Prisemi®

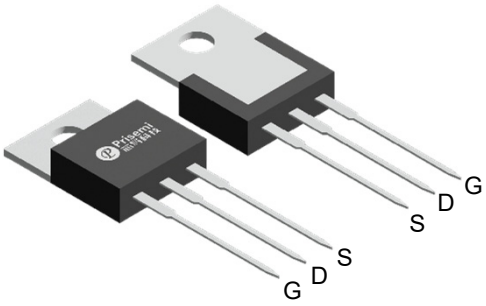
PSMTO12R9L

N-Channel MOSFET

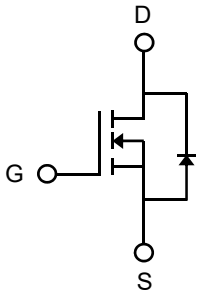
Description

The PSMTO12R9L 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.

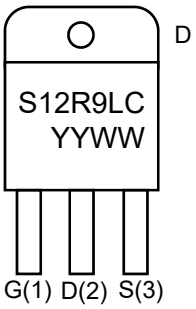
MOSFET Product Summary		
V_{DS}(V)	$R_{DS(on)}$(mΩ)	I_D(A)
120	8.2@ V_{GS} = 10V	100



Bottom View



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}	120	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	100	A
Pulsed Drain Current[1)]	I_{DM}	330	A
Total Power Dissipation[2)]	P_D	116	W
Thermal Resistance , Junction-case	$R_{\theta JC}$	0.702	℃/W
Thermal Resistance Junction-to-Ambient @ Steady State[2)]	$R_{\theta JA}$	51.5	℃/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	120	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}= 120V,V_{GS}= 0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}= ±20V, V_{DS}= 0V	-	-	±100	nA
On Characteristics[3]						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}= V_{GS}, I_D= 250μA	1.55	1.95	2.35	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}= 10V, I_D= 20A	-	8.2	10	mΩ
		V_{GS}= 10V, I_D= 75A	-	8.9	11	
Dynamic Parameters[4]						
Input Capacitance	C_{iss}	V_{DS}= 60V,V_{GS}= 0V, f= 1MHz	-	2256	-	pF
Output Capacitance	C_{oss}		-	247	-	
Reverse Transfer Capacitance	C_{rss}		-	3.43	-	
Switching Parameters[4]						
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 60V, V_{GS} = 10V, R_G = 10Ω,I_D = 20A	-	4.9	-	ns
Turn-on Rise Time	t_r		-	15.7	-	
Turn-Off Delay Time	$t_{d(off)}$		-	82	-	
Turn-Off Fall Time	t_f		-	40	-	
Total Gate Charge	Q_g	V_{DD}= 60V,I_D= 20A, V_{GS}= 10V	-	18	-	nC
Gate-Source Charge	Q_{gs}		-	6.9	-	
Gate-Drain Charge	Q_{gd}		-	7.4	-	
Gate Resistance	R_g	V_{GS}=0V, V_{DS}=0V,f=1MHz	-	6.5	-	Ω
Drain-Source Diode Characteristics						
Diode Forward Voltage[3]	V_{SD}	V_{GS}= 0V,I_S= 20A	-	0.83	1.1	V

Notes:
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. The value of $R_{\theta JA}$ is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper in a still air environment with T_a = 25℃.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production

