Prisemi®

PSMTO100V120

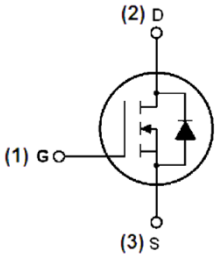
N-Channel MOSFET

Description

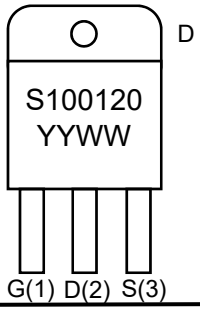
The PSMTO100V120 uses split gate trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. This device is suitable for power management and high efficiency applications at high switching frequencies applications.

MOSFET Product Summary		
V_{DS}(V)	$R_{DS(on)}$(mΩ)	I_D(A)
100	3.2@ V_{GS} = 10V	189

TO-220 (Top View)



Schematic 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	189	A
	T_C=100℃		134	
Pulsed Drain Current[2)]		I_{DM}	757	A
Single Pulse Avalanche Current @ L=0.1mH		I_{AS}	72	A
Single Pulse Avalanche Energy @ L=0.1mH		E_{AS}	259	mJ
Total Power Dissipation[4)]	T_C=25℃	P_D	254	W
	T_C=100℃		127	
Thermal Resistance , Junction-to-Case[4)]		$R_{\theta JC}$	0.59	℃/W
Thermal Resistance Junction-to-Ambient [3)]		$R_{\theta JA}$	32	℃/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		-	3.2	3.8	mΩ
Forward Transconductance	g_{fs}	V_{DS}=5V,I_D=20A		-	46	-	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} = 100V,V_{GS} = 0V, f = 1.0MHz		-	4799	-	pF
Output Capacitance	C_{oss}			-	1256	-	
Reverse Transfer Capacitance	C_{rss}			-	50	-	
Switching Characteristics[6)]							
Turn-on Delay Time	$t_{d(on)}$	V_{DS} = 100V, V_{GS} = 10V, I_D = 20A, R_{GEN} = 3Ω		-	10	-	ns
Turn-on Rise Time	t_r			-	17	-	
Turn-Off Delay Time	$t_{d(off)}$			-	44	-	
Turn-Off Fall Time	t_f			-	23	-	
Total Gate Charge @ V_{GS} =10V	Q_g	V_{DS} = 100V,I_D = 20A, V_{GS} = 10V		-	68	-	nC
Total Gate Charge @ V_{GS} =6V				-	44	-	
Gate-Source Charge	Q_{gs}			-	19	-	
Gate-Drain Charge	Q_{gd}			-	15	-	
Gate Resistance	R_g	V_{GS}=0V, V_{DS}=0V, f=1MHz		-	1.5	-	Ω
Drain-Source Diode Characteristics							
Reverse Recovery Time	t_{rr}	I_F=20A ,di/dt=100A/μs		-	62	-	ns
Reverse Recovery Charge	Q_{rr}			-	130	-	nC
Diode Forward Current	I_S	-		-	-	189	A

Notes:

