

PWM20NP1K1SQ

20V N-Channel + P-Channel MOSFET

-3A -20V; $R_{DS(ON)typ}=68m\Omega@-4.5V$, $R_{DS(ON)typ}=95m\Omega@-2.5V$.
 3.5A20V; $R_{DS(ON)typ}=32m\Omega@4.5V$, $R_{DS(ON)typ}=50m\Omega@2.5V$.

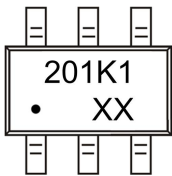
FEATURE

- TrenchFET Power MOSFET
- High Density Cell Design for Low $R_{DS(ON)}$
- Voltage Controlled Small Signal Switch

Application

- Load Switch for Portable Devices
- DC/DC Converter

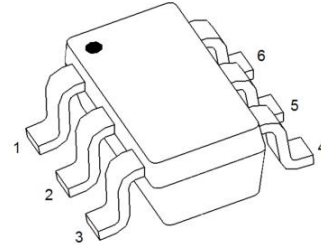
MARKING:



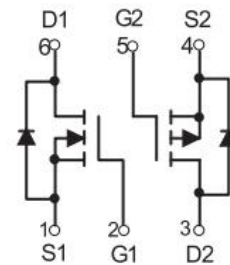
201K1 = Device Code

XX = Date Code

SOT-23-6L



Schematic diagram



ABSOLUTE MAXIMUM RATINGS (T_a=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
P-MOSFET			
Drain-Source Voltage	V _{DS}	-20	V
Gate-Source Voltage	V _{GS}	±12	V
Continuous Drain Current	I _D	-3	A
Pulsed Drain Current ⁽¹⁾	I _{DM}	-12	A
Power Dissipation	P _D	0.75	W
N-MOSFET			
Drain-Source Voltage	V _{DS}	20	V
Gate-Source Voltage	V _{GS}	±12	V
Continuous Drain Current	I _D	3.5	A
Pulsed Drain Current ⁽¹⁾	I _{DM}	14	A
Power Dissipation	P _D	0.75	W
Temperature and Thermal Resistance			
Thermal Resistance from Junction to Ambient ⁽²⁾	R _{θJA}	167	°C/W
Junction Temperature	T _J	150	°C
Storage Temperature	T _{STG}	-55~ +150	°C

P-channel MOSFET ELECTRICAL CHARACTERISTICS(T_a=25°C unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
STATIC CHARACTERISTICS						
Drain-source breakdown voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D = -250μA	-20			V
Zero gate voltage drain current	I _{DSS}	V _{DS} = -16V, V _{GS} = 0V			-1	μA
Gate-body leakage current	I _{GSS}	V _{GS} = ±8V, V _{DS} = 0V			±100	μA
Gate threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = -250μA	-0.4	-0.7	-1.0	V
Drain-source on-resistance ⁽³⁾	R _{DS(on)}	V _{GS} = -4.5V, I _D = -3A		68	90	mΩ
		V _{GS} = -2.5V, I _D = -2A		95	125	
Forward tranconductance	g _{FS}	V _{DS} = -5V, I _D = -2.0A	3			S
Diode forward voltage ⁽³⁾	V _{DS}	I _S = -0.7A, V _{GS} = 0V			-1.2	V
DYNAMIC CHARACTERISTICS⁽⁴⁾						
Input Capacitance	C _{iss}	V _{DS} = -10V, V _{GS} = 0V, f = 1MHz		363		pF
Output Capacitance	C _{oss}			70		
Reverse Transfer Capacitance	C _{rss}			60		
Total gate charge	Q _g	V _{DS} = -10V, V _{GS} = -2.5V, I _D = -3A		3.2		nC
Gate-source charge	Q _{gs}			0.6		
Gate-drain charge	Q _{gd}			1.2		
SWITCHING CHARACTERISTICS⁽⁴⁾						
Turn-on delay time	t _{d(on)}	V _{DD} = -10V, V _{GEN} = -4.5V, I _D = -1A R _L = 10Ω, R _{GEN} = 1Ω		9		nS
Turn-on rise time	t _r			33		
Turn-off delay time	t _{d(off)}			29		
Turn-off fall time	t _f			9		

N-channel MOSFET ELECTRICAL CHARACTERISTICS(T_a=25°C unless otherwise noted)

