Prisemi®

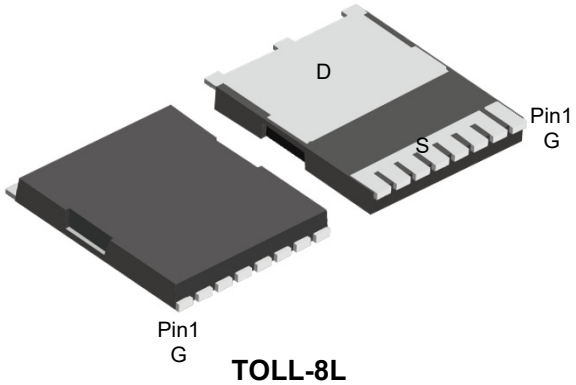
PSMTL10R2

N-Channel MOSFET

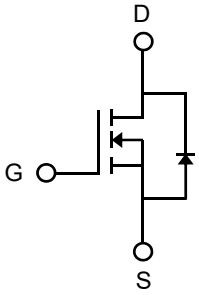
Description

The PSMTL10R2 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	1.4@ V_{GS} = 10V	351



TOLL-8L



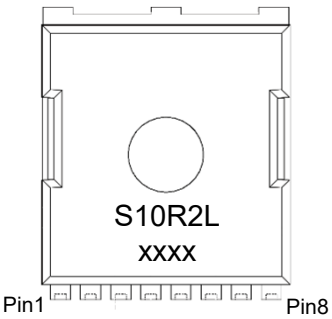
Circuit Diagram

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



Marking (Top View)

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	351	A
	T_C=100℃		249	
Pulsed Drain Current[2)]		I_{DM}	1406	A
Total Power Dissipation[4)]	T_C=25℃	P_D	429	W
	T_C=100℃		214	
Avalanche Current @ L=0.3mH		I_{AS}	71	A
Avalanche Energy @ L=0.3mH		E_{AS}	756	mJ
Thermal Resistance , Junction-to-Case[4)]		$R_{\theta JC}$	0.35	℃/W
Thermal Resistance Junction-to-Ambient[3)]		$R_{\theta JA}$	29	℃/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		-	1.4	1.7	mΩ
Forward Transconductance	g_{fs}	V_{DS} = 5 V,I_D = 20A		-	67	-	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		-	9665	-	pF
Output Capacitance	C_{oss}			-	2065	-	
Reverse Transfer Capacitance	C_{rss}			-	59	-	
Switching Characteristics[6)]							
Turn-on Delay Time	$t_{d(on)}$	V_{DS} = 50V, V_{GS} = 10V, R_G = 3Ω, I_D = 20A		-	21	-	ns
Turn-on Rise Time	t_r			-	28	-	
Turn-Off Delay Time	$t_{d(off)}$			-	72	-	
Turn-Off Fall Time	t_f			-	37	-	
Total Gate Charge @ V_{GS} = 10V	Q_g	V_{DS} = 50V, I_D = 20A, V_{GS} = 10V,		-	134	-	nC
Total Gate Charge @ V_{GS} = 6V				-	86	-	
Gate-Source Charge	Q_{gs}			-	36	-	
Gate-Drain Charge	Q_{gd}			-	27	-	
Gate Resistance	R_g	V_{GS}=0V,V_{DS}=0V,f=1MHz		-	1.4	-	Ω
Drain-Source Diode Characteristics[6)]							
Reverse Recovery Time	t_{rr}	I_F=20A, d_i/d_t=100A/μs		-	85	-	ns
Reverse Recovery Charge	Q_{rr}			-	251	-	nC
Diode Forward Current	I_S	-		-	-	351	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