1. Pluse 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

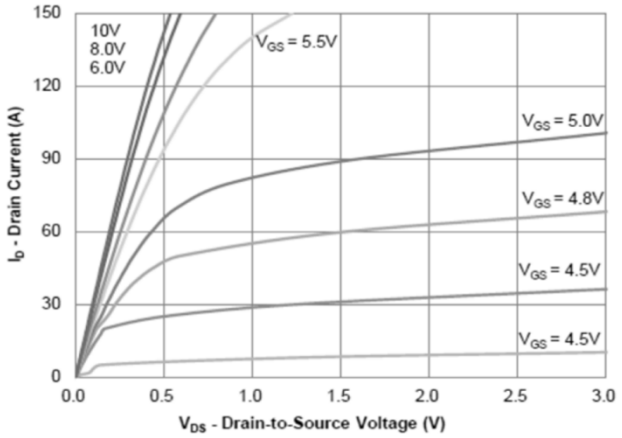


Figure 1: Output Characteristics

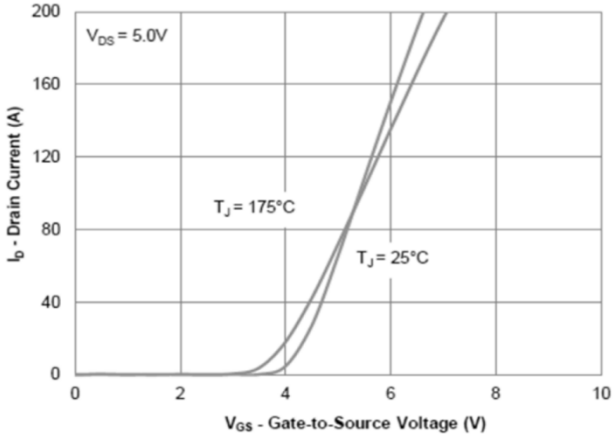


Figure 2: Transfer Characteristics

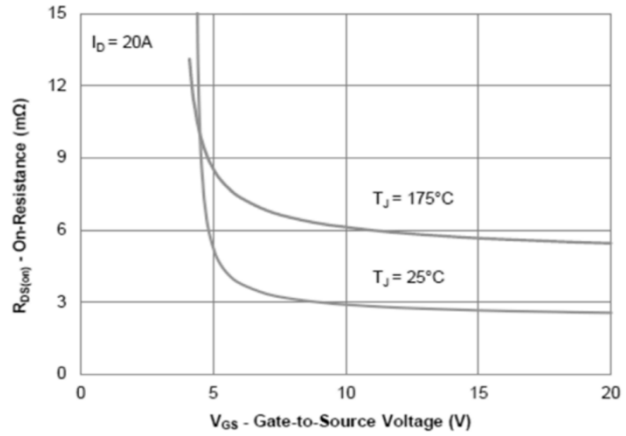


Figure 3: On-Resistance vs. Gate-Source Voltage

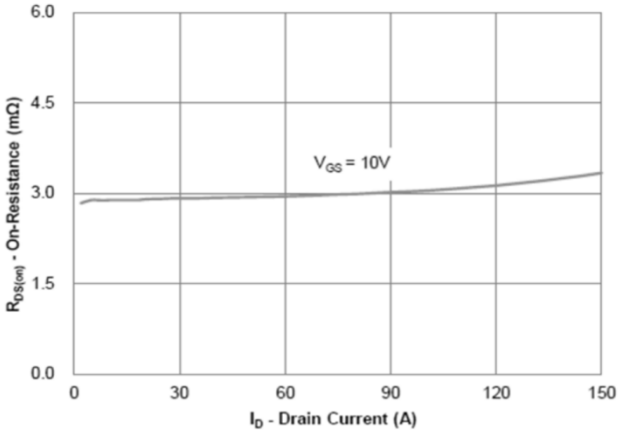


Figure 4: On-Resistance vs. Gate-Source Voltage

