

## Description

The PSM8PN03R4L uses split gate trench technology to provide excellent  $R_{DS(on)}$  and low gate charge. This device is suitable for power management and high efficiency applications at high switching frequencies applications.

### MOSFET Product Summary

$V_{DS}(V)$	$R_{DS(on)}(m\Omega)(Typ)$	$I_D(A)$
30	3.7@ $V_{GS} = 10V$	78
	5.7@ $V_{GS} = 4.5V$	

## Feature

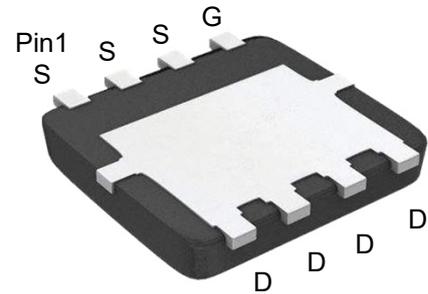
- Low  $R_{DS(ON)}$  - Ensures On-State Losses are Minimized
- Excellent  $Q_{gd} \times R_{DS(ON)}$  Product(FOM)
- Advanced Technology for DC-DC Converts
- Small Form Factor Thermally Efficient Package  
Enables Higher Density End Products
- 100% UIS (Avalanche) Rated
- Lead-Free Finish ; RoHS Compliant
- Halogen and Antimony Free. "Green" Device

## Applications

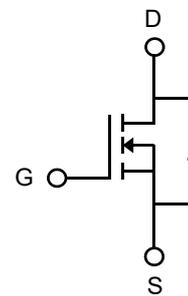
- PWM applications
- Load switch
- Power management
- DC-DC Converters
- Wireless Chargers

## Absolute maximum rating@25°C

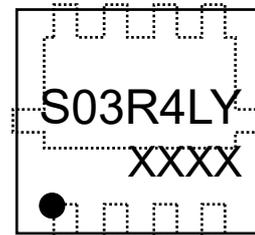
Rating	Symbol	Value	Units
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous <sup>1)</sup>	$I_D$	$T_C=25^\circ C$	78
		$T_C=100^\circ C$	49
Pulsed Drain Current <sup>2)</sup>	$I_{DM}$	312	A
Total Power Dissipation <sup>3)</sup>	$P_D$	38	W
Avalanche Current <sup>4)</sup>	$I_{AS}$	38	A
Avalanche Energy <sup>4)</sup>	$E_{AS}$	72.5	mJ
Thermal Resistance Junction-to-Ambient <sup>6)</sup>	$R_{\theta JA}$	46.7	$^\circ C/W$
Thermal Resistance Junction-to-Case <sup>5)</sup>	$R_{\theta JC}$	3.3	$^\circ C/W$
Junction and Storage Temperature Range	$T_J, T_{STG}$	-55~+150	$^\circ C$



**PDFN3333-8L  
(Bottom View)**



**Circuit Diagram**



Pin1

**Marking (Top View)**

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	30	-	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 30V, V_{GS} = 0V$	-	-	1.0	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS} = \pm 20V, V_{DS} = 0V$	-	-	$\pm 100$	nA
<b>On Characteristics</b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.0	1.5	2.0	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 10A$	-	3.7	4.6	m $\Omega$
		$V_{GS} = 4.5V, I_D = 10A$	-	5.7	8.0	
<b>Dynamic Characteristics<sup>7)</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS} = 15V, V_{GS} = 0V,$ $f = 1.0MHz$	-	968	-	pF
Output Capacitance	$C_{oss}$		-	252	-	
Reverse Transfer Capacitance	$C_{rss}$		-	17	-	
<b>Switching Characteristics<sup>7)</sup></b>						
Turn-on Delay Time	$t_{d(on)}$	$V_{DS} = 15V, V_{GS} = 10V,$ $I_D = 20A, R_G = 10\Omega$	-	5.0	-	ns
Turn-on Rise Time	$t_r$		-	12	-	
Turn-Off Delay Time	$t_{d(off)}$		-	32	-	
Turn-Off Fall Time	$t_f$		-	14	-	
Total Gate Charge	$Q_g$	$V_{DS} = 15V, V_{GS} = 10V,$ $I_D = 20A$	-	14.3	-	nC
Gate-Source Charge	$Q_{gs}$		-	2.0	-	
Gate-Drain Charge	$Q_{gd}$		-	3.7	-	
Gate Resistance	$R_g$	$f=1MHz, \text{ Open Drain}$	-	1.0	-	$\Omega$
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage	$V_{SD}$	$V_{GS} = 0V, I_S = 10A$	-	0.7	1.2	V
Reverse Recovery Time	$t_{rr}$	$I_F = 10A, d_i/d_t = 100A/\mu s$	-	16	-	ns
Reverse Recovery Charge	$Q_{rr}$		-	5.9	-	nC

