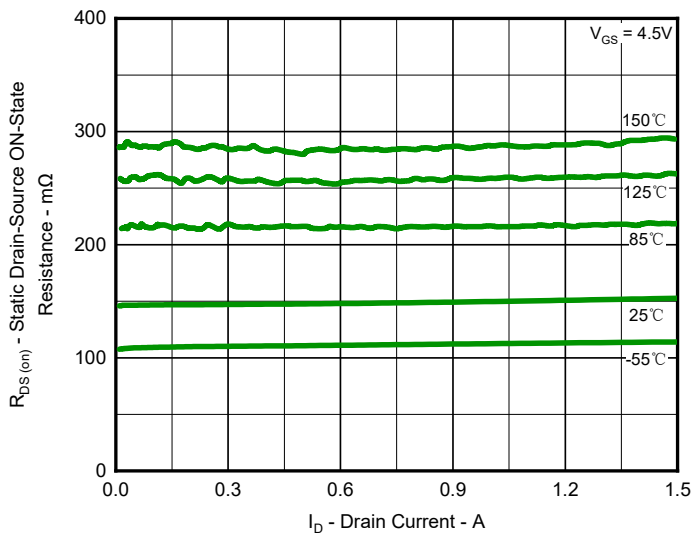


Fig.3 Typical On-Resistance vs Drain Current and Temperature

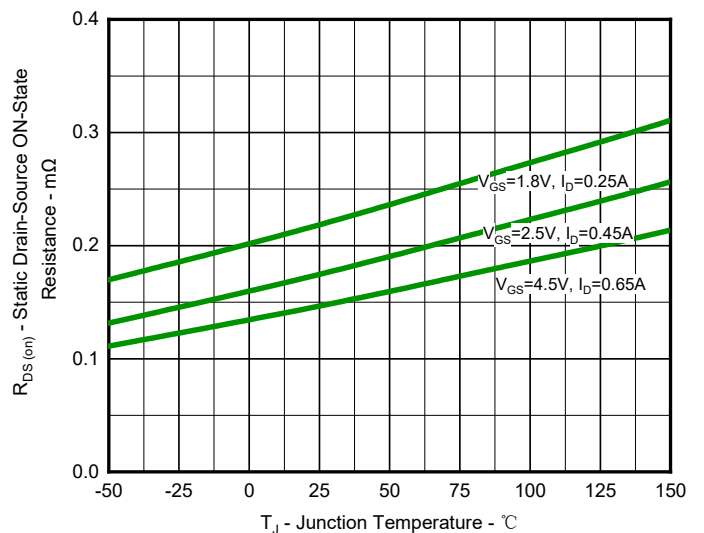


Fig.4 On-Resistance Variation with Temperature

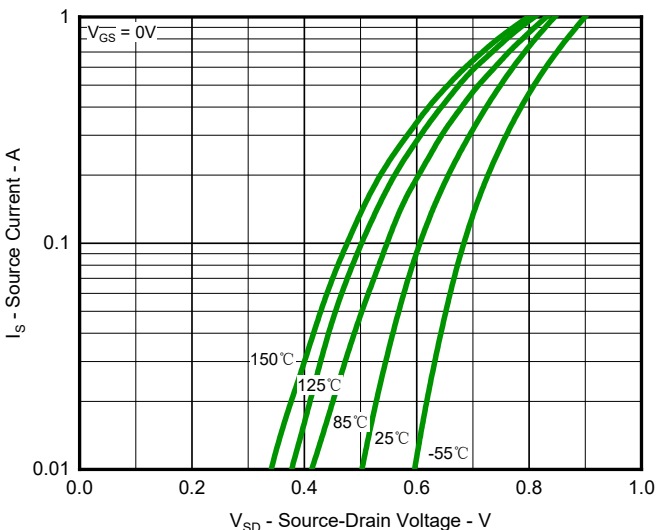


