Prisemi®

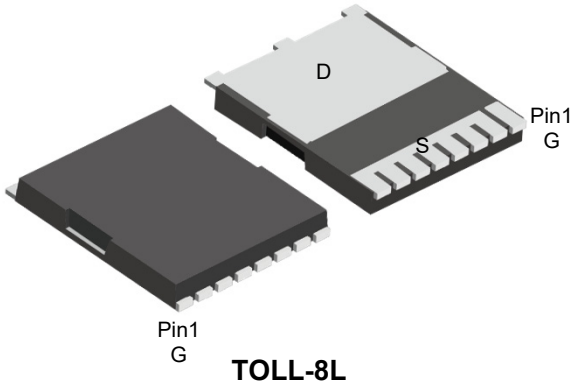
PSMTL10R1

N-Channel MOSFET

Description

The PSMTL10R1 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)	$R_{DS(on)}$(mΩ)（Typ）	I_D(A)
100	1.2@ V_{GS} = 10V	415



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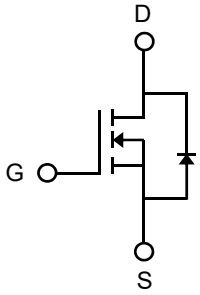
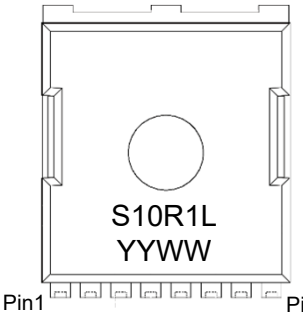


Circuit Diagram



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}	100	V
Gate-Source Voltage		V_{GS}	±20	V
Drain Current-Continuous[1)]	T_C=25℃	I_D	415	A
	T_C=100℃		293	
Pulsed Drain Current[2)]		I_{DM}	1589	A
Total Power Dissipation[4)]	T_C=25℃	P_D	500	W
	T_C=100℃		250	
Avalanche Current @ L=0.3mH		I_{AS}	78	A
Avalanche Energy @ L=0.3mH		E_{AS}	913	mJ
Thermal Resistance , Junction-to-Case[4)]		$R_{\theta JC}$	0.3	℃/W
Thermal Resistance Junction-to-Ambient[3)]		$R_{\theta JA}$	25	℃/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		100	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 100V, V_{GS} = 0V	T_J=25℃	-	-	1.0	μA
			T_J=55℃	-	-	10	
Gate-Body Leakage Current	I_{GSS}	V_{GS} = ±20V,V_{DS} = 0V		-	-	±100	nA
On Characteristics[5)]							
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS},I_D = 250μA		2.0	3.0	4.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS} = 10V,I_D = 20A		-	1.2	1.5	mΩ
Forward Transconductance	g_{fs}	V_{DS} = 5 V,I_D = 20A		-	72	-	S
Diode Forward Voltage	V_{SD}	V_{GS} = 0V,I_S = 1A		-	0.7	1.2	V
Dynamic Characteristics[6)]							
Input Capacitance	C_{lss}	V_{DS} = 50V,V_{GS} = 0V, f = 1.0MHz		-	11930	-	pF
Output Capacitance	C_{oss}			-	2720	-	
Reverse Transfer Capacitance	C_{rss}			-	71	-	
Switching Characteristics[6)]							
Turn-on Delay Time	$t_{d(on)}$	V_{DS} = 50V, V_{GS} = 10V, R_G = 3Ω, I_D = 20A		-	26	-	ns
Turn-on Rise Time	t_r			-	35	-	
Turn-Off Delay Time	$t_{d(off)}$			-	94	-	
Turn-Off Fall Time	t_f			-	49	-	
Total Gate Charge @ V_{GS} = 10V	Q_g	V_{DS} = 50V, I_D = 20A, V_{GS} = 10V,		-	154	-	nC
Total Gate Charge @ V_{GS} = 6V				-	98	-	
Gate-Source Charge	Q_{gs}			-	46	-	
Gate-Drain Charge	Q_{gd}			-	29	-	
Gate Resistance	R_g	V_{GS}=0V,V_{DS}=0V,f=1MHz		-	1.6	-	Ω
Drain-Source Diode Characteristics[6)]							
Reverse Recovery Time	t_{rr}	I_F=20A, d_i/d_t=100A/μs		-	107	-	ns
Reverse Recovery Charge	Q_{rr}			-	229	-	nC
Diode Forward Current	I_S	-		-	-	415	A

