Prisemi®

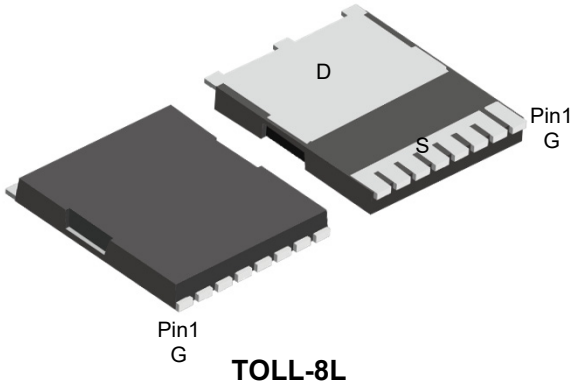
PSMTL04R1L

N-Channel MOSFET

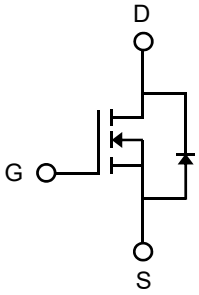
Description

The PSMTL04R1L 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.

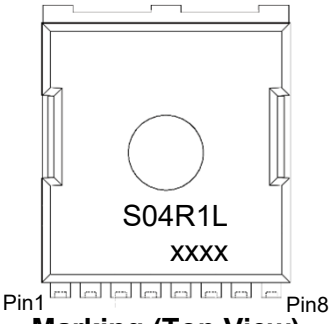
MOSFET Product Summary		
V_{DS}(V)	$R_{DS(on)}$(mΩ)	I_D(A)
40	0.85@ V_{GS} = 10V	360



TOLL-8L



Circuit Diagram



Marking (Top View)

Feature

- Low $R_{DS(ON)}$ - Ensures On-State Losses are Minimized
- Excellent Q_{gd} x $R_{DS(ON)}$ 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℃

Rating		Symbol	Value	Units
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{GS}	±20	V
Drain Current-Continuous[1]	T_C=25℃	I_D	360	A
	T_C=100℃		230	
Pulsed Drain Current[2]		I_{DM}	1440	A
Total Power Dissipation[3]		P_D	290.7	W
Avalanche Current[4]		I_{AS}	88	A
Avalanche Energy[4]		E_{AS}	1161	mJ
Thermal Resistance , Junction-case[5]		$R_{\theta JC}$	0.4	℃/W
Thermal Resistance Junction-to-Ambient[6]		$R_{\theta JA}$	27.7	℃/W
Junction and Storage Temperature Range		T_J,T_{STG}	-55~+150	℃

Electrical characteristics per line@25℃ (unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0V,I_D = 250μA	40	44	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 40V,V_{GS} = 0V	-	-	1.0	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS} = ±20V,V_{DS} = 0V	-	-	±100	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS},I_D = 250μA	1.2	1.8	2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS} = 10V,I_D = 50A	-	0.85	1.2	mΩ
		V_{GS} = 4.5V,I_D = 50A	-	1.25	1.7	
Dynamic Characteristics[7)]						
Input Capacitance	C_{lss}	V_{DS} = 25V,V_{GS} = 0V, f = 1.0MHz	-	6300	-	pF
Output Capacitance	C_{oss}		-	1490	-	
Reverse Transfer Capacitance	C_{rss}		-	98	-	
Switching Characteristics[7)]						
Turn-on Delay Time	$t_{d(on)}$	V_{DS} = 20V, V_{GS} = 10V, R_G = 4Ω, I_D = 50A	-	15	-	ns
Turn-on Rise Time	t_r		-	42	-	
Turn-Off Delay Time	$t_{d(off)}$		-	84	-	
Turn-Off Fall Time	t_f		-	72	-	
Total Gate Charge	Q_g	V_{DS} = 32V, V_{GS} = 10V, I_D = 50A	-	99.7	-	nC
Gate-Source Charge	Q_{gs}		-	20.5	-	
Gate-Drain Charge	Q_{gd}		-	17.8	-	
Gate Resistance	R_g	f=1MHz, Open Drain	-	1.2	-	Ω
Drain-Source Diode Characteristics						
Diode Forward Voltage	V_{SD}	V_{GS} = 0V,I_S = 40A	-	0.8	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℃).
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. This single-pulse measurement was taken under the following condition [L=0.3mH,V_{GS}=10V,V_{DS}=40V]while it's value is limited by T_{J_Max}=150℃
5. Device mounted on infinite heatsink
6. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout
7. Guaranteed by design, not subject to production

