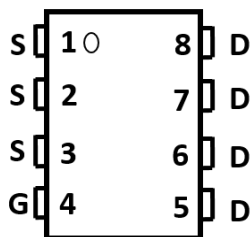
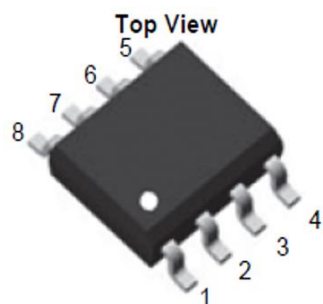
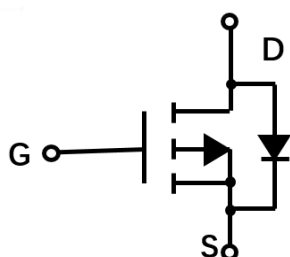


P-Channel Enhancement Mode Field Effect Transistor


SOP-8


Product Summary

- V_{DS} -20V
- I_D -13A
- $R_{DS(ON)}$ (at $V_{GS}=-4.5V$) <18 mohm
- $R_{DS(ON)}$ (at $V_{GS}=-2.5V$) <22 mohm
- $R_{DS(ON)}$ (at $V_{GS}=-1.8V$) <31 mohm

General Description

- Trench Power LV MOSFET technology
- High density cell design for Low $R_{DS(ON)}$
- High Speed switching

Applications

- Battery protection
- Load switch
- Power management

■ Absolute Maximum Ratings ($T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter		Symbol	Maximum	Unit
Drain-source Voltage		V_{DS}	-20	V
Gate-source Voltage		V_{GS}	± 10	V
Drain Current	$T_A=25^\circ\text{C}$ @ Steady State	I_D	-13	A
	$T_A=70^\circ\text{C}$ @ Steady State		-10.4	
Pulsed Drain Current ^A		I_{DM}	-55	A
Total Power Dissipation @ $T_A=25^\circ\text{C}$		P_D	3.0	W
Thermal Resistance Junction-to-Ambient @ Steady State ^B		$R_{\theta JA}$	42	$^\circ\text{C}/\text{W}$
Junction and Storage Temperature Range		T_J, T_{STG}	-55~+150	$^\circ\text{C}$

■ Ordering Information (Example)

PREFERRED P/N	Marking	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
TPM2020UX	2P18	4000	8000	64000	13" reel

■ Electrical Characteristics ($T_J=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0V, I _D =-250μA	-20			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-20V,V _{GS} =0V,T _C =25℃			-1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} = ±10V, V _{DS} =0V			±100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D =-250μA	-0.4	-0.62	-1.0	V
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} = -4.5V, I _D =-10A		14	18	mΩ
		V _{GS} = -2.5V, I _D =-6.5A		17	22	
		V _{GS} = -1.8V, I _D =-4.0A		21	31	
Diode Forward Voltage	V _{SD}	I _S =-13A,V _{GS} =0V		-0.8	-1.2	V
Maximum Body-Diode Continuous Current	I _S				-13	A
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{DS} =-10V,V _{GS} =0V,f=1MHZ		2050		pF
Output Capacitance	C _{oss}			411		
Reverse Transfer Capacitance	C _{rss}			362		
Switching Parameters						
Total Gate Charge	Q _g	V _{GS} =-10V,V _{DS} =-15V,I _D =-9.1A		30		nC
Gate Source Charge	Q _{gs}			5.3		
Gate Drain Charge	Q _{gd}			7.6		
Turn-on Delay Time	t _{D(on)}	V _{GS} =-10V,V _{DS} =-15V, I _D =-6A, R _{GEN} =2.5Ω		14		ns
Turn-on Rise Time	t _r			20		
Turn-off Delay Time	t _{D(off)}			95		
Turn-off Fall Time	t _f			65		