Notes:
1. Pulse width limited by maximum junction temperature.
2. Pulse test : Pulse width ≤ 100μs, duty cycle ≤ 2%.
3. Device mounted on 1 inch FR4 PCB with 2oz.Copper.
4. Device mounted on infinite heatsink.
5. Measured under pulsed conditions. Pulse width ≤ 300μs, duty cycle ≤ 2%.
6. Guaranteed by design, not subject to production.

Typical Characteristics

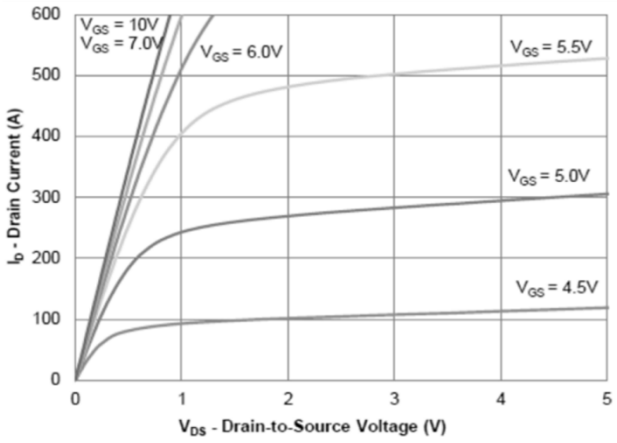


Figure 1: Output Characteristics

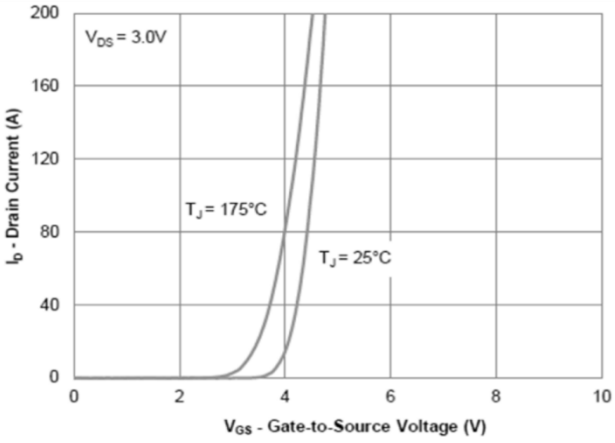


Figure 2: Transfer Characteristics

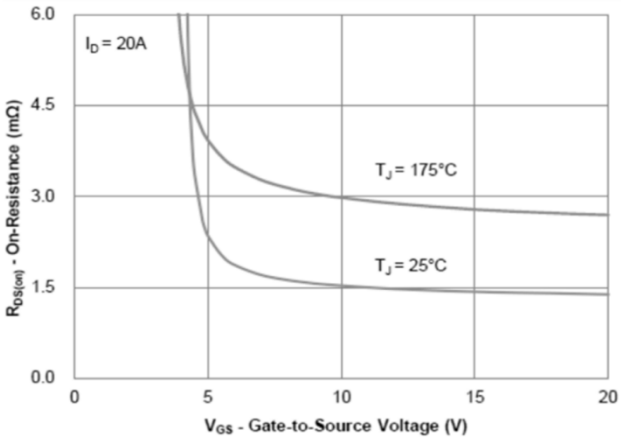