Typical Characteristics

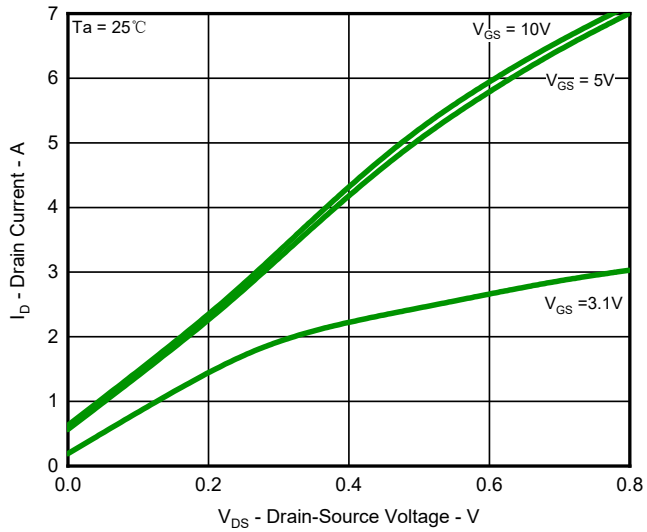


Fig.1 Output Characteristics

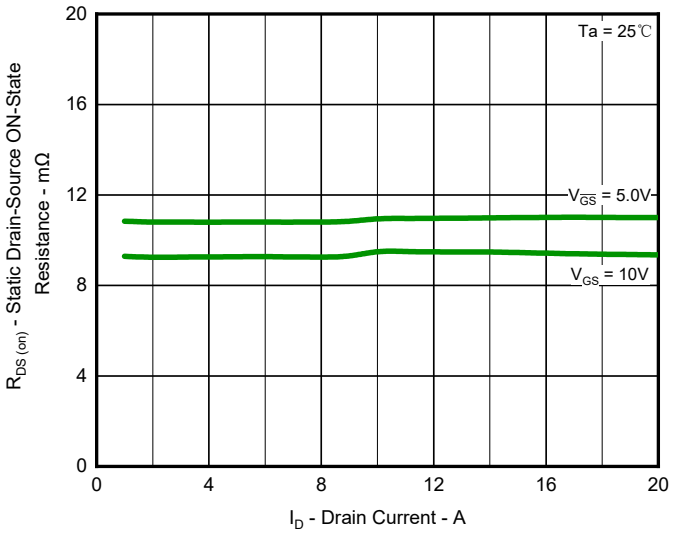


Fig.2 On-Resistance vs. Drain Current

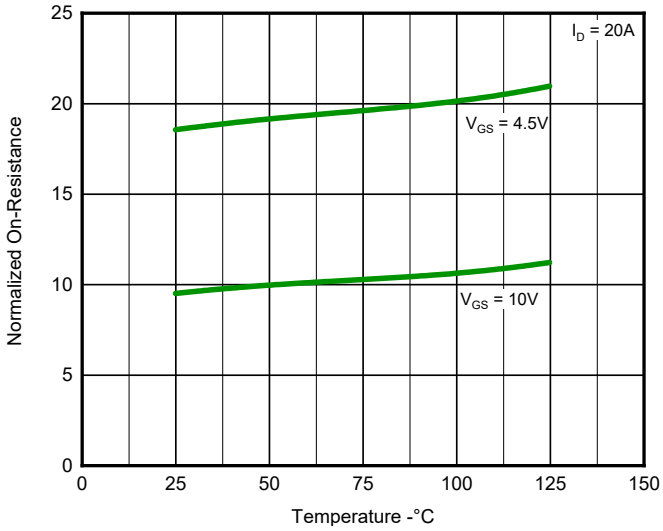


Fig.3 Normalized On-Resistance vs. Junction Temperature

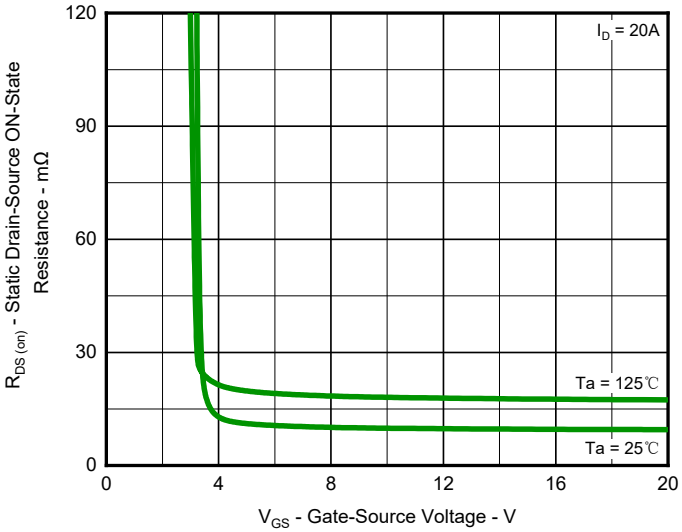


Fig.4 On-Resistance vs. Gate-Source Voltage