## 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 [ $L=0.1mH, V_{GS}=10V, V_{DS}=30V$ ]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 1inch square copper pad layout.
7. Guaranteed by design, not subject to production.

Typical Characteristics

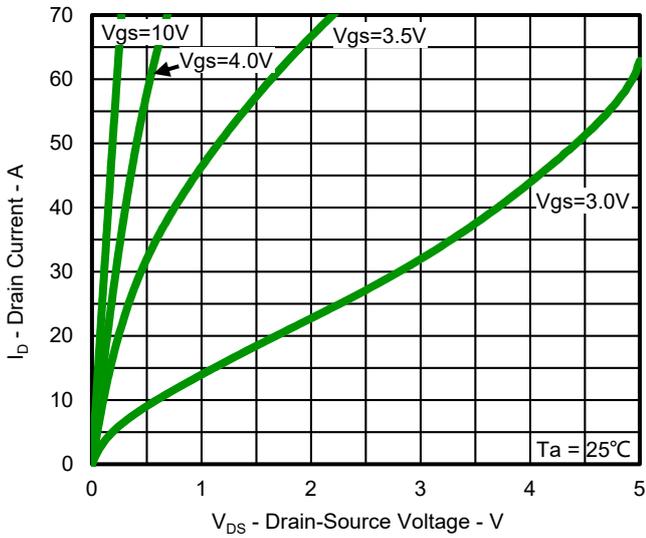


Fig.1 Output Characteristics