Typical Characteristics

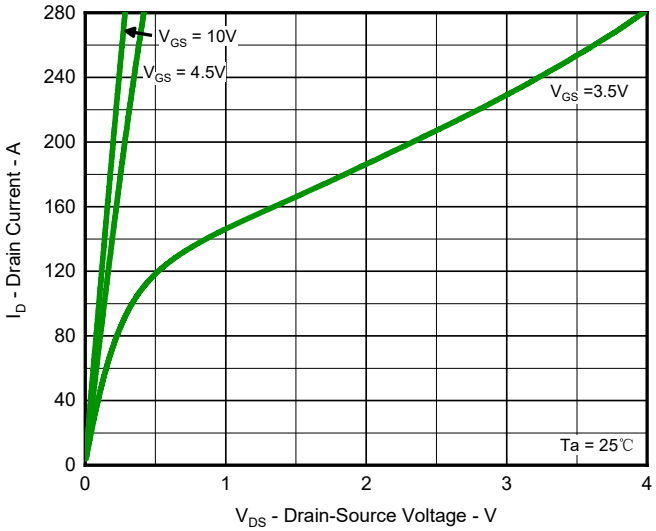


Fig.1 Output Characteristics

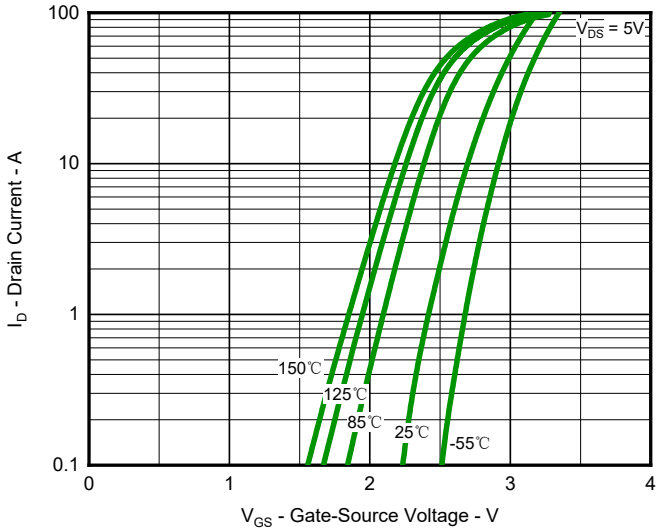


Fig.2 Typical Transfer Characteristic