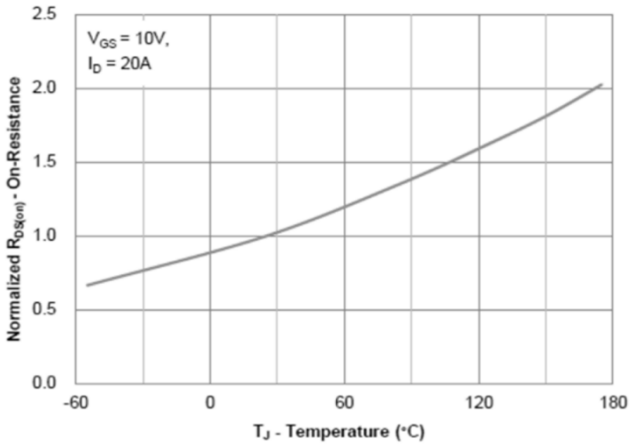


Figure 5: On-Resistance vs. Junction Temperature

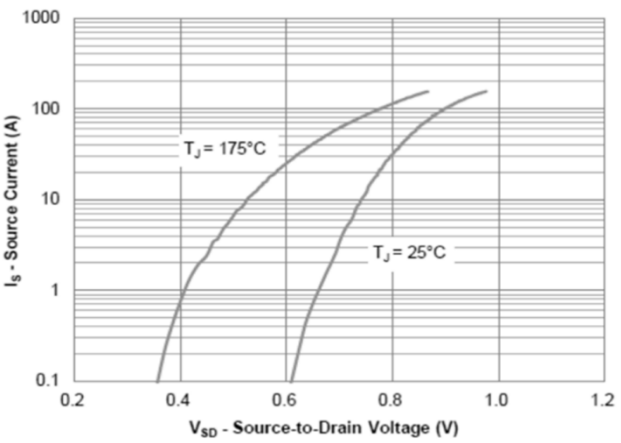


Figure 6: Source-Drain Diode Forward Voltage

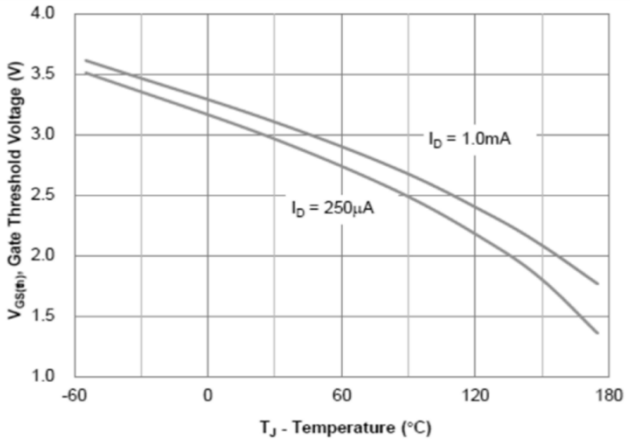


Figure 7: Gate Threshold Variation vs. Junction Temperature

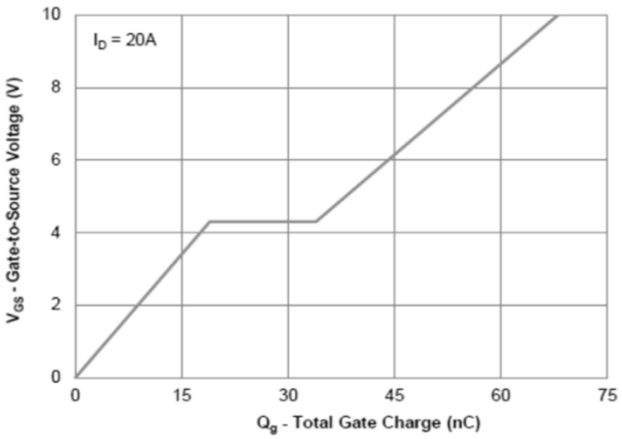


Figure 8: Gate Charge Characteristics

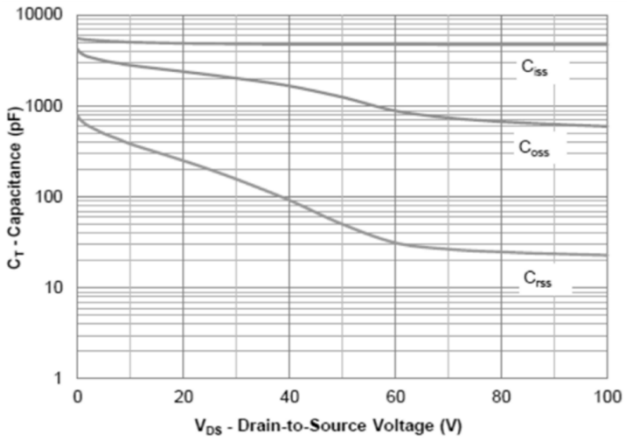