A. Repetitive Rating: Pulse width limited by maximum junction temperature.

B. Surface Mounted on FR4 Board, $t \leq 10$ sec.



■ Typical Performance Characteristics

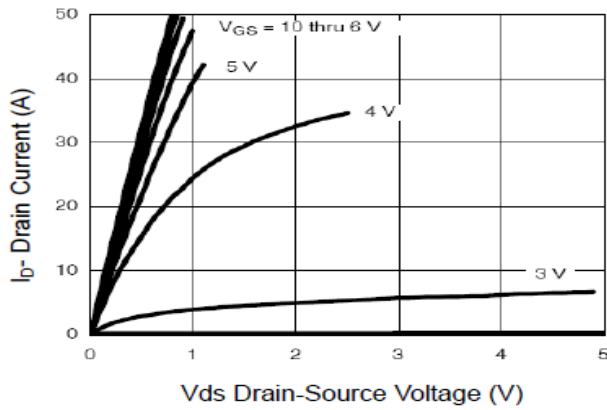


Figure1. Output Characteristics

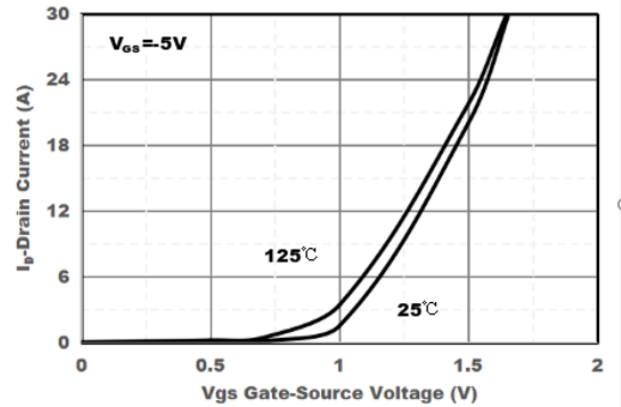


Figure2. Transfer Characteristics

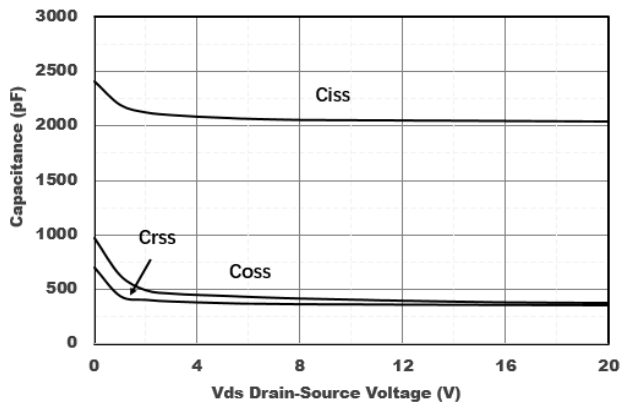


Figure3. Capacitance Characteristics

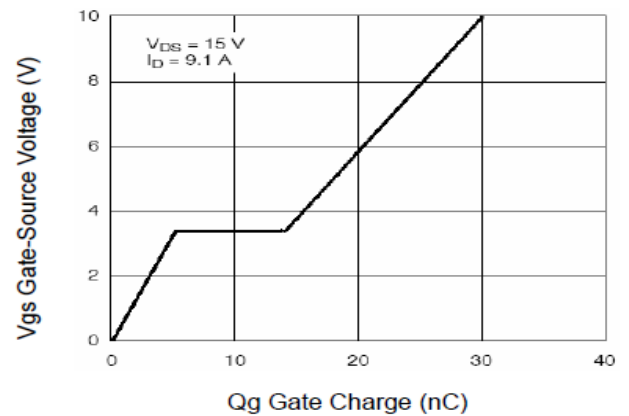


Figure4. Gate Charge

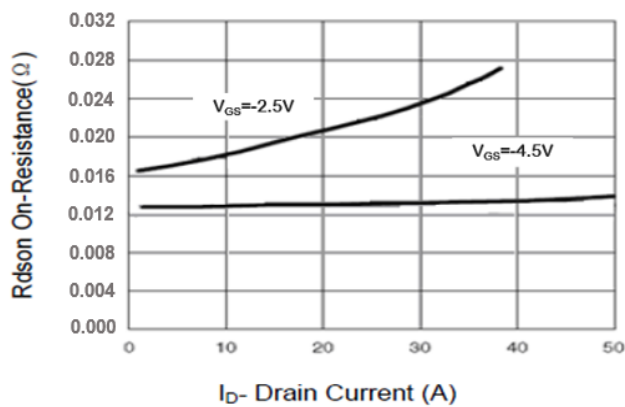


Figure5. Drain-Source on Resistance

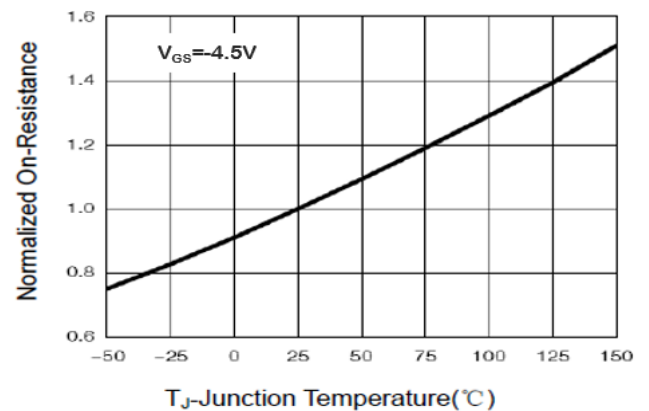


Figure6. Drain-Source on Resistance

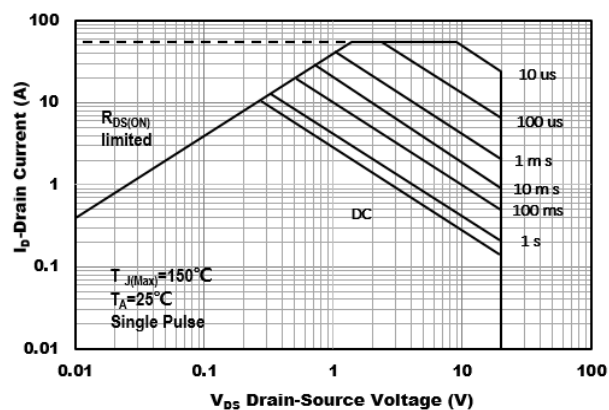


Figure7. Safe Operation Area