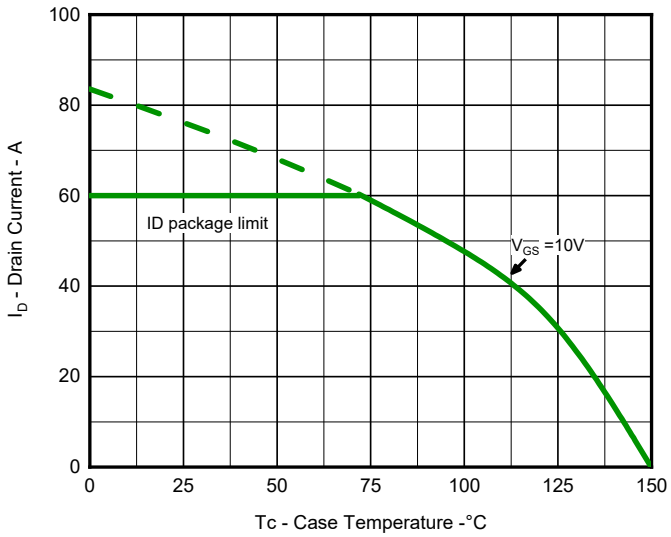


Fig.5 Maximun Drain Current vs. Case Temperature

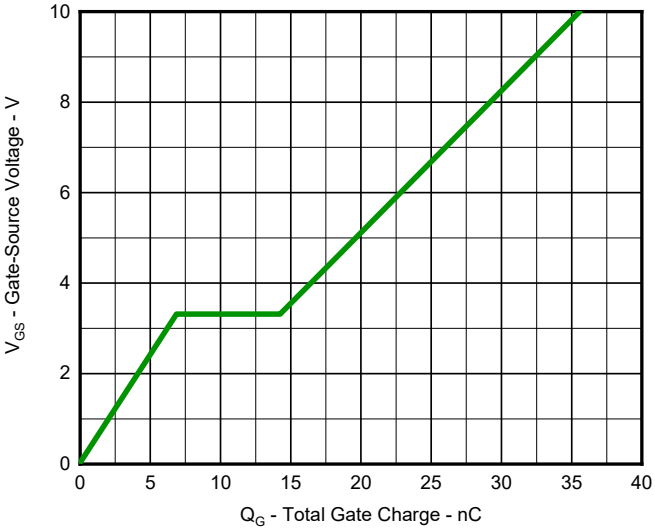


Fig.6 Gate Charge Characteristics

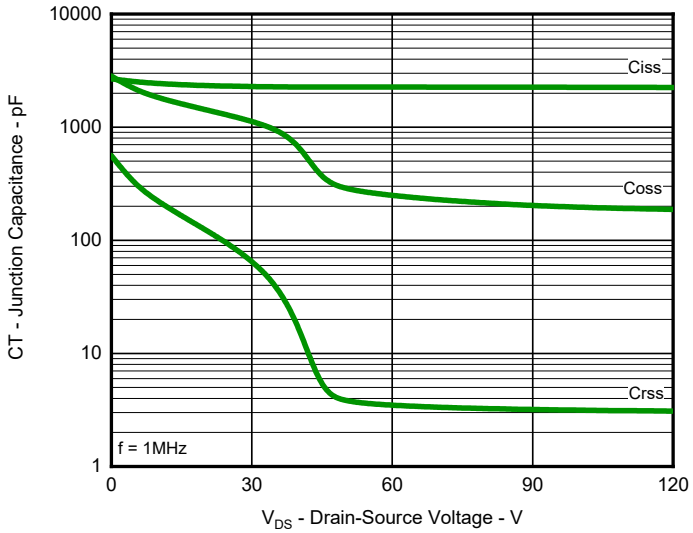


Fig.7 Typical Junction Capacitance

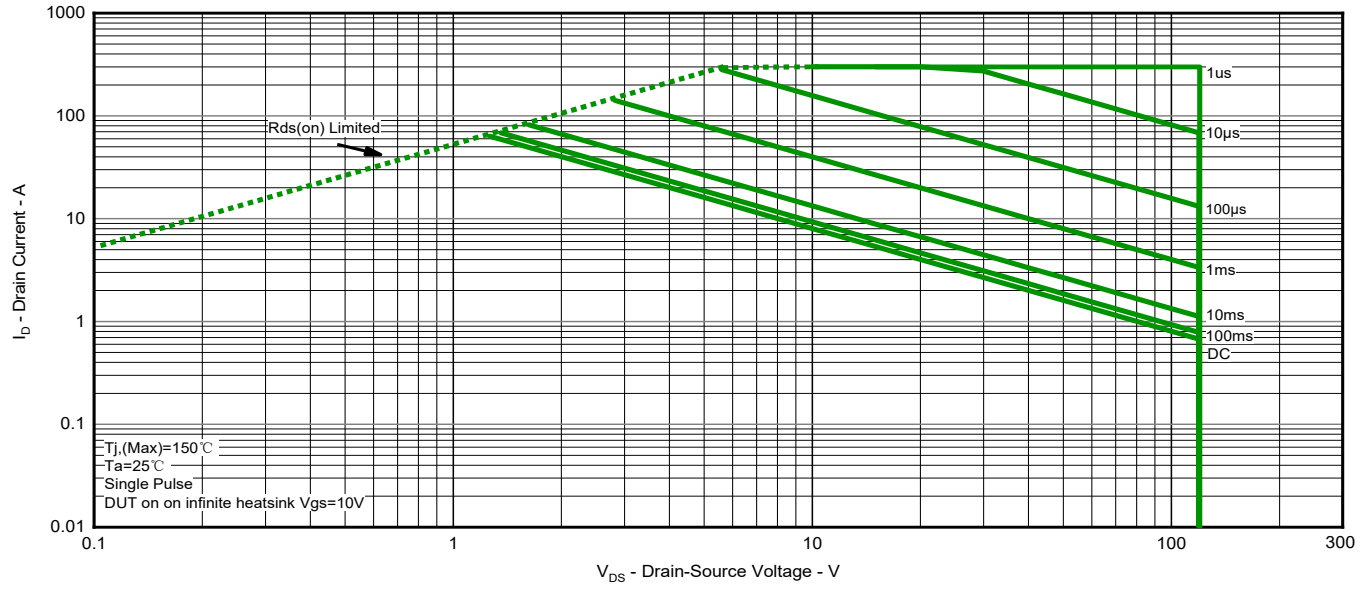


Fig.8 Safe Operation Area

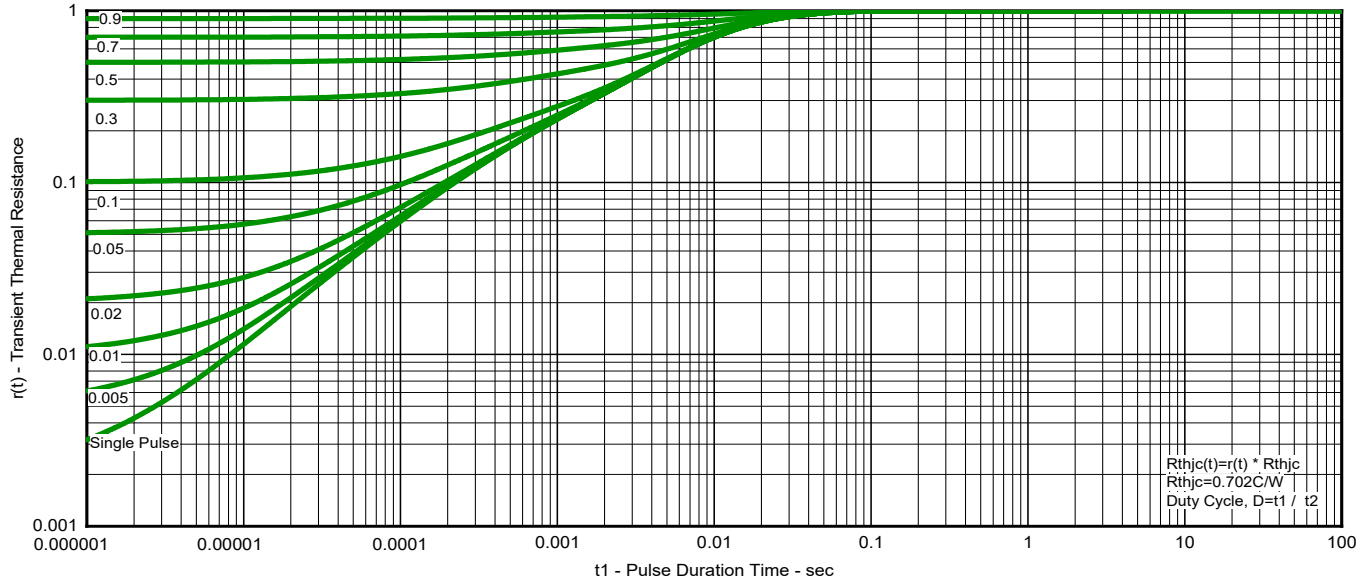