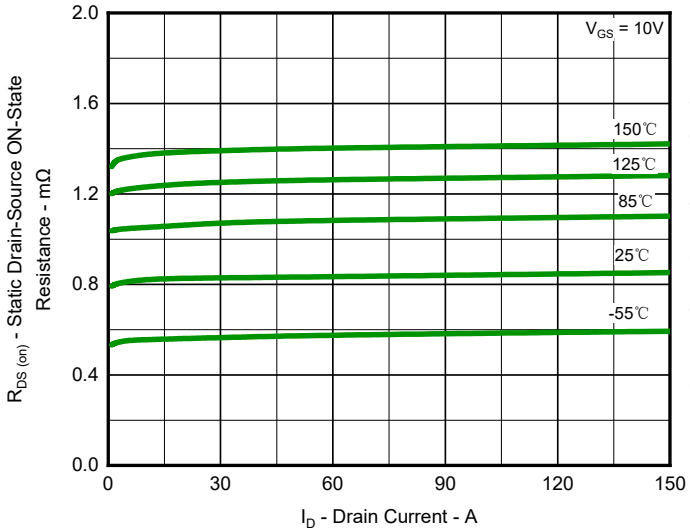


Fig.3 Typical On-Resistance vs Drain Current and Temperature

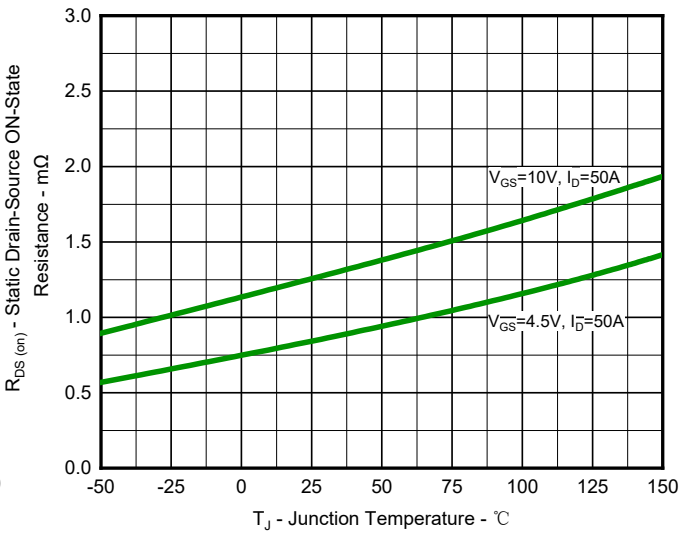