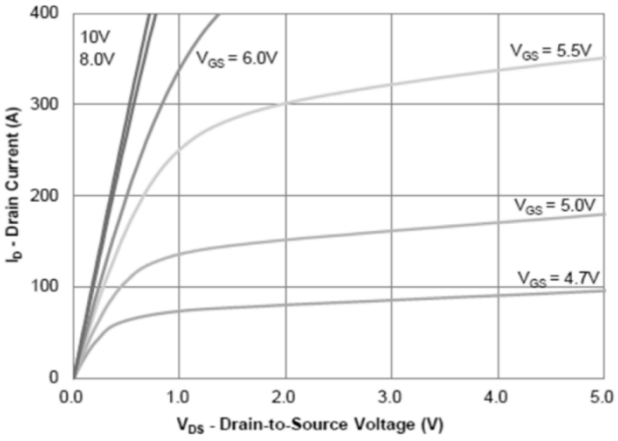


Figure 1: Output Characteristics

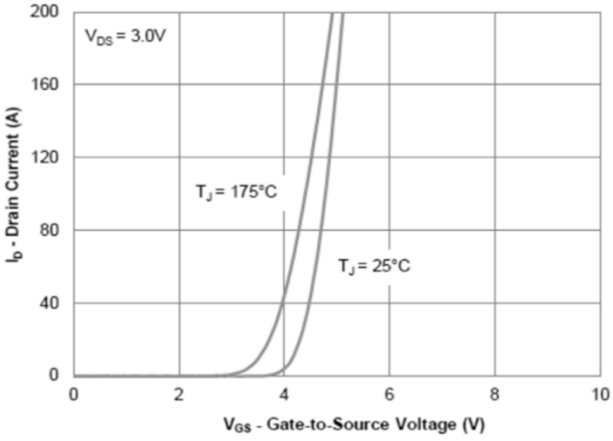


Figure 2: Transfer Characteristics

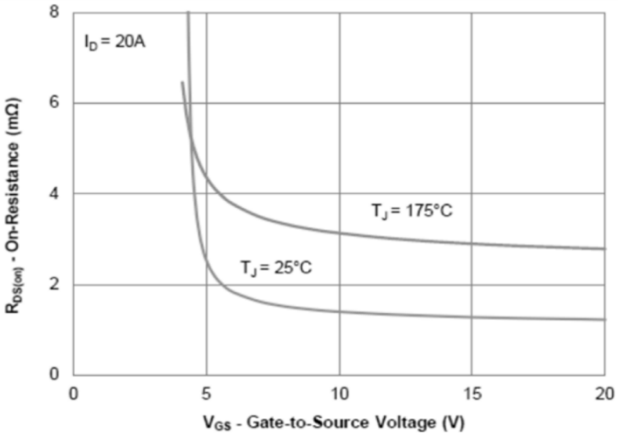


Figure 3: On-Resistance vs. Gate-Source Voltage

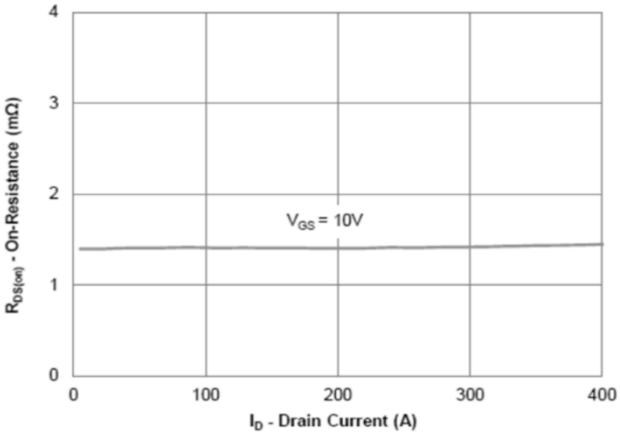