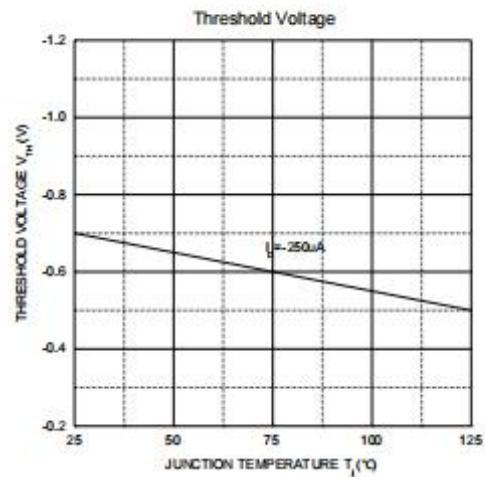
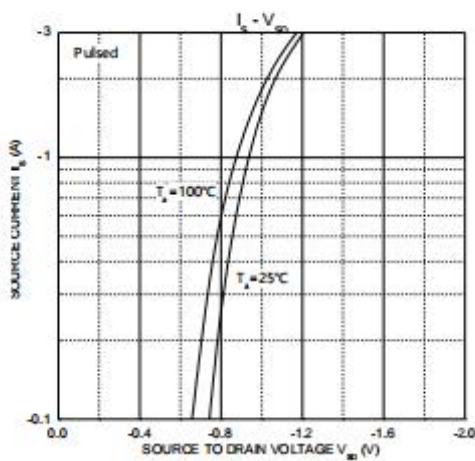
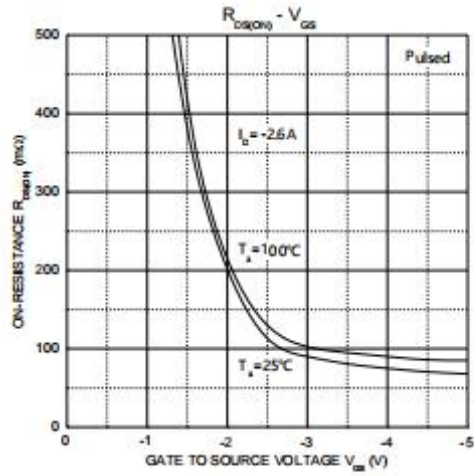
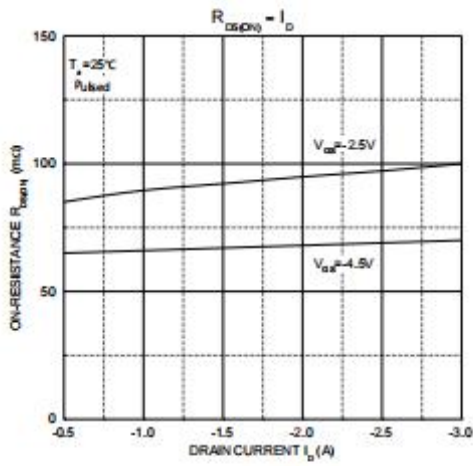
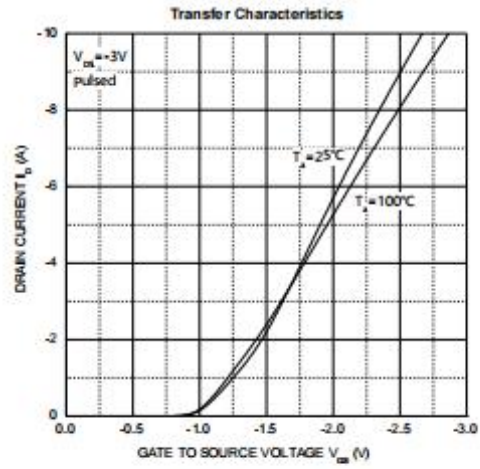
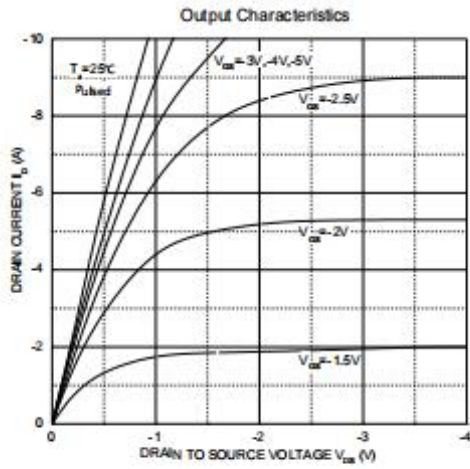
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
STATIC CHARACTERISTICS						
Drain-source breakdown voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D = 250μA	20			V
Zero gate voltage drain current	I _{DSS}	V _{DS} = 16V, V _{GS} = 0V			1	μA
Gate-body leakage current	I _{GSS}	V _{GS} = ±8V, V _{DS} = 0V			±100	μA
Gate threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	0.6	0.8	1.2	V
Drain-source on-resistance ⁽³⁾	R _{DS(on)}	V _{GS} = 4.5V, I _D = 3A		32	42	mΩ
		V _{GS} = 2.5V, I _D = 3A		50	65	
Forward tranconductance	g _{FS}	V _{DS} = 5V, I _D = 3.6A		8		S
Diode forward voltage ⁽³⁾	V _{DS}	V _{GS} = 0V, I _S = 0.94A			1.2	V
DYNAMIC CHARACTERISTICS⁽⁴⁾						
Input Capacitance	C _{iss}	V _{DS} = 10V, V _{GS} = 0V, f = 1MHz		260		pF
Output Capacitance	C _{oss}			48		
Reverse Transfer Capacitance	C _{rss}			27		
Total gate charge	Q _g	V _{DS} = 10V, V _{GS} = 4.5V, I _D = 3.0A		2.9	5	nC
Gate-source charge	Q _{gs}			0.4		
Gate-drain charge	Q _{gd}			0.6		
SWITCHING CHARACTERISTICS⁽⁴⁾						
Turn-on delay time	t _{d(on)}	V _{DD} = 10V, R _L = 3.3Ω, V _{GEN} = 4.5V, R _g = 6Ω		2.5		nS
Turn-on rise time	t _r			3.2		
Turn-off delay time	t _{d(off)}			21		
Turn-off fall time	t _f			3		