Fig.4 On-Resistance Variation with Temperature

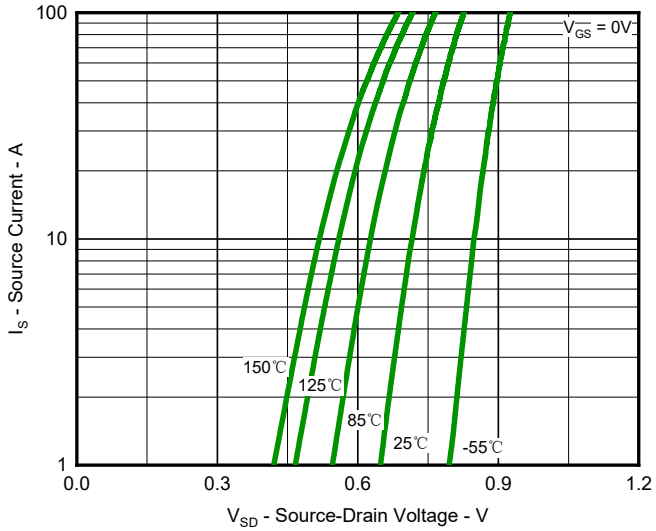


Fig.5 Diode Forward Voltage vs. Current

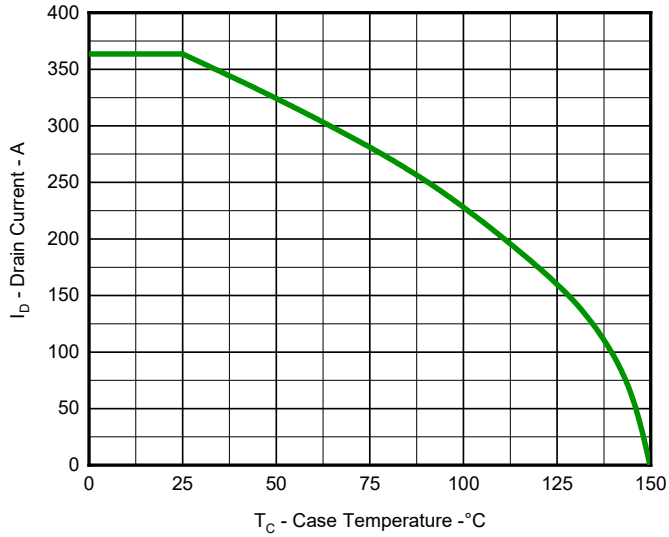