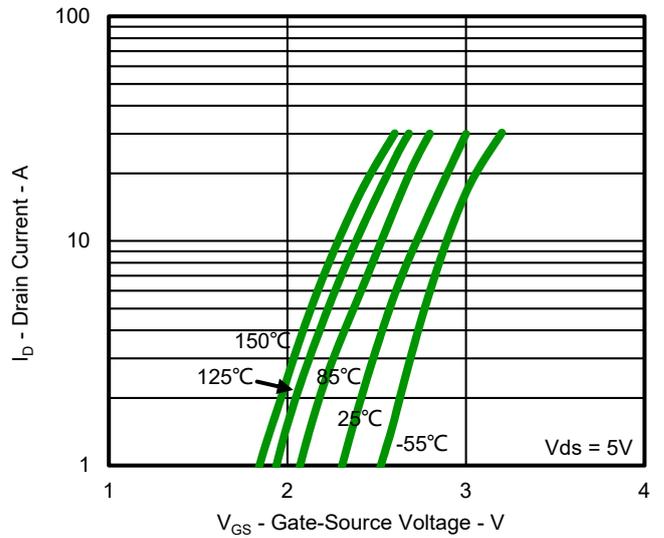


Fig.2 Typical Transfer Characteristic

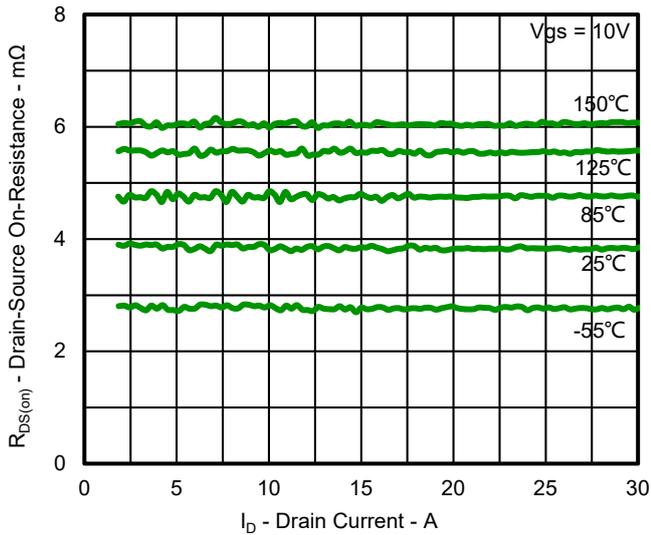


Fig.3 Typical On-Resistance vs Drain Current and Temperature

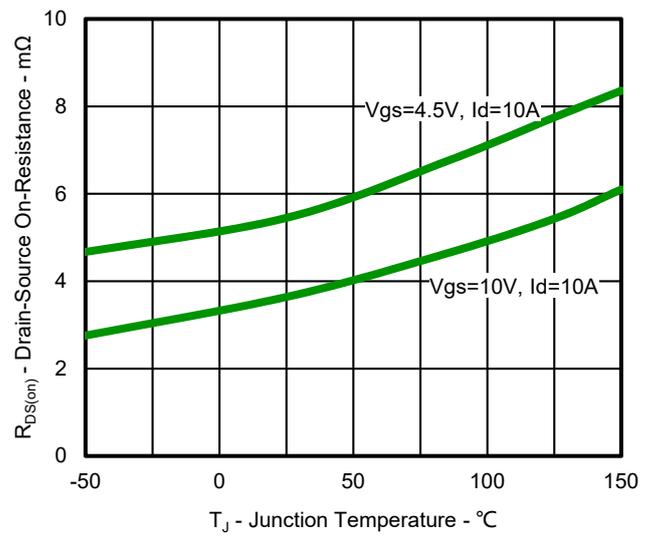


Fig.4 On-Resistance Variation with Temperature

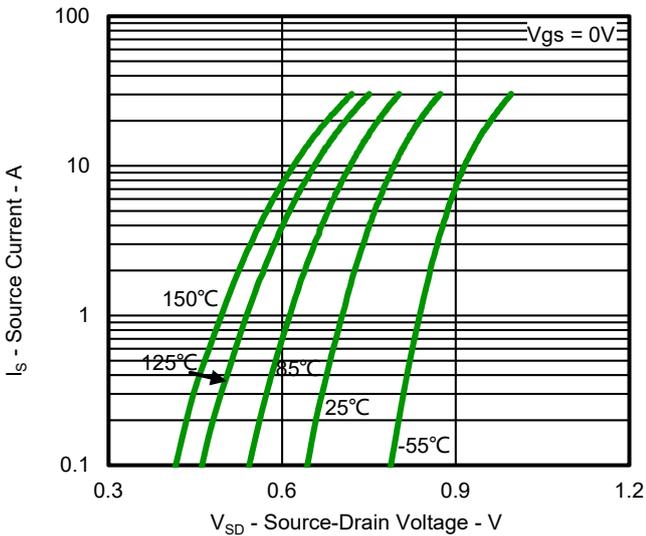


Fig.5 Diode Forward Voltage vs. Current