Figure 4: On-Resistance vs. Gate-Source Voltage

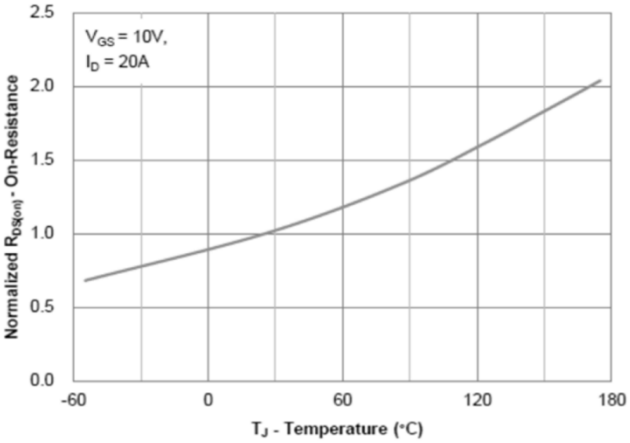


Figure 5: On-Resistance vs. Junction Temperature

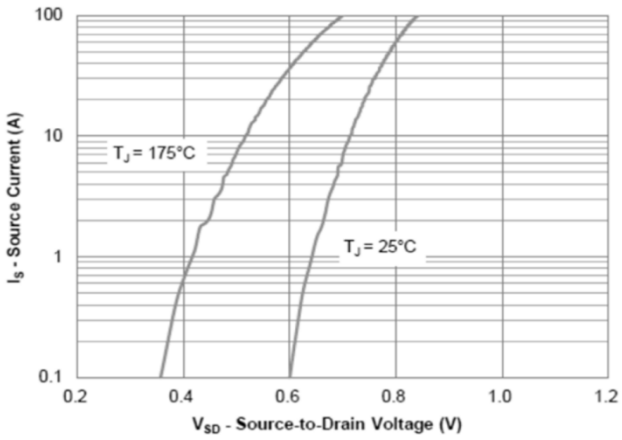


Figure 6: Source-Drain Diode Forward Voltage

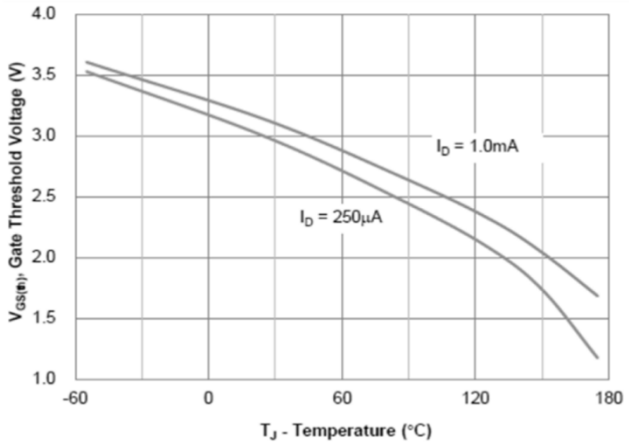