Fig.6 Maximum Drain Current vs. Case Temperature

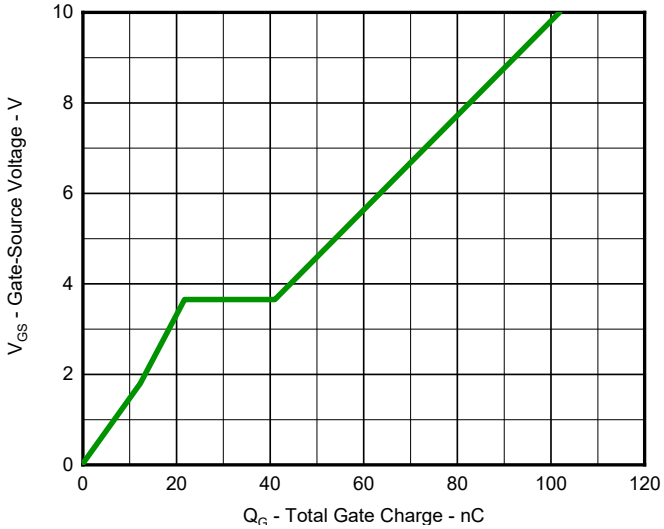


Fig.7 Gate Charge Characteristics

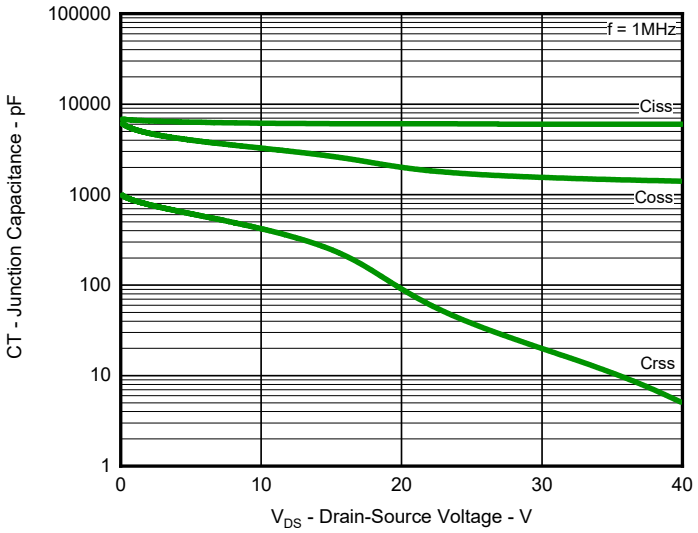