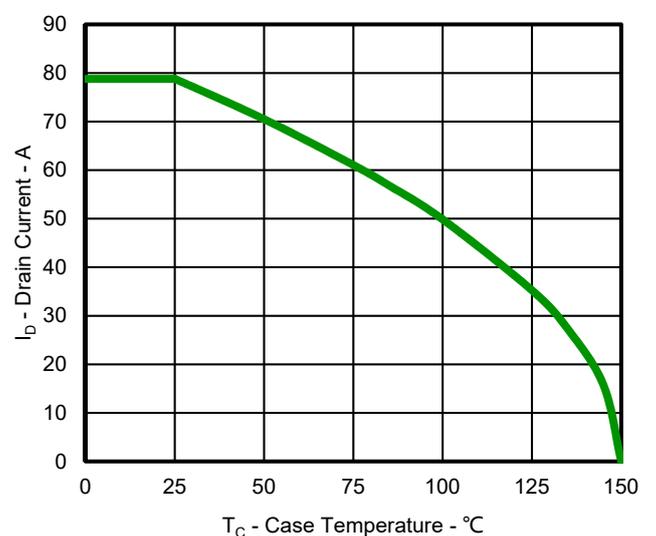


Fig.6 Maximum Drain Current vs. Case Temperature

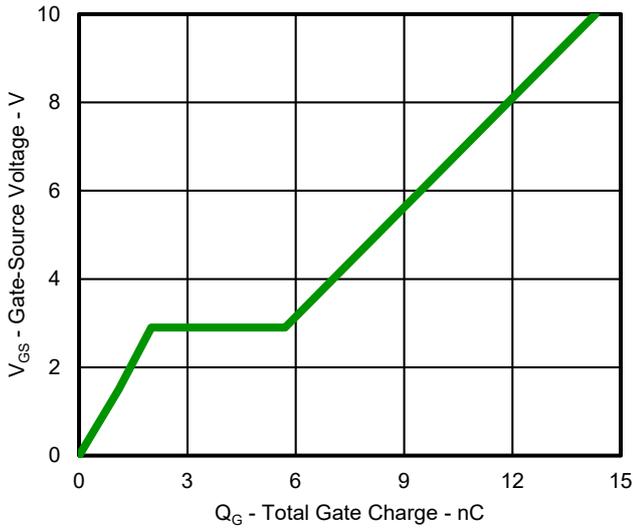


Fig.7 Gate Charge Characteristics

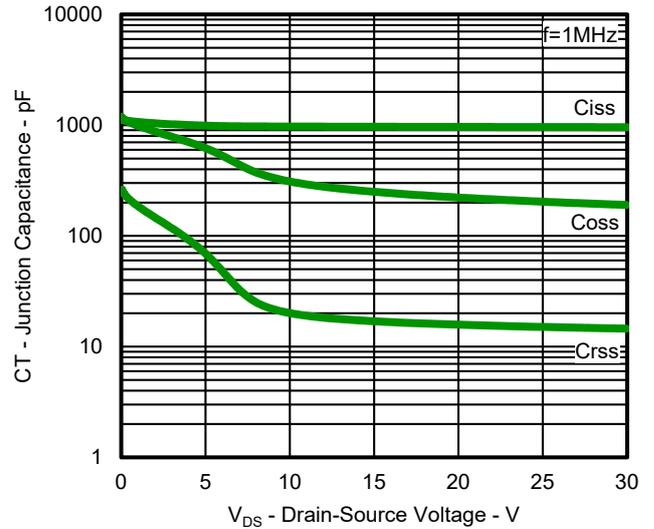


Fig.8 Typical Junction Capacitance

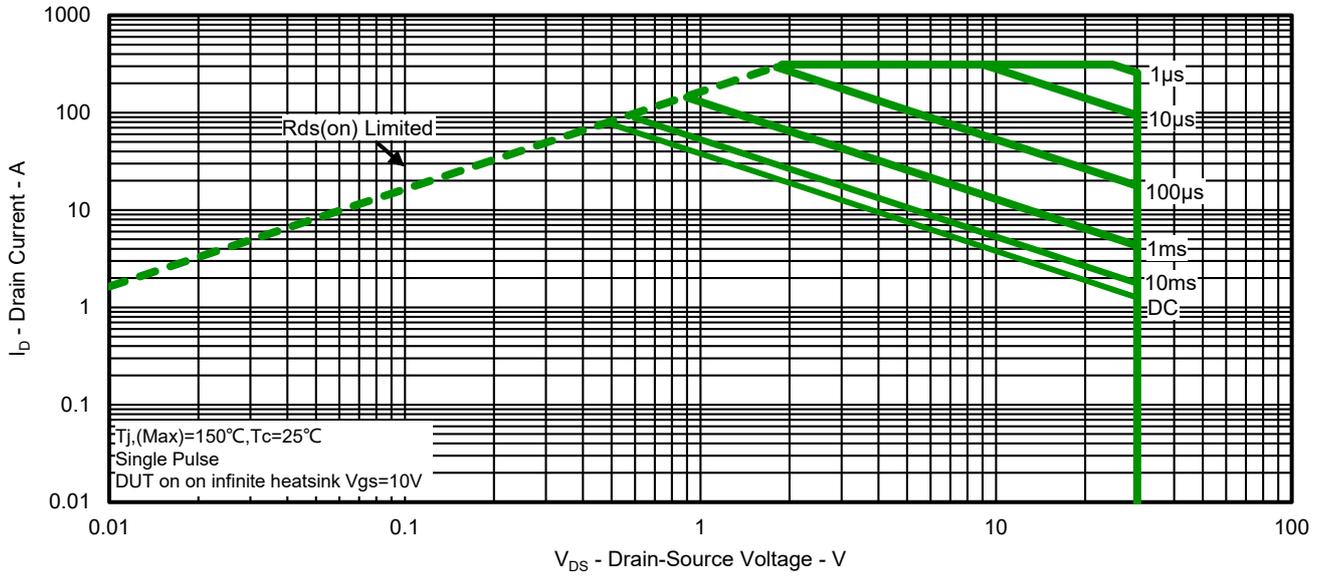


Fig.9 Safe Operation Area

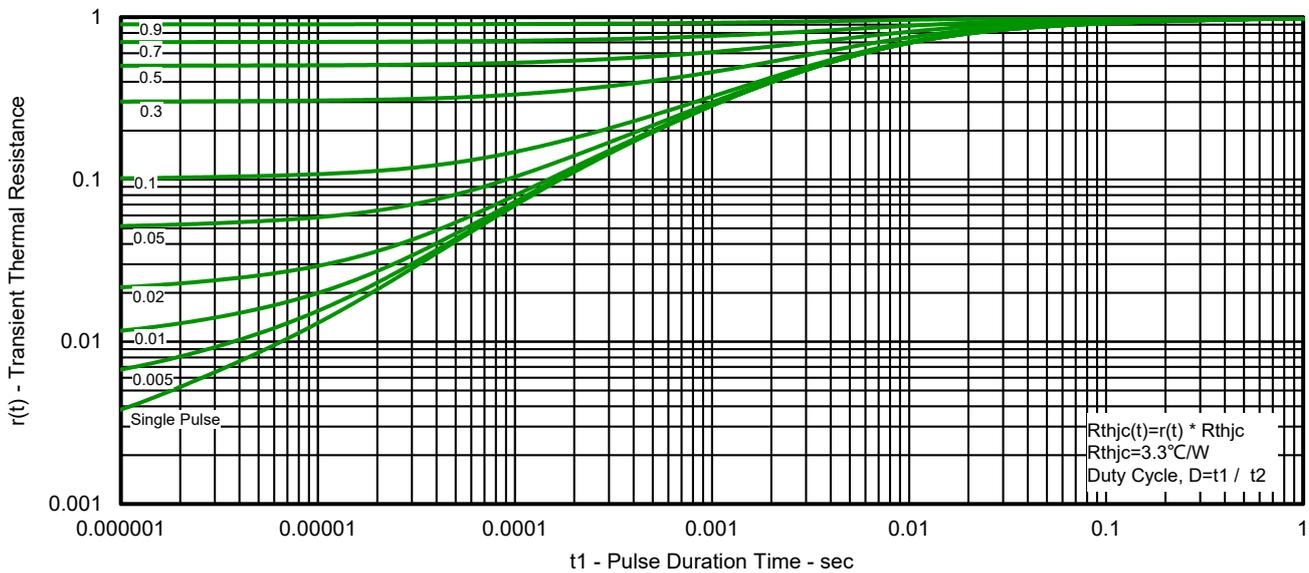