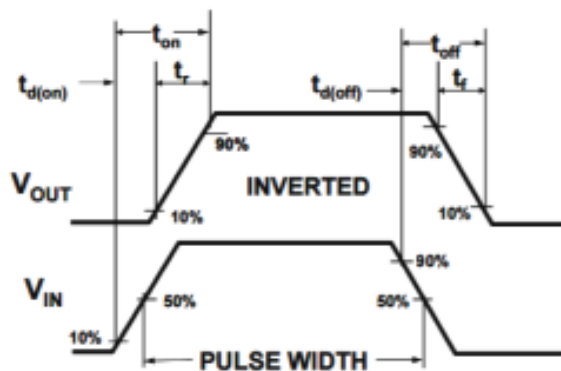
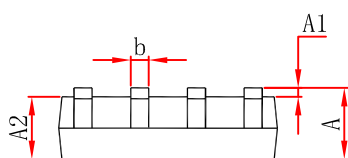
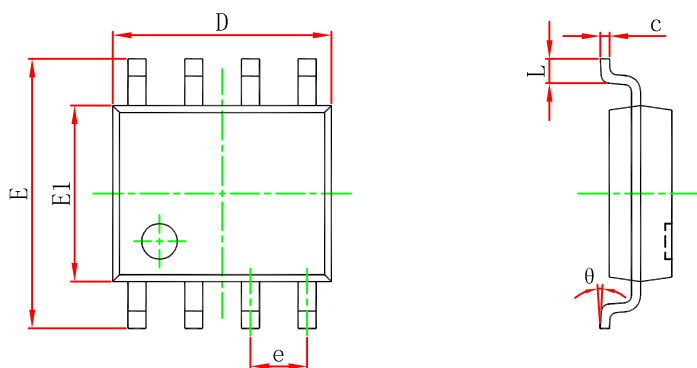


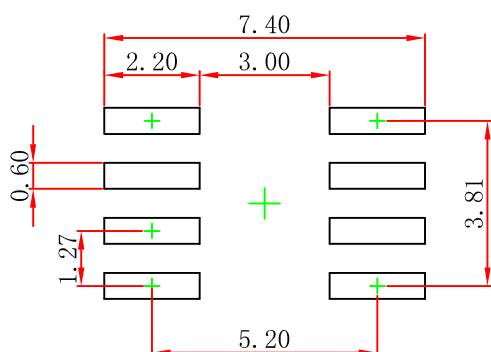
Figure8. Switching wave

■ SOP-8 Package information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.450	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.007	0.010
D	4.700	5.100	0.185	0.201
e	1.270 (BSC)		0.050 (BSC)	
E	5.800	6.200	0.228	0.244
E1	3.800	4.000	0.150	0.157
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

■ SOP-8 Suggested Pad Layout

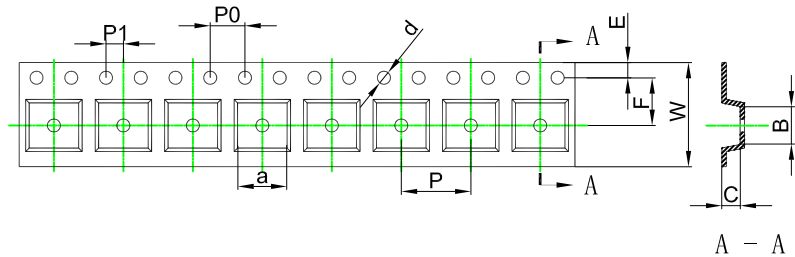


Note:

1. Controlling dimension: in millimeters.
2. General tolerance: $\pm 0.05\text{mm}$.
3. The pad layout is for reference purposes only.