Fig.8 Typical Junction Capacitance

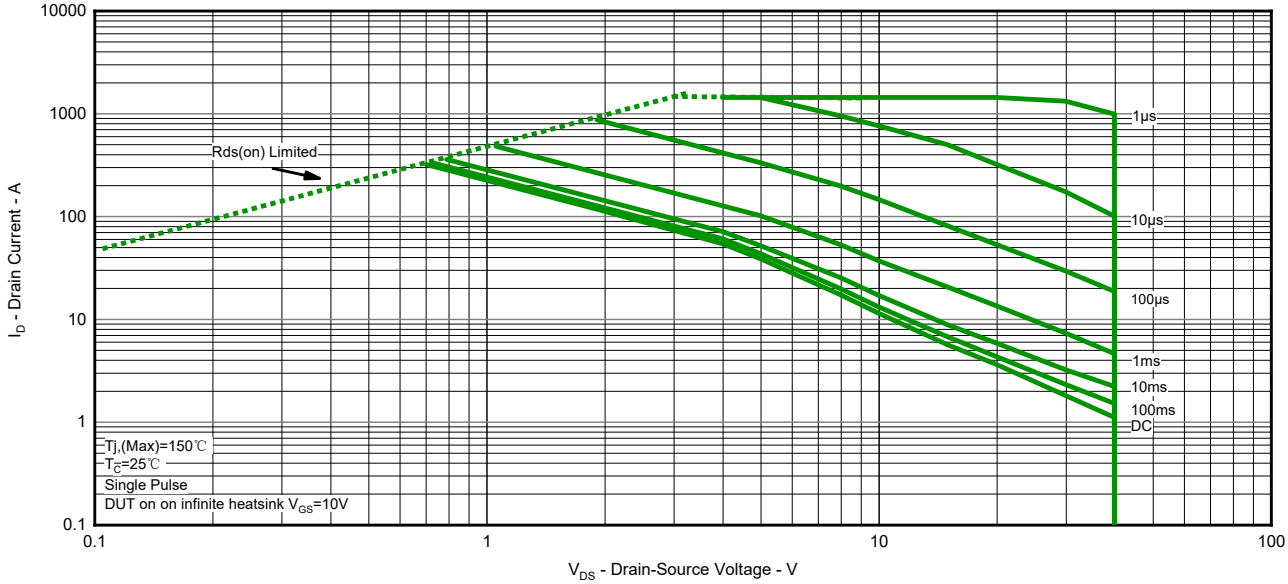


Fig.9 Safe Operation Area

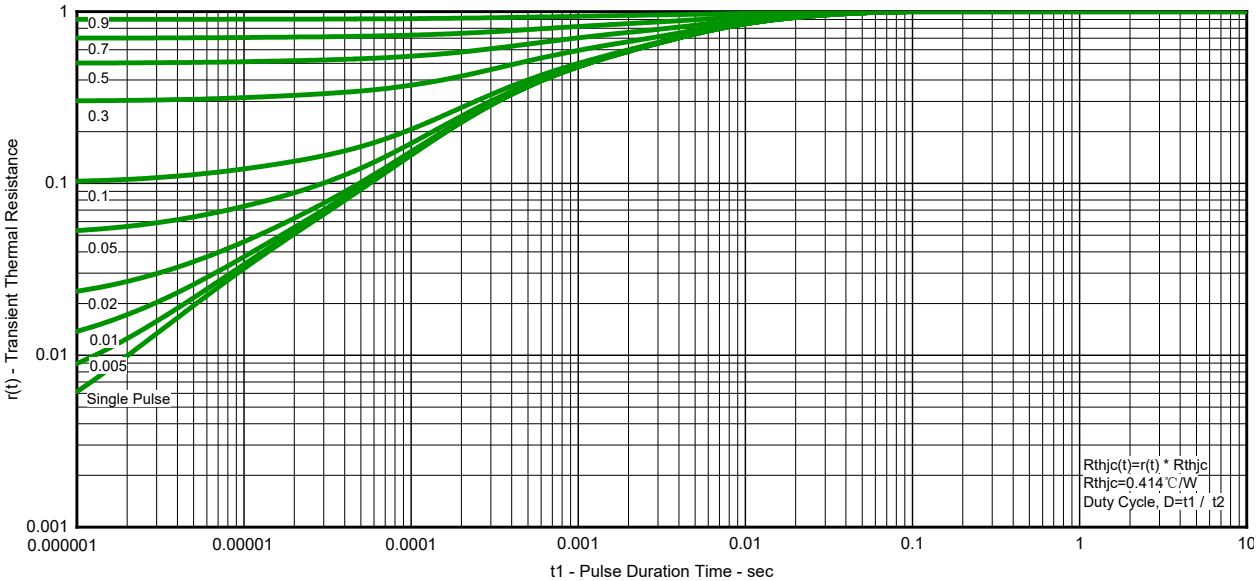
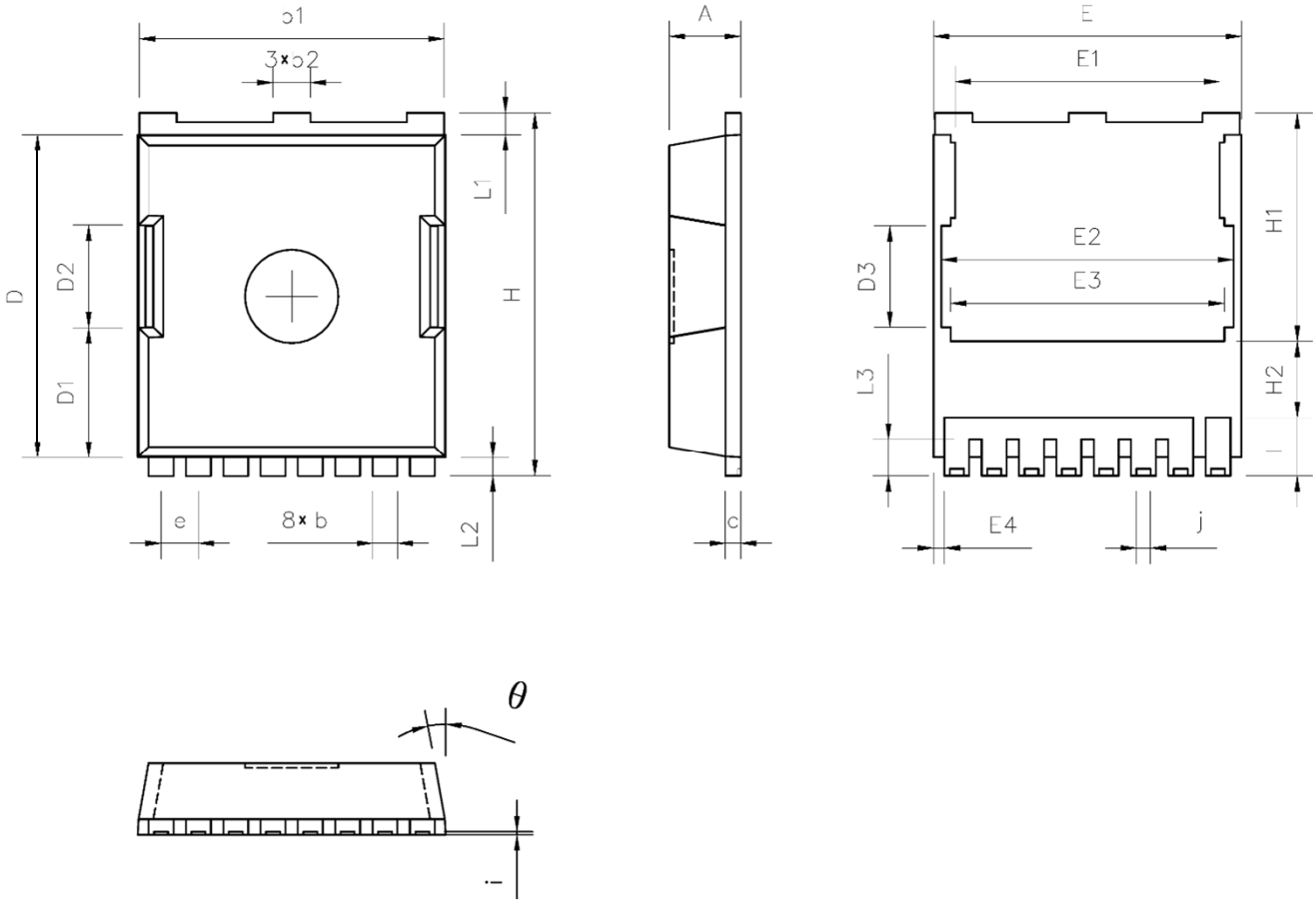