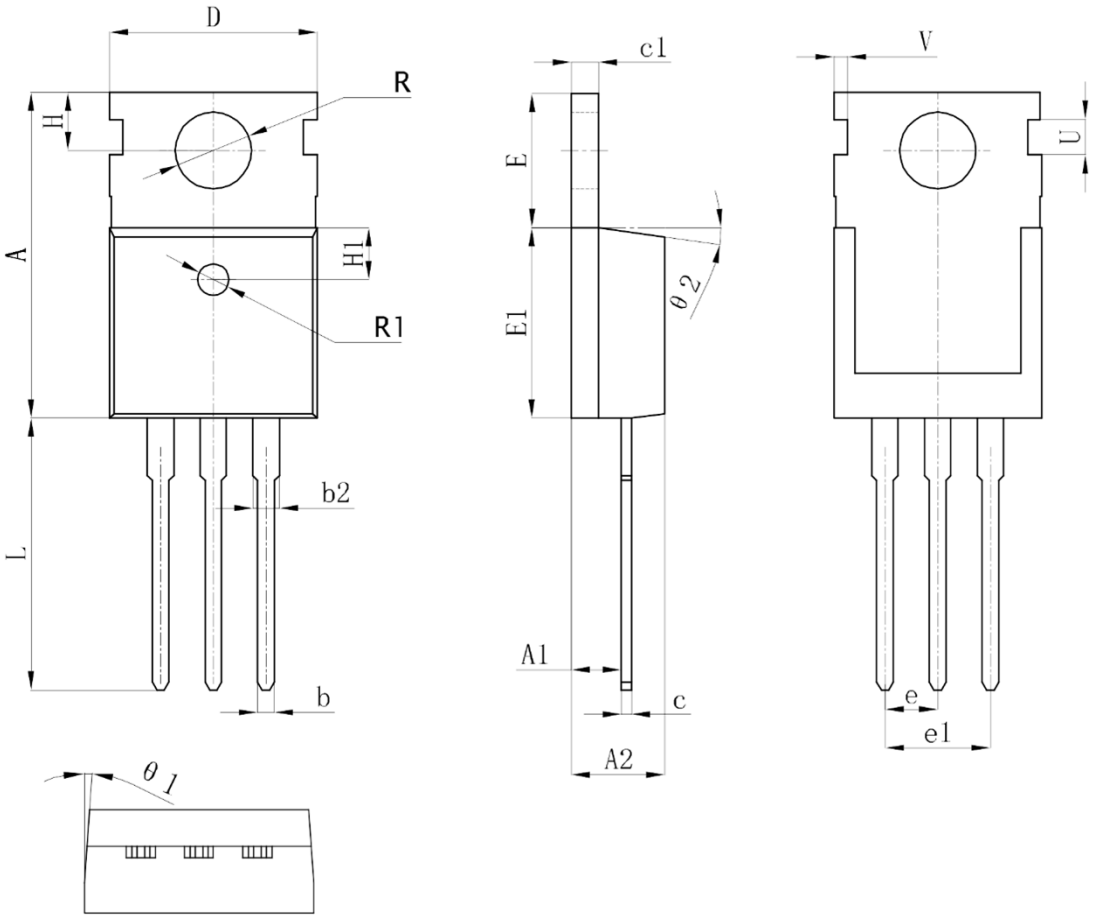


Fig.9 Transient Thermal Resistance

Product dimension (TO-220)



Dim	Millimeters		Inches		Dim	Millimeters		Inches	
	Min	Max	Min	Max		Min	Max	Min	Max
A	15.40	15.80	0.606	0.622	e1	4.84	5.32	0.191	0.209
A1	2.35	2.50	0.093	0.098	H	2.73	2.87	0.107	0.113
A2	4.40	4.70	0.173	0.185	H1	2.40	2.60	0.094	0.102
b	0.70	0.90	0.028	0.035	L	13.02	13.72	0.513	0.540
b2	1.18	1.44	0.046	0.057	R	3.50	3.63	0.138	0.143
c	0.48	0.56	0.019	0.022	R1	1.40	1.60	0.055	0.063
c1	1.29	1.32	0.051	0.052	U	1.65	1.85	0.065	0.073
D	9.80	10.20	0.386	0.402	V	0.58	0.78	0.023	0.031
E	6.40	6.60	0.252	0.260	θ1	2°	3°	2°	3°
E1	9.00	9.20	0.354	0.362	θ2	6.5°	7.5°	6.5°	7.5°
e	2.42	2.66	0.095	0.105					

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