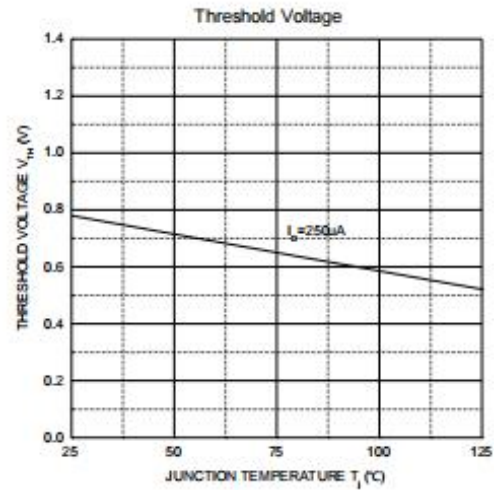
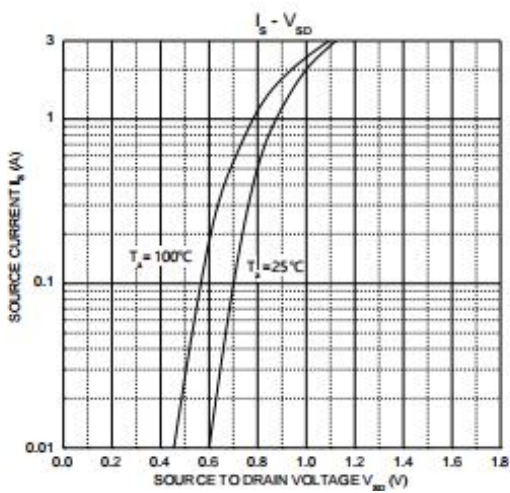
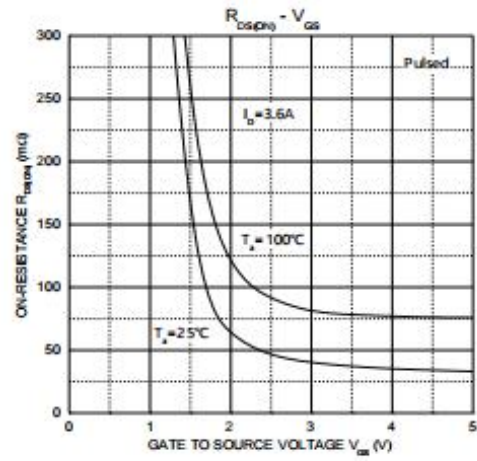
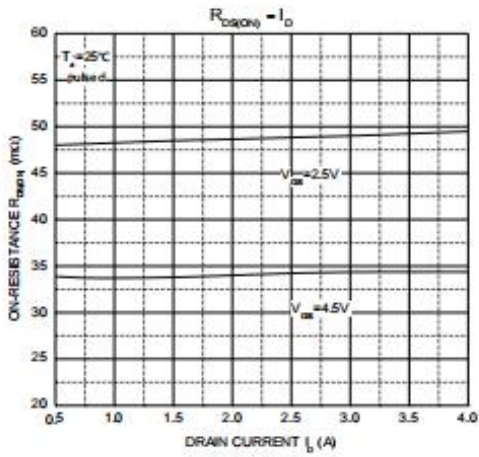
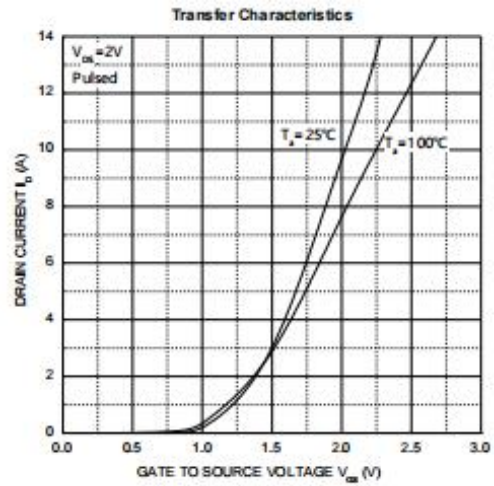
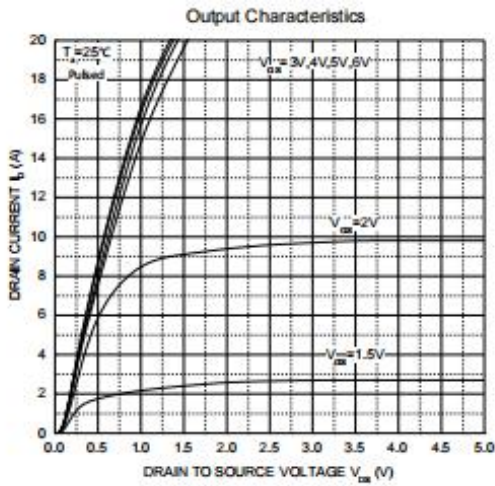
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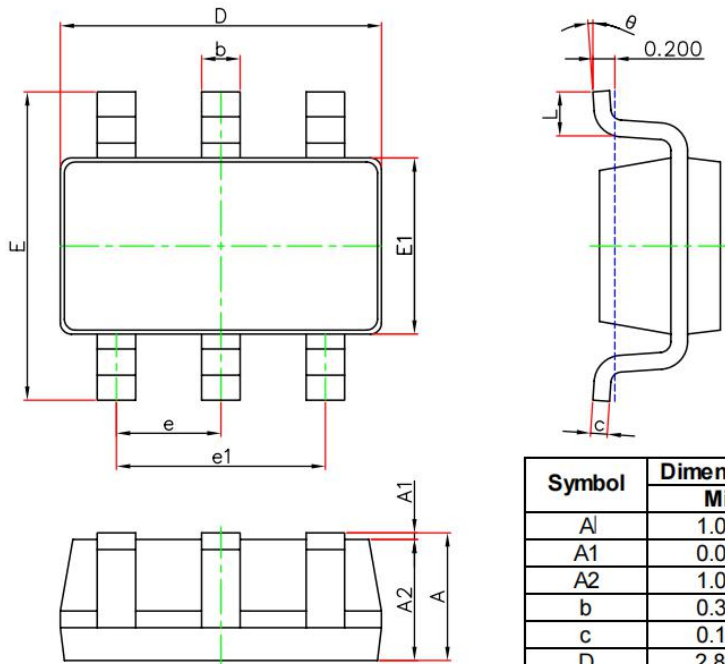
- 1.Repetitive Rating : Pulse width limited by maximum junction temperature.
- 2.Surface Mounted on FR4 Board, t < 5 sec.
- 3.Pulse Test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
- 4.Guaranteed by design, not subject to production testing.