Fig.10 Transient Thermal Resistance

Product Dimension (TOLL-8L)

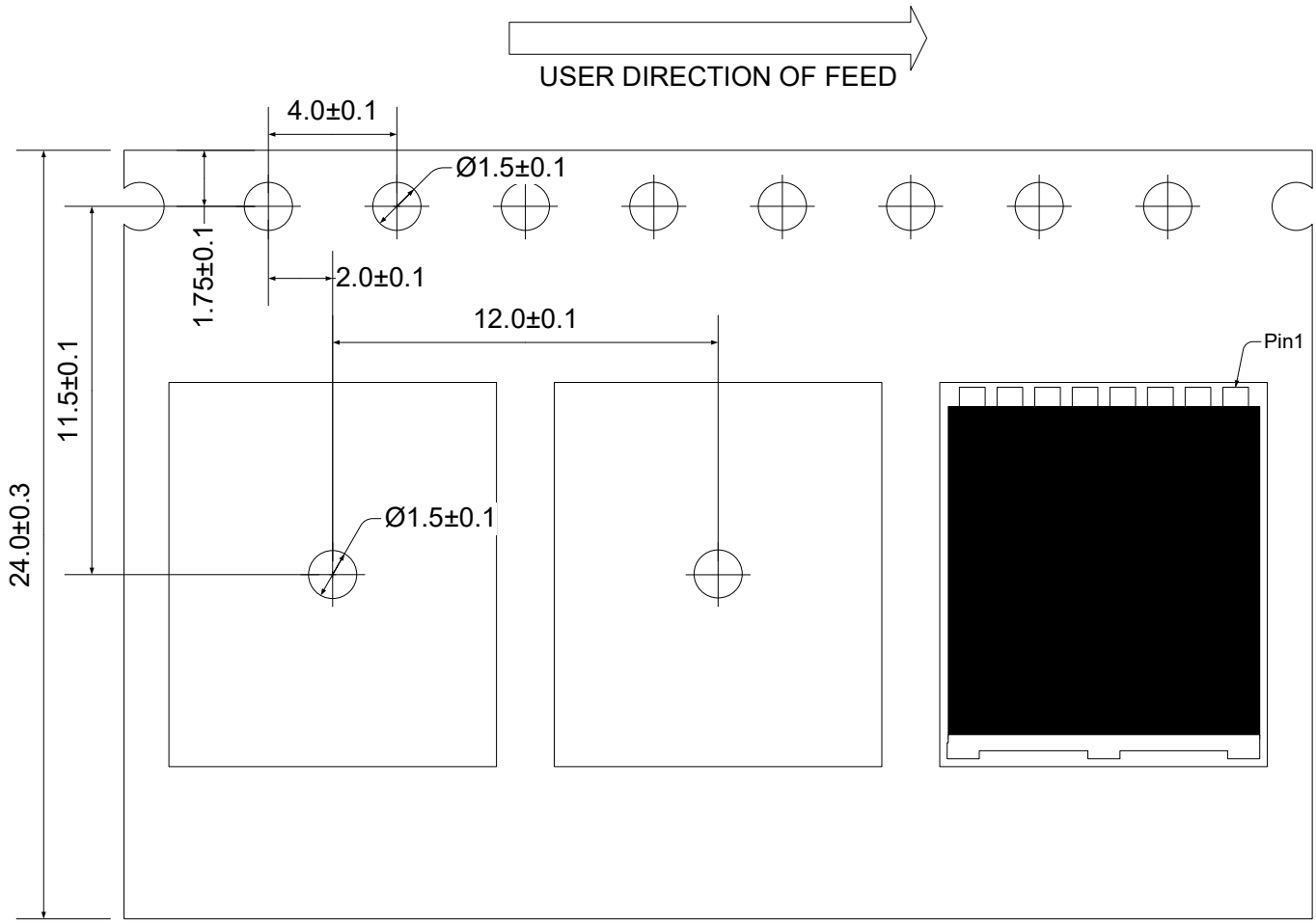


Dim	Millimeters		Inches		Dim	Millimeters		Inches	
	Min	Max	Min	Max		Min	Max	Min	Max
A	2.20	2.40	0.087	0.094	E4	0.25	0.45	0.010	0.018
b	0.70	0.90	0.028	0.035	e	1.20 Basic		0.047 Basic	
b1	9.70	9.90	0.382	0.390	H	11.58	11.78	0.456	0.464
b2	1.20 Ref.		0.047 Ref.		H1	7.23	7.43	0.285	0.293
c	0.40	0.60	0.016	0.024	H2	2.45 Ref.		0.096	Ref.
D	10.28	10.48	0.405	0.413	i	0.10	-	0.004	-
D1	4.06	4.28	0.160	0.169	j	0.45 Ref.		0.018 Ref.	
D2	3.20	3.40	0.126	0.134	L	1.60	2.10	0.063	0.083
D3	3.16	3.36	0.124	0.132	L1	0.60	0.80	0.024	0.031
E	9.80	10.00	0.386	0.394	L2	0.50	0.70	0.020	0.028
E1	8.40	8.60	0.331	0.339	L3	1.05	1.30	0.041	0.051
E2	9.30	9.50	0.366	0.374	θ	10° Ref.		10° Ref.	
E3	8.80 Ref.		0.346 Ref.						

Ordering Information

Device	Package	Reel	Shipping
PSMTL04R1L	TOLL-8L	13"	2000 / Tape & Reel

Load With Information



Unit:mm

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