Figure 7: Gate Threshold Variation vs. Junction Temperature

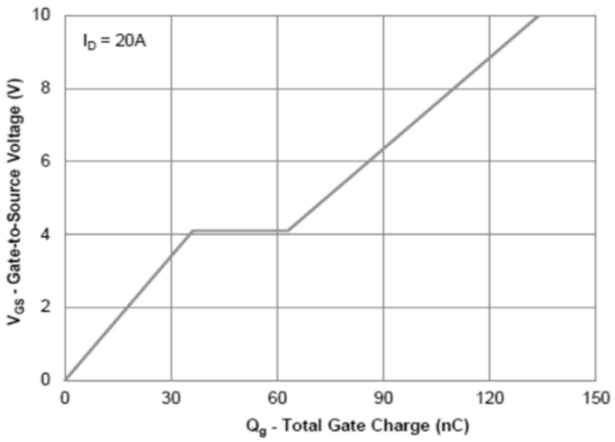


Figure 8: Gate Charge Characteristics

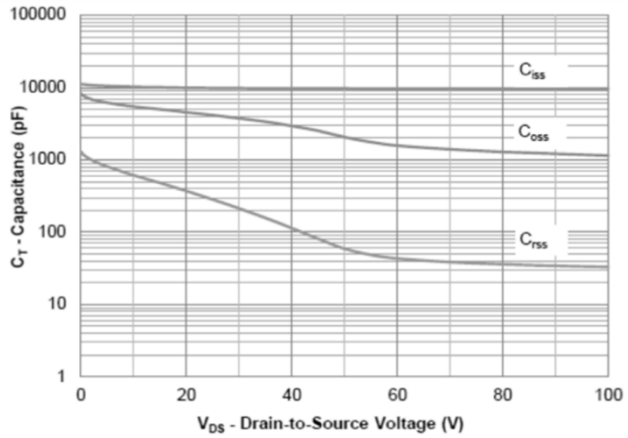


Figure 9: Capacitance Characteristics

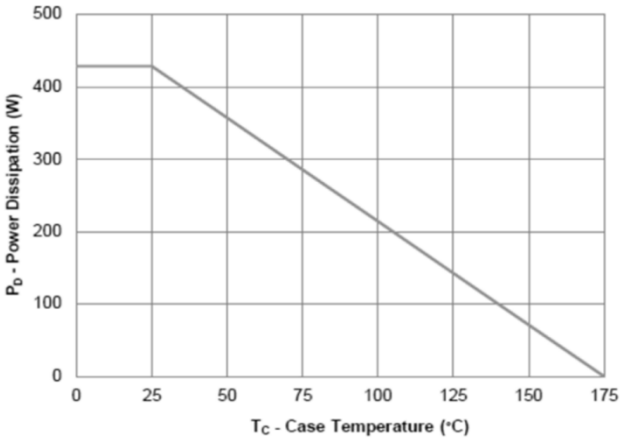