Figure 3: On-Resistance vs. Gate-Source Voltage

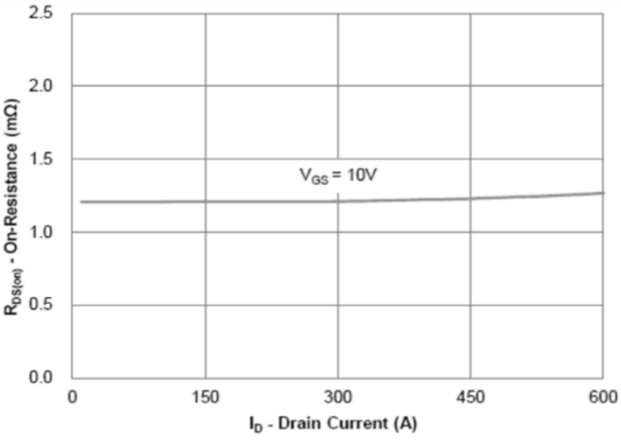


Figure 4: On-Resistance vs. Gate-Source Voltage

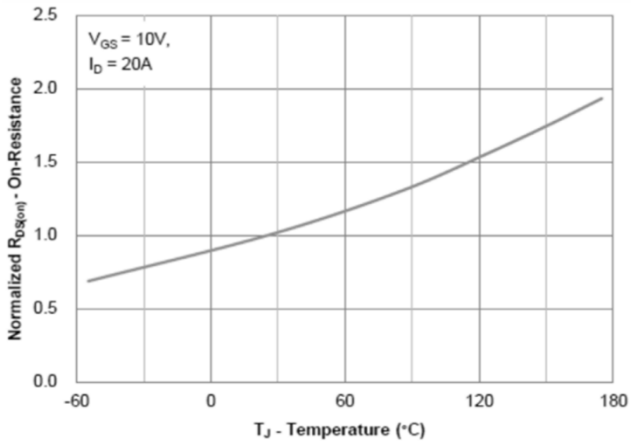


Figure 5: On-Resistance vs. Junction Temperature

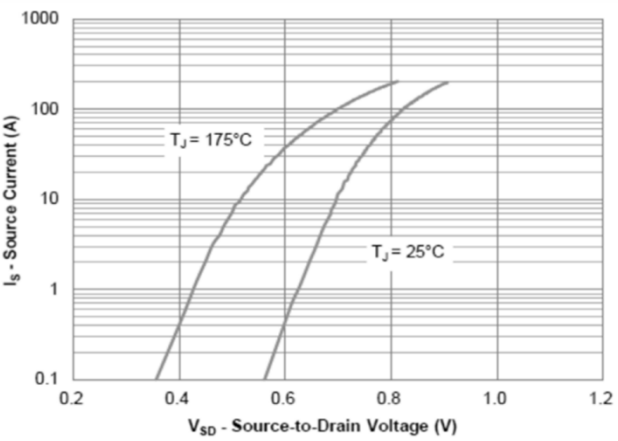


Figure 6: Source-Drain Diode Forward Voltage