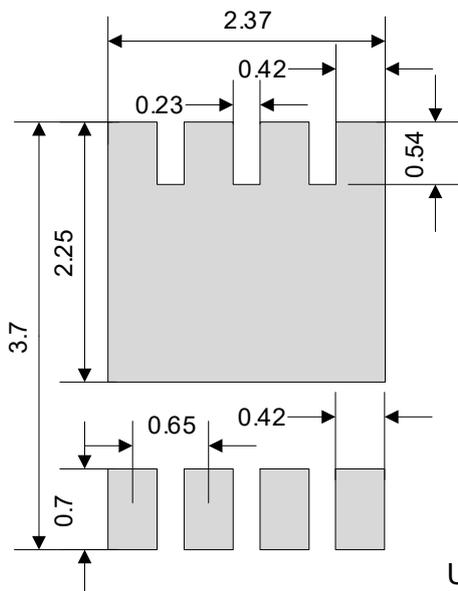
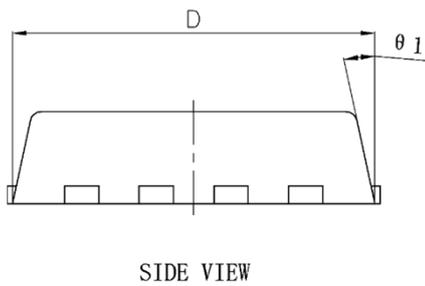
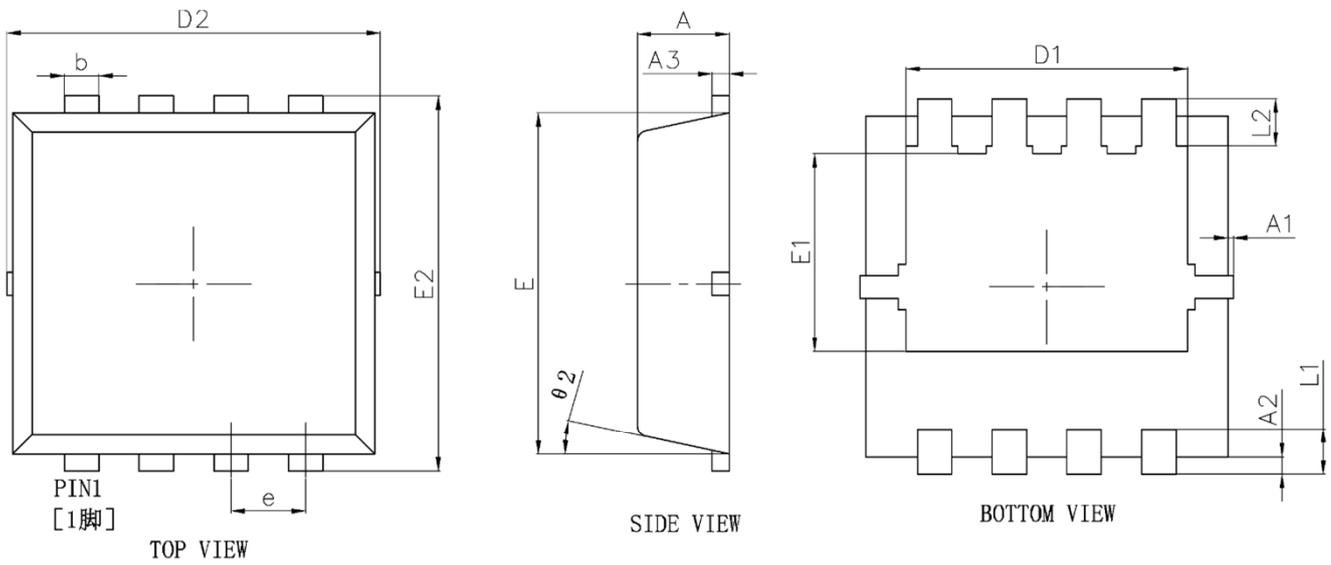


Fig.10 Transient Thermal Resistance

## Product Dimension (PDFN3333-8L)



Unit: mm

Suggested PCB Layout

Dim	Millimeters		Inches	
	Min	Max	Min	Max
A	0.60	0.85	0.024	0.033
A1	0.00	0.10	0.000	0.004
A2	0.10	0.20	0.004	0.008
A3	0.152 Ref.		0.006 Ref.	
D	2.95	3.25	0.116	0.128
D1	2.35	2.55	0.093	0.100
D2	3.00	3.40	0.118	0.134
E	2.90	3.10	0.114	0.122
E1	1.635	1.835	0.064	0.072
E2	3.15	3.40	0.124	0.134
b	0.20	0.40	0.008	0.016
e	0.625	0.675	0.025	0.027
L1	0.30	0.45	0.012	0.018
L2	0.36	0.50	0.014	0.020
$\theta 1$	5°	14°	5°	14°
$\theta 2$	5°	14°	5°	14°