Figure 10: Power Derating

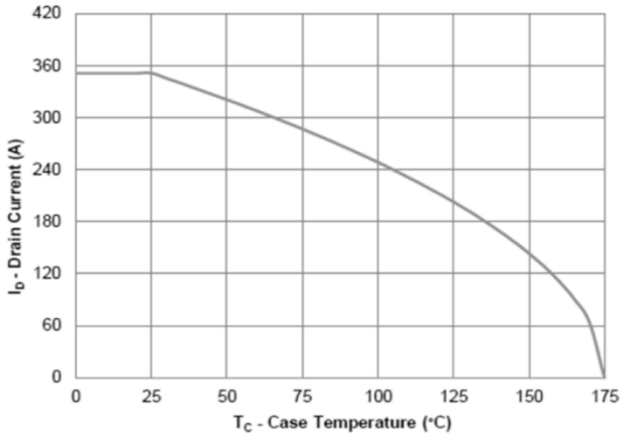


Figure 11: Current Derating

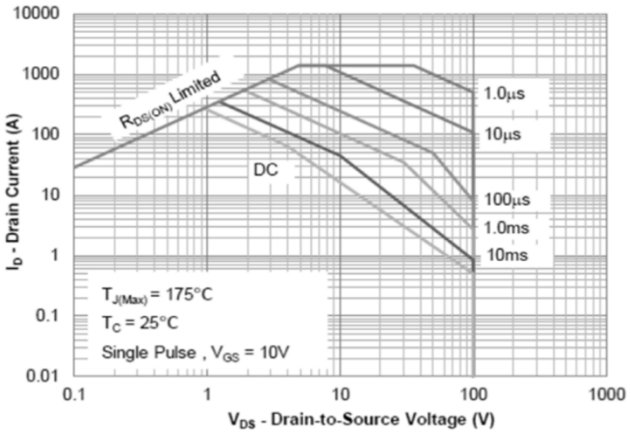


Figure 12: Safe Operating Area

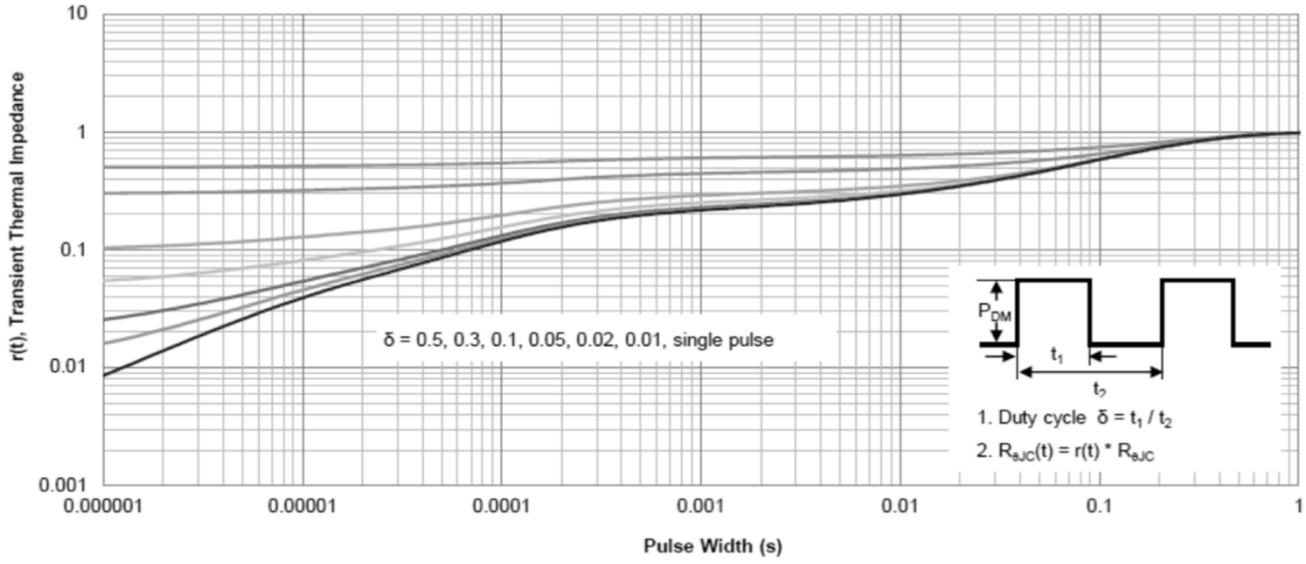
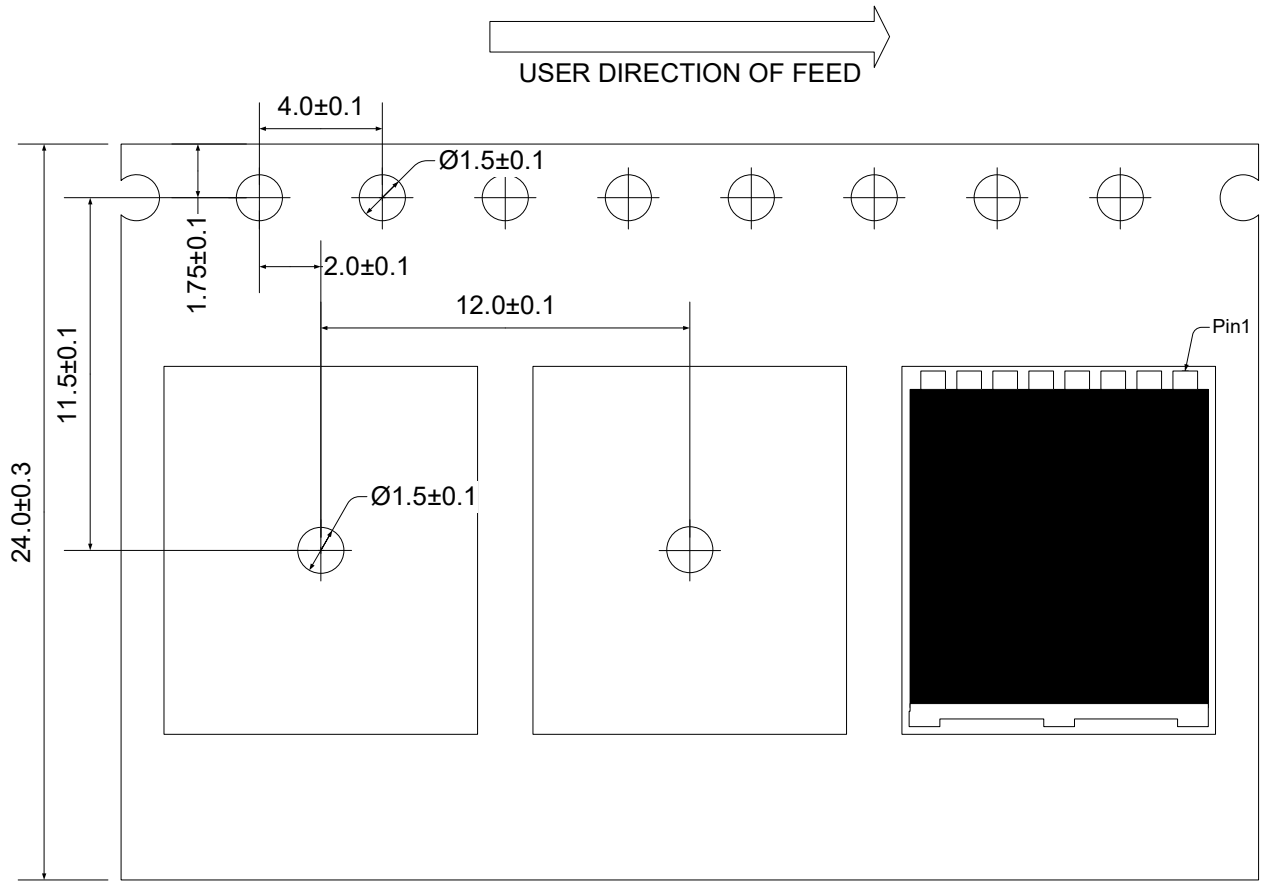