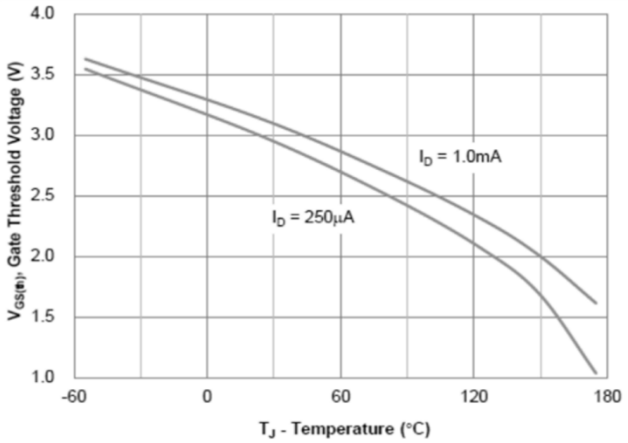


Figure 7: Gate Threshold Variation vs. Junction Temperature

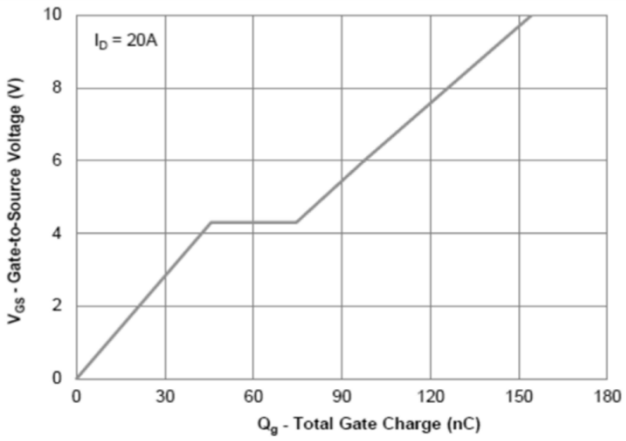


Figure 8: Gate Charge Characteristics

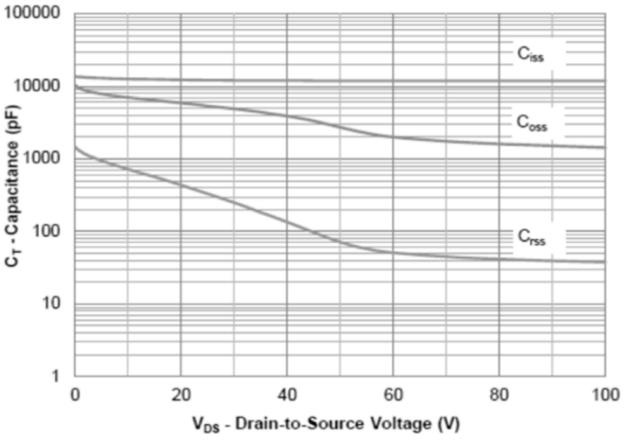


Figure 9: Capacitance Characteristics