Fig.5 Diode Forward Voltage vs. Current

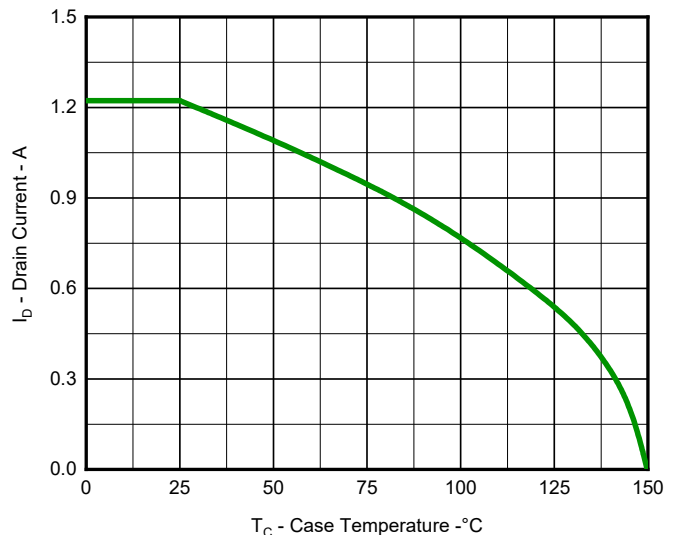


Fig.6 Maximum Drain Current vs. Case Temperature

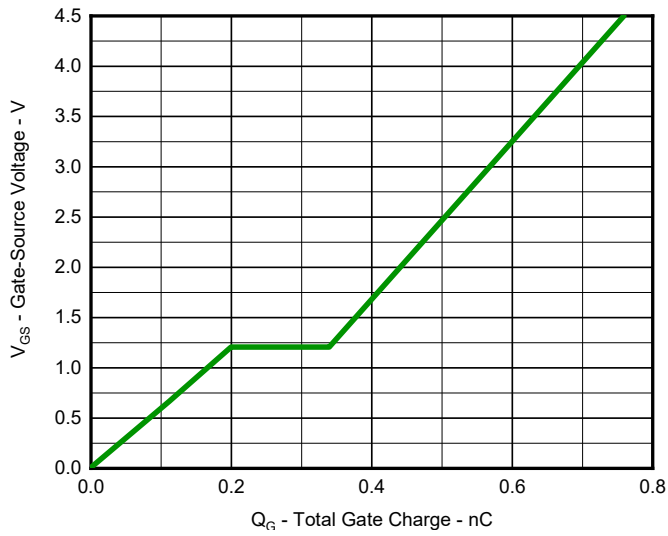


Fig.7 Gate Charge Characteristics

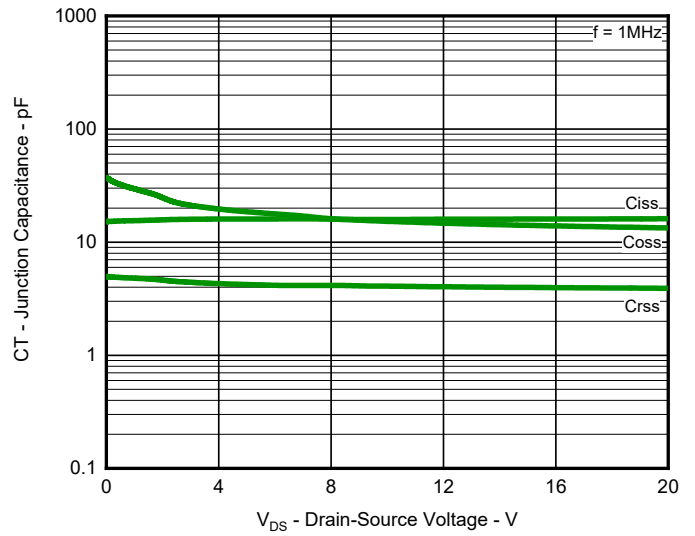