Figure 13: Normalized Maximum Transient Thermal Impedance

Ordering Information

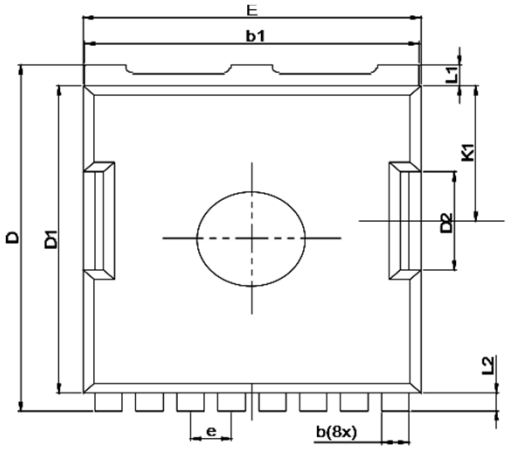
Device	Package	Reel	Shipping
PSMTL10R2	TOLL-8L	13"	2000 / Tape & Reel

Load With Information

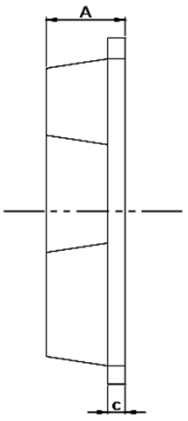


Unit:mm

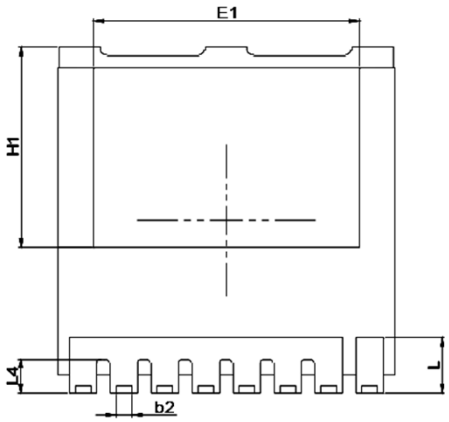
Product Dimension (TOLL-8L)



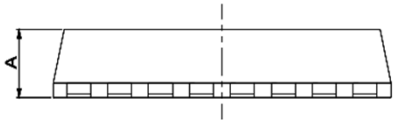
Top View



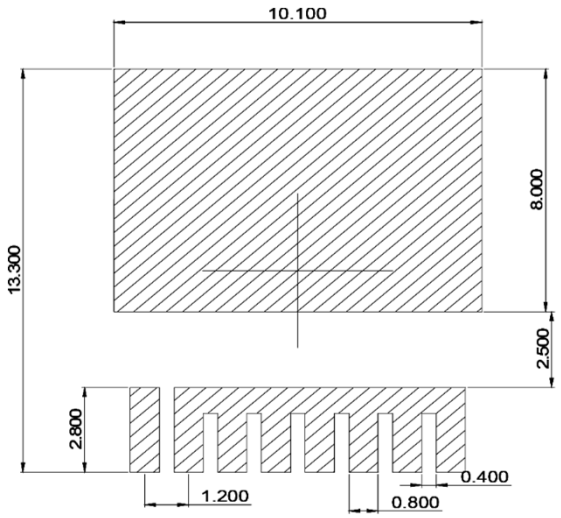
Side View



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

IMPORTANT NOTICE

Prisemi® and Prisemi® are registered trademarks of **Prisemi Electronics Co., Ltd** (Prisemi**),** Prisemi reserves the right to make changes without further notice to any products herein. Prisemi makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Prisemi assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. “Typical” parameters which may be provided in Prisemi data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including “Typicals” must be validated for each customer application by customer’s technical experts. Prisemi does not convey any license under its patent rights nor the rights of others. The products listed in this document are designed to be used with ordinary electronic equipment or devices, Should you intend to use these products with equipment or devices which require an extremely high level of reliability and the malfunction of with would directly endanger human life (such as medical instruments, aerospace machinery, nuclear-reactor controllers, fuel controllers and other safety devices), please be sure to consult with our sales representative in advance.

Website: http://www.prisemi.com
For additional information, please contact your local Sales Representative.