Typical Electrical and Thermal Characteristics

P-Channel MOS



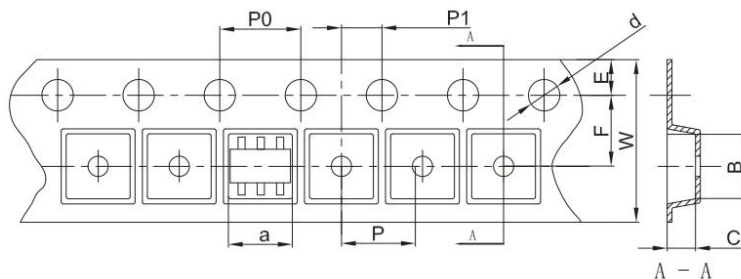




Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A1	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E1	1.500	1.700	0.059	0.067
E	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

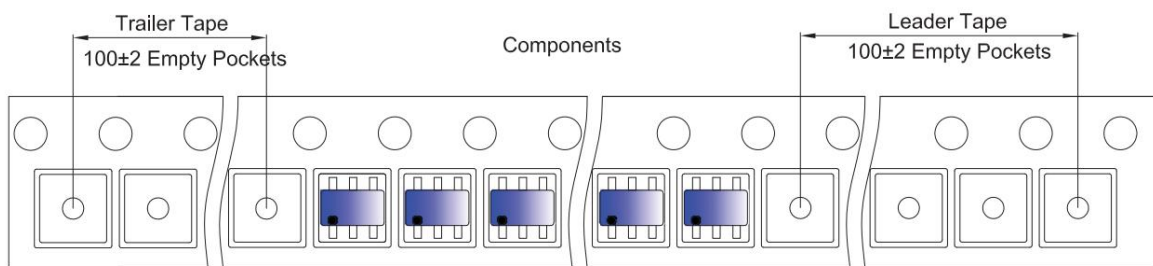
SOT-23-6L Tape and Reel

SOT-23-6L Embossed Carrier Tape

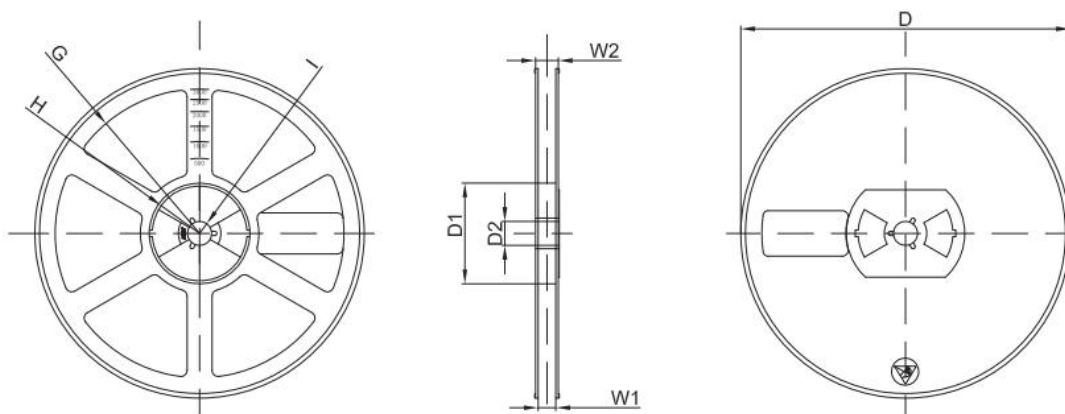


Dimensions are in millimeter										
Pkg type	a	B	C	d	E	F	P0	P	P1	W
SOT-23-6L	3.17	3.23	1.37	Ø1.55	1.75	3.50	4.00	4.00	2.00	8.00

SOT-23-6L Tape Leader and Trailer



SOT-23-6L Reel



Dimensions are in millimeter									
Reel Option	D	D1	D2	G	H	I	W1	W2	
7" Dia	Ø180.00	60.00	13.00	R78.00	R25.60	R6.50	9.50	13.10	

REEL	Reel Size	Box	Box Size(mm)	Carton	Carton Size(mm)	G.W.(kg)
3000 pcs	7 inch	30,000 pcs	203×203×195	120,000 pcs	438×438×220	