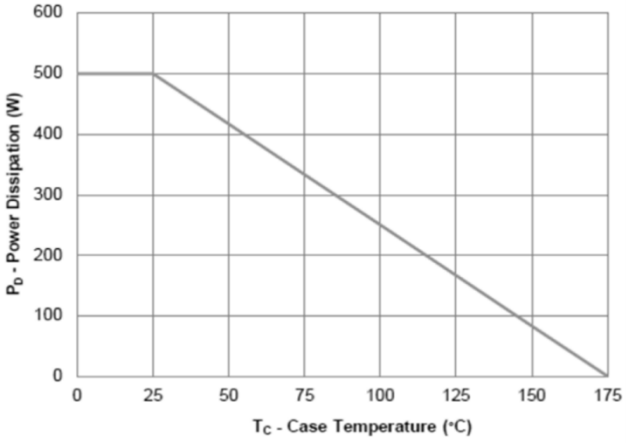


Figure 10: Power Derating

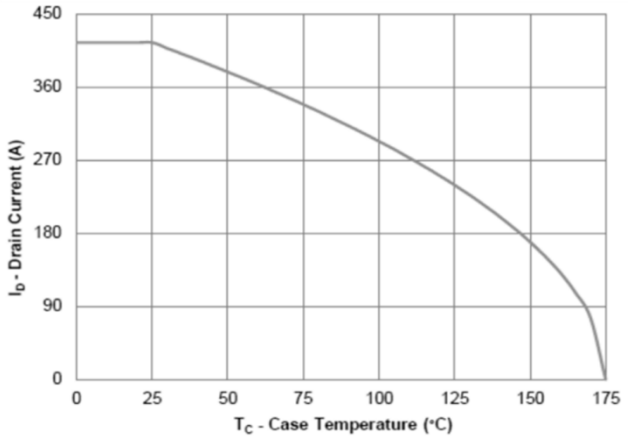


Figure 11: Current Derating

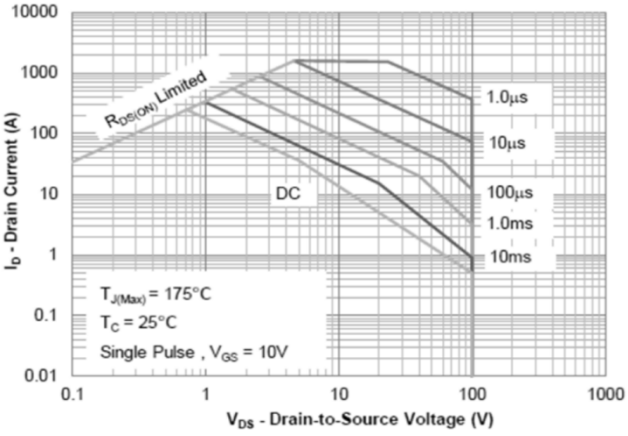


Figure 12: Safe Operating Area

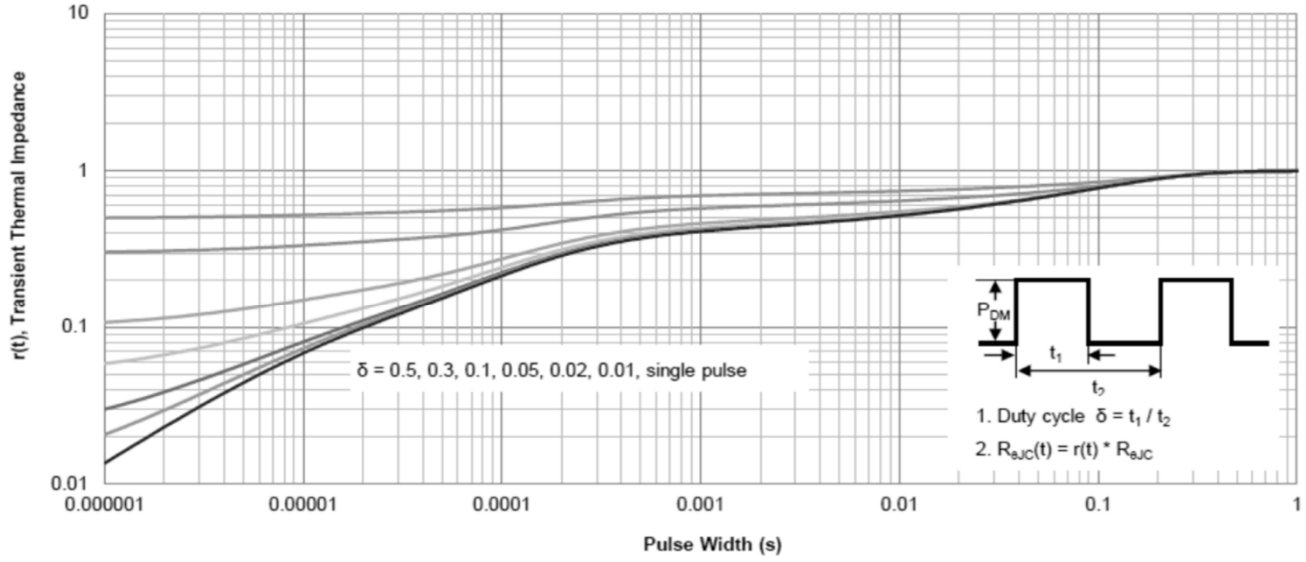
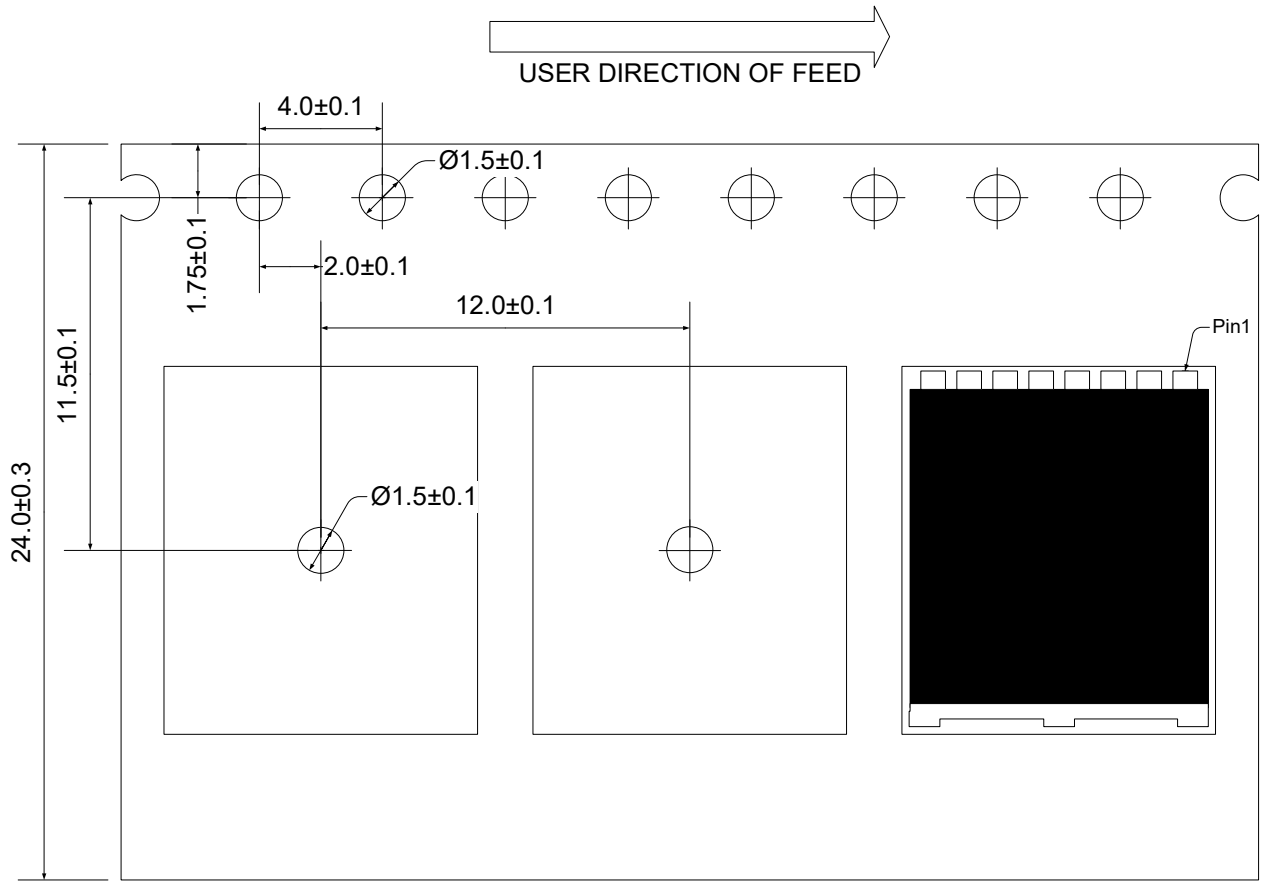