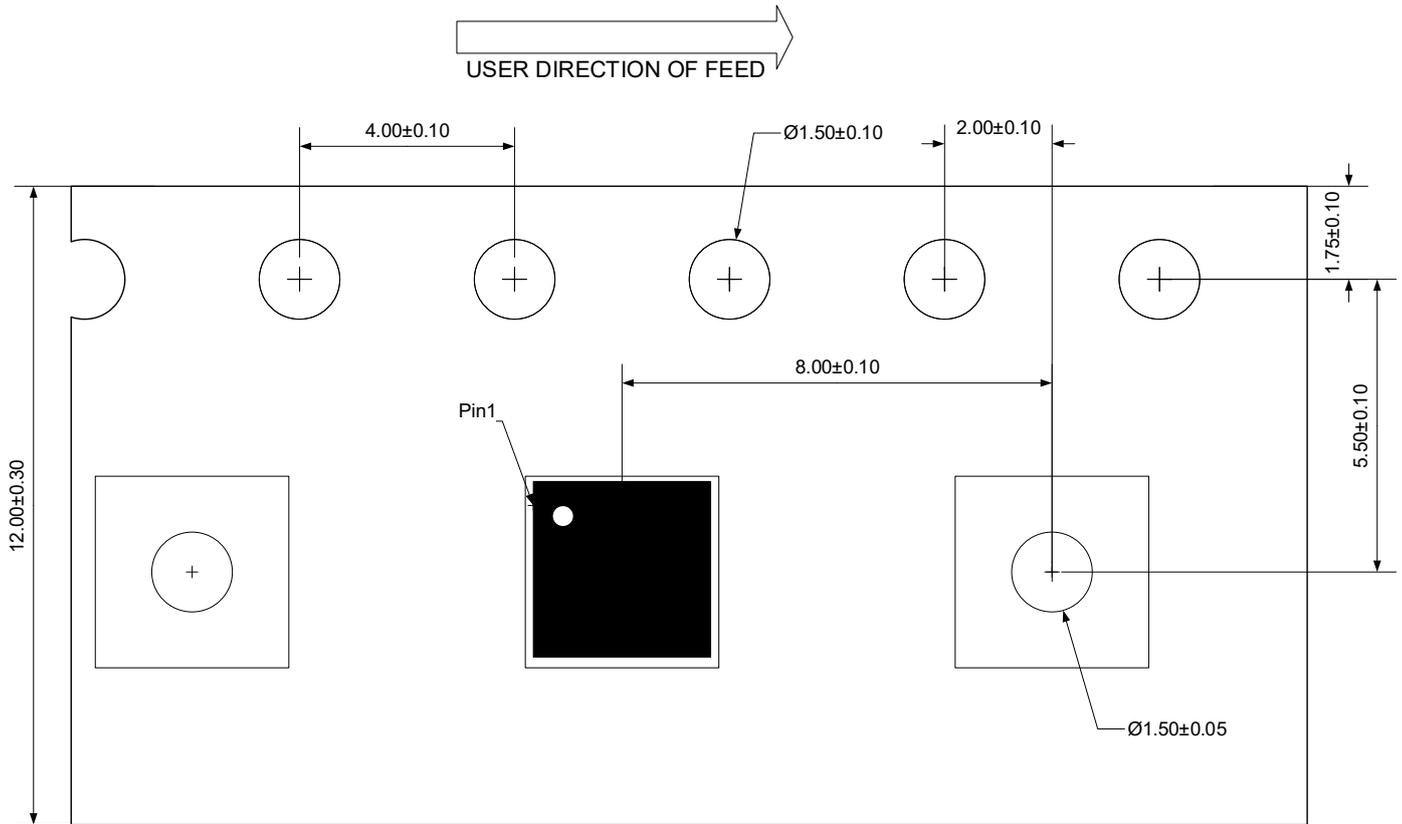
# N-Channel MOSFET

# PSM8PN03R4L

## Ordering Information

Package	Reel	Shipping
PDFN3333-8L	13"	5000 / Tape & Reel

## Load With Information



Unit:mm

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