Figure 9: Capacitance Characteristics

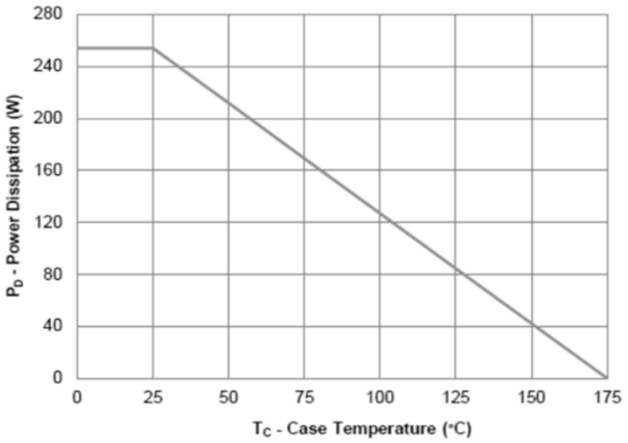


Figure 10: Power Derating

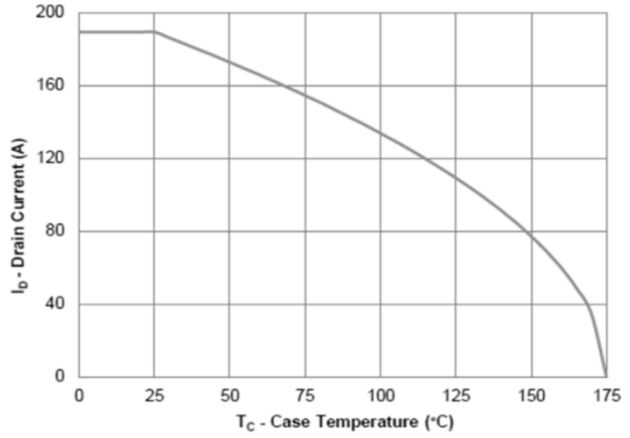


Figure 11: Current Derating

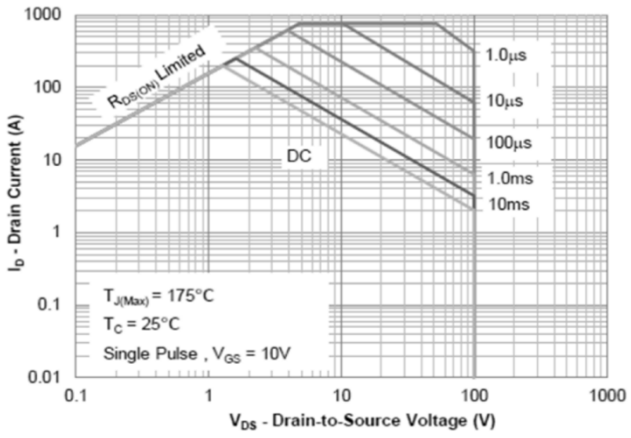


Figure 12: Safe Operating Area

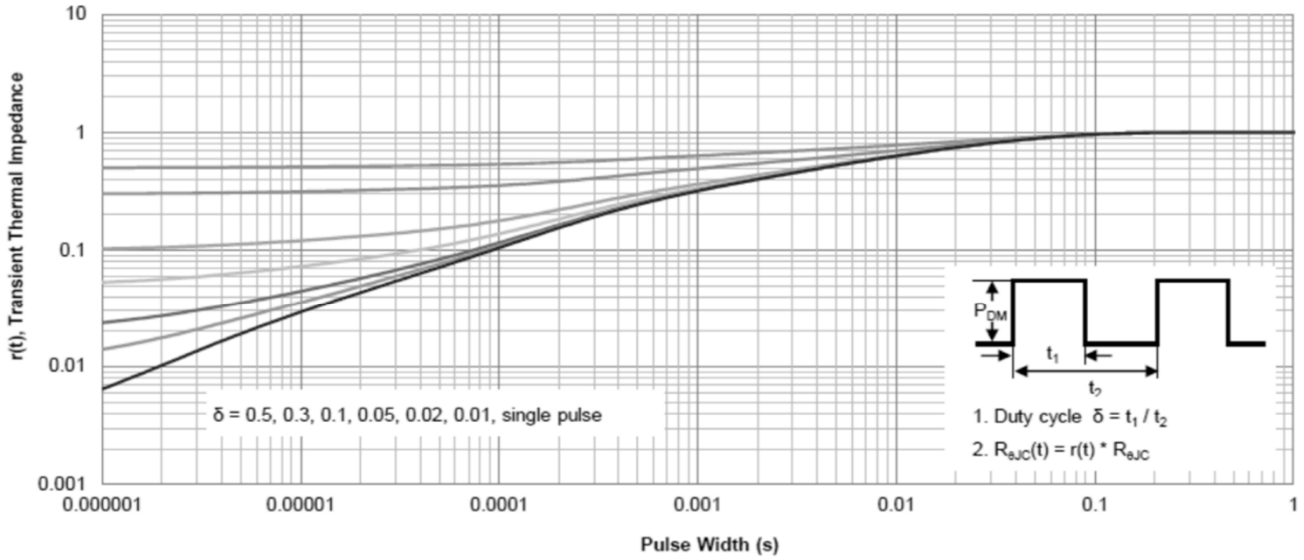
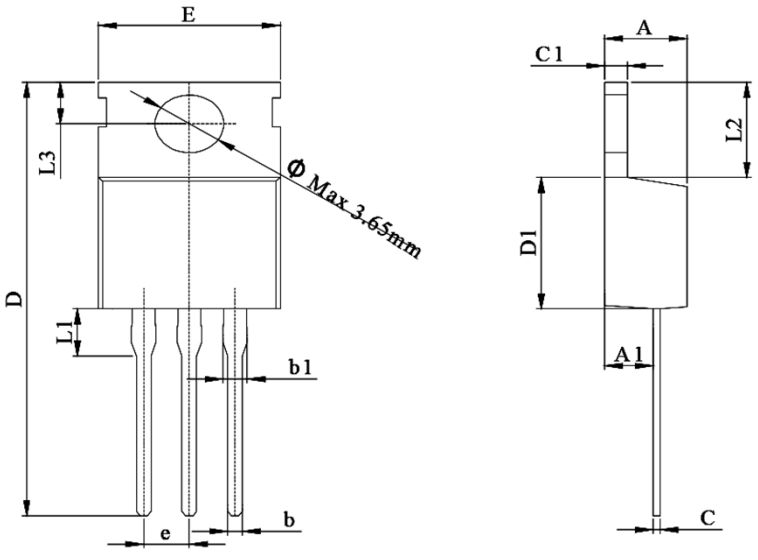


Figure 13: Normalized Maximum Transient Thermal Impedance

Product Dimension (TO-220)



Dim	Millimeters		Inches	
	Min	Max	Min	Max
A	4.37	4.70	0.172	0.185
A1	2.20	3.00	0.087	0.118
b	0.70	0.95	0.028	0.037
b1	1.14	1.65	0.045	0.065
C	0.45	0.60	0.018	0.024
C1	1.23	1.40	0.048	0.055
D	28.00	29.80	1.102	1.173
D1	8.90	9.90	0.350	0.390
E	9.70	10.50	0.382	0.413
L1	-	4.00	-	0.157
L2	6.25	6.90	0.246	0.272
L3	2.40	3.00	0.094	0.118
e	2.54 BSC.		0.010 Ref.	

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