Fig.8 Typical Junction Capacitance

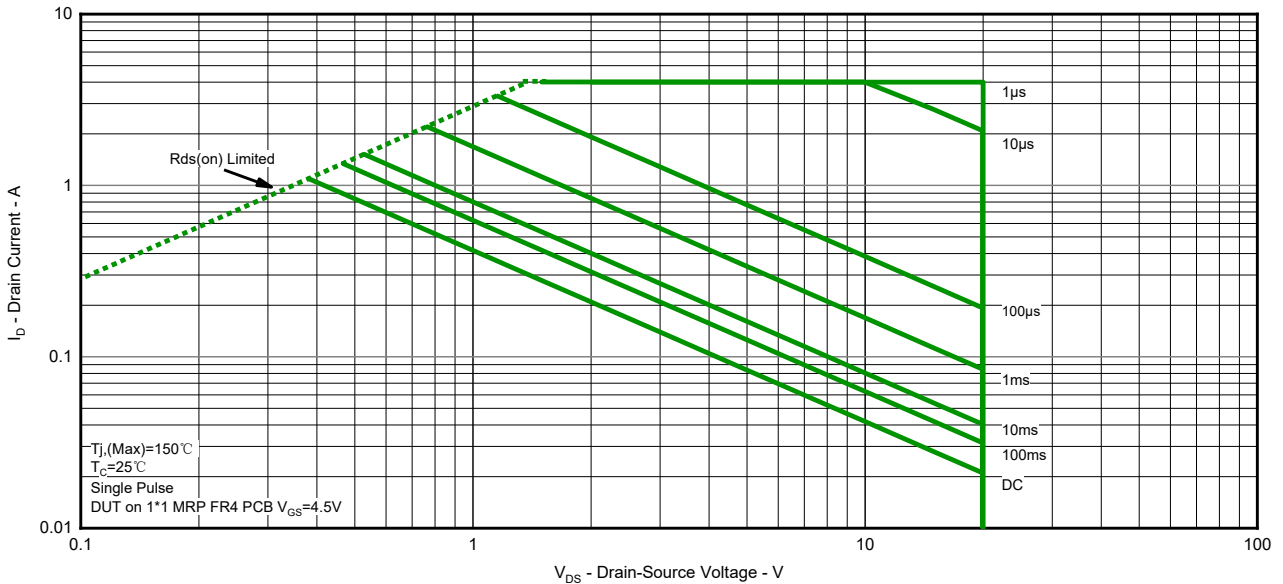


Fig.9 Safe Operation Area

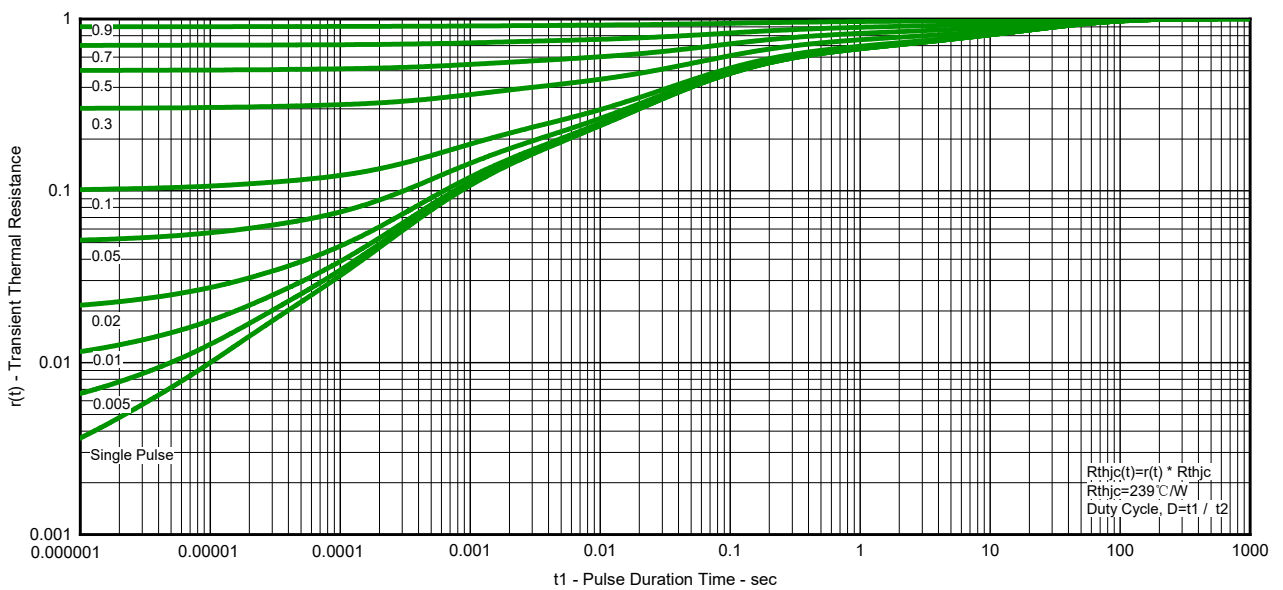
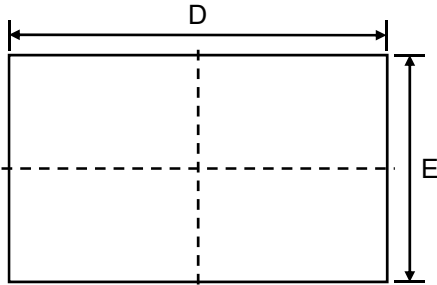
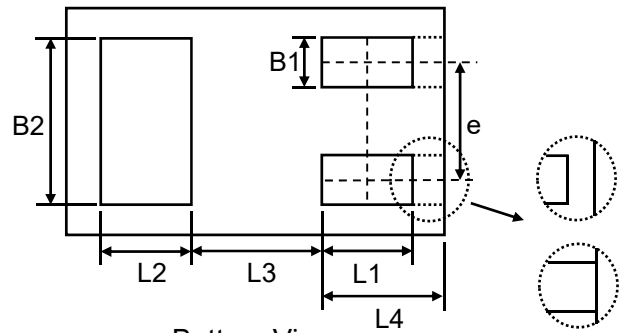