Figure 13: Normalized Maximum Transient Thermal Impedance

Ordering Information

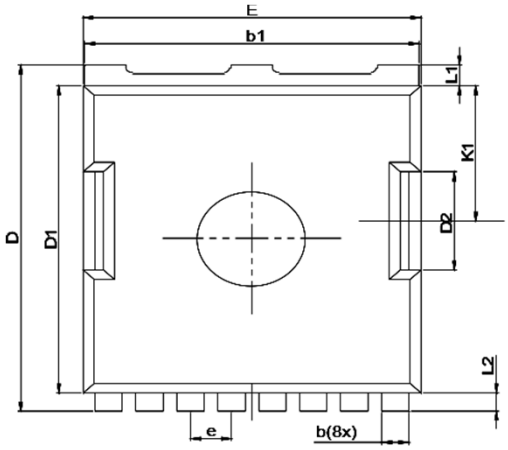
Device	Package	Reel	Shipping
PSMTL10R1	TOLL-8L	13"	2000 / Tape & Reel

Load With Information

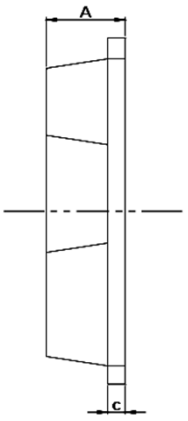


Unit:mm

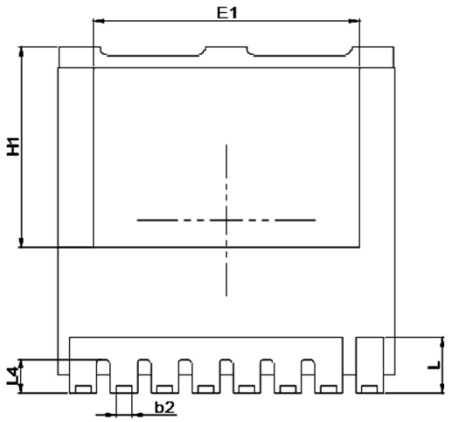
Product Dimension (TOLL-8L)



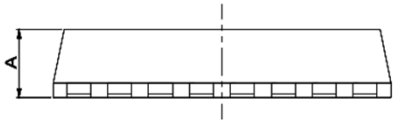
Top View



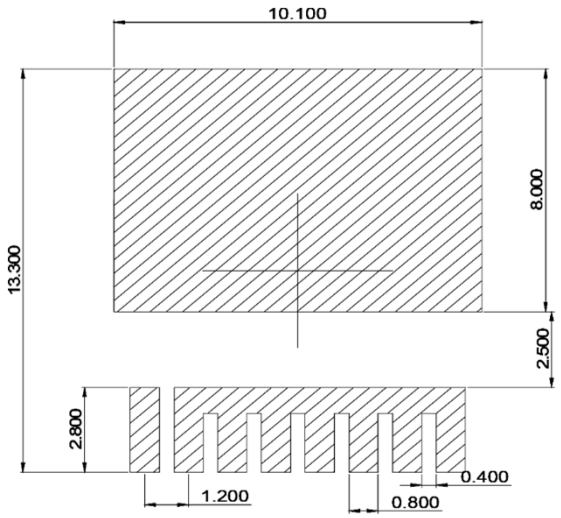
Side View



Bottom View



Front View



Unit: mm

Suggested PCB Layout

Dim	Millimeters		Inches	
	Min	Max	Min	Max
A	2.20	2.40	0.087	0.094
b	0.65	0.90	0.026	0.035
b1	9.65	9.95	0.380	0.392
c	0.40	0.60	0.016	0.024
D	11.48	11.95	0.452	0.470
D1	10.25	10.70	0.404	0.421
D2	2.85	3.40	0.112	0.134
E	9.70	10.10	0.382	0.398
E1	8.00	9.25	0.315	0.364
e	1.20 BSC		0.047 BSC	
H1	6.70	7.30	0.264	0.287
K1	4.55 BSC		0.179 BSC	
L	1.35	2.10	0.053	0.083
L1	0.70 BSC		0.028 BSC	
L2	0.60 BSC		0.024 BSC	
L4	0.95	1.35	0.037	0.053

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