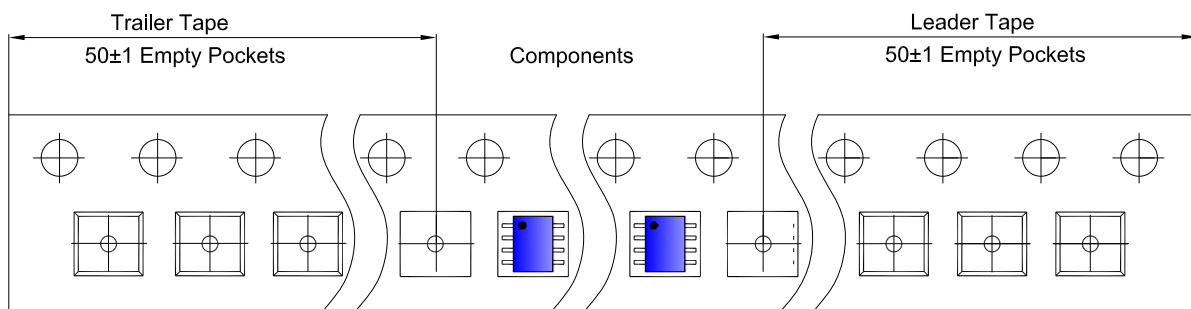
SOP8 Tape and Reel

SOP8 Embossed Carrier Tape

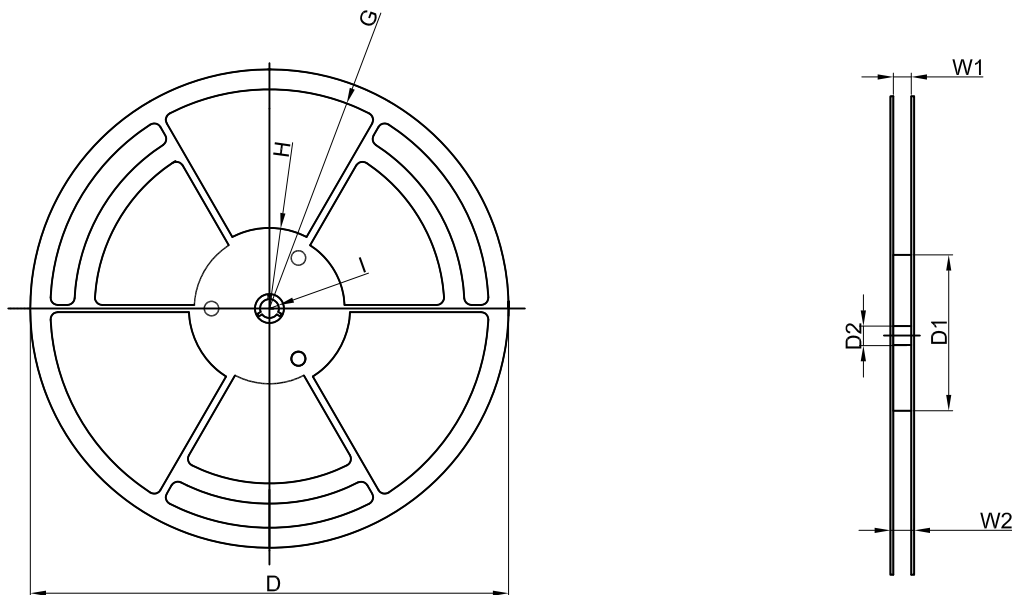


Dimensions are in millimeter										
Pkg type	a	B	C	d	E	F	P0	P	P1	W
SOP8	6.40	5.40	2.10	Ø1.50	1.75	5.50	4.00	8.00	2.00	12.00

SOP8 Tape Leader and Trailer



SOP8 Reel



Dimensions are in millimeter								
Reel Option	D	D1	D2	G	H	I	W1	W2
13"Dia	Ø330.00	100.00	13.00	R151.00	R56.00	R6.50	12.40	17.60