Fig.10 Transient Thermal Resistance

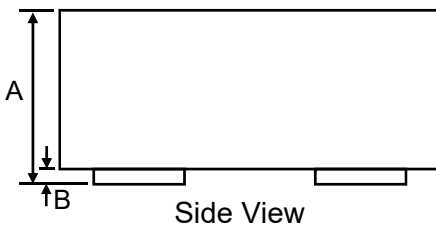
Product Dimension (DFN1006-3L)



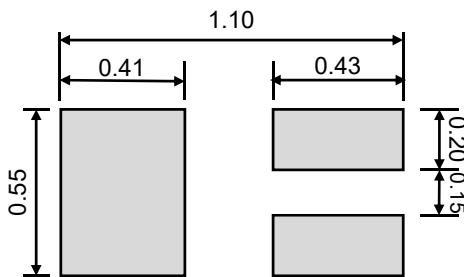
Top View



Bottom View



Side View



Suggested PCB Layout

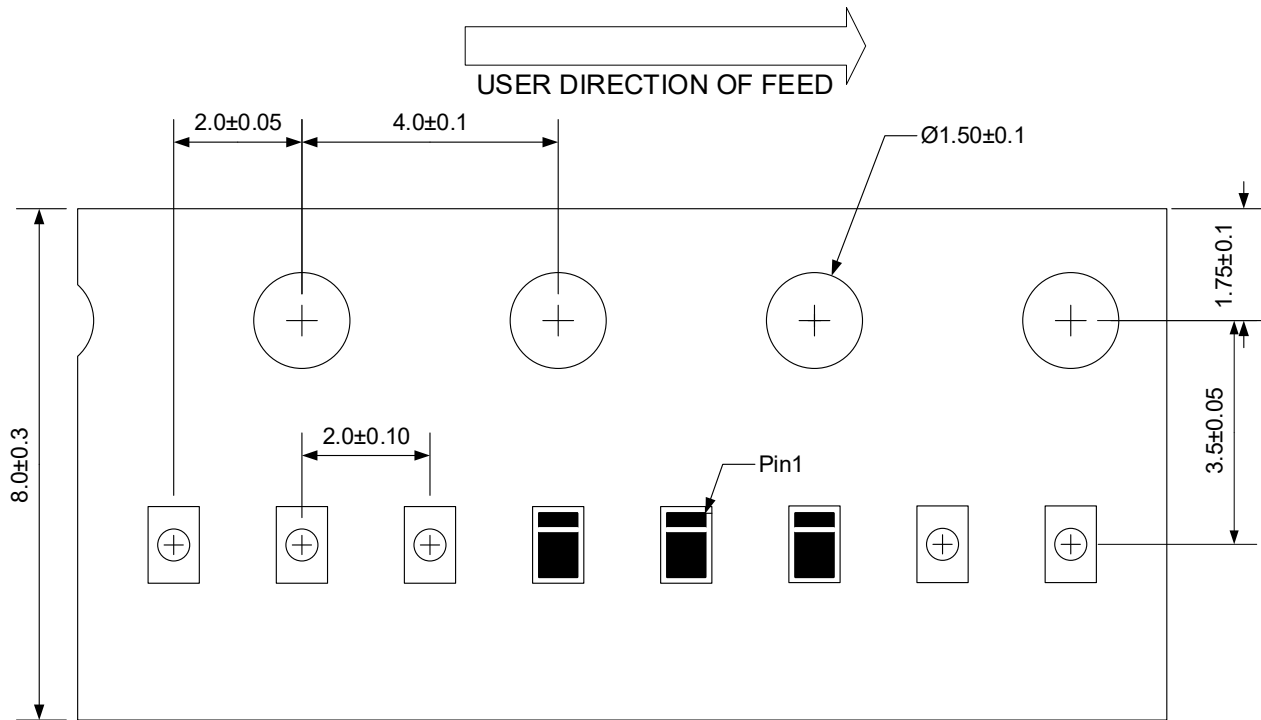
Dim	Millimeters		Inches	
	Min	Max	Min	Max
A	0.33	0.498	0.013	0.020
B	0.00	0.05	0.000	0.002
B1	0.10	0.20	0.004	0.008
B2	0.45	0.55	0.018	0.022
D	0.90	1.05	0.035	0.041
E	0.50	0.65	0.020	0.026
e	0.35		0.014	
L1	0.20	0.30	0.008	0.012
L2	0.20	0.30	0.008	0.012
L3	0.39		0.015	
L4	0.25	0.35	0.010	0.014

Unit: mm

Ordering information


Device	Package	Reel	Shipping
PNM3FD20V1EL	DFN1006-3L(Pb-Free)	7"	10000 / Tape & Reel

Load with information



Unit:mm


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