

# Preliminary TSM414K34

## 30V N-Channel MOSFET with Schottky Diode

SOP-8



**Pin Definition:**

- |           |            |
|-----------|------------|
| 1. Anode  | 8. Cathode |
| 2. Anode  | 7. Cathode |
| 3. Source | 6. Drain   |
| 4. Gate   | 5. Drain   |

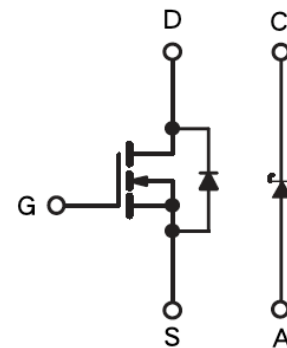
**MOSFET PRODUCT SUMMARY**

$V_{DS}$ (V)	$R_{DS(on)}$ (m $\Omega$ )	$I_D$ (A)
30	55 @ $V_{GS} = 10V$	4
	65 @ $V_{GS} = 4.5V$	2

**SCHOTTKY PRODUCT SUMMARY**

$V_{RRM}$ (V)	$V_F$ (V)	$I_F$ (A)
30	0.51	3

**Block Diagram**



N-Channel MOSFET with Schottky Diode

**Features**

- Advance Trench Process Technology
- High Density Cell Design for Ultra Low On-resistance

**Application**

- Load Switch
- PA Switch

**Ordering Information**

Part No.	Package	Packing
TSM414K34CS RL	SOP-8	2.5Kpcs / 13" Reel

**MOSFET Absolute Maximum Rating** ( $T_a = 25^\circ C$  unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current, $V_{GS}$	$I_D$	4	A
Pulsed Drain Current,	$I_{DM}$	20	A
Continuous Source Current (Diode Conduction) <sup>a,b</sup>	$I_S$	4	A
Maximum Power Dissipation @ $T_a = 25^\circ C$	$P_D$	2	W
Operating Junction Temperature	$T_J$	+150	$^\circ C$
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 ~ +150	$^\circ C$

**Schottky Absolute Maximum Rating** ( $T_a = 25^\circ C$  unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{RRM}$	30	V
Average Forward Current	$I_F$	3	A
Non-Peak Repetitive Surge Current <sup>c</sup>	$I_{FSM}$	20	A

**Thermal Performance**

Parameter	Symbol	Limit	Unit
Junction to Ambient Thermal Resistance	$R_{\theta JA}$	62.5	$^\circ C/W$

- Notes: a. Pulse width limited by the Maximum junction temperature  
 b. Surface Mounted on FR4 Board using 1 inch sq pad size,  $t \leq 10$  sec.  
 c. Surge Applied at Rated Load Conditions, Half-Wave, Single Phase, 60Hz.

### MOSFET Electrical Specifications (Ta = 25°C unless otherwise noted)

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	$BV_{DSS}$	30	--	--	V
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	$V_{GS(TH)}$	1	1.4	3	V
Gate Body Leakage	$V_{GS} = \pm 20V, V_{DS} = 0V$	$I_{GSS}$	--	--	$\pm 100$	nA
Zero Gate Voltage Drain Current	$V_{DS} = 24V, V_{GS} = 0V$	$I_{DSS}$	--	--	1.0	$\mu A$
On-State Drain Current <sup>a</sup>	$V_{DS} \geq 5V, V_{GS} = 10V$	$I_{D(ON)}$	30	--	--	A
Drain-Source On-State Resistance <sup>a</sup>	$V_{GS} = 10V, I_D = 4A$	$R_{DS(ON)}$	--	30	45	m $\Omega$
	$V_{GS} = 4.5V, I_D = 2A$		--	40	55	
Forward Transconductance <sup>a</sup>	$V_{DS} = 5V, I_D = 4A$	$g_{fs}$	--	20	--	S
Diode Forward Voltage	$I_S = 4A, V_{GS} = 0V$	$V_{SD}$	--	1	1.2	V
<b>Dynamic<sup>b</sup></b>						
Total Gate Charge	$V_{DS} = 15V, I_D = 4A,$ $V_{GS} = 10V$	$Q_g$	--	13	--	nC
Gate-Source Charge		$Q_{gs}$	--	4.2	--	
Gate-Drain Charge		$Q_{gd}$	--	3.1	--	
Input Capacitance	$V_{DS} = 15V, V_{GS} = 0V,$ $f = 1.0MHz$	$C_{iss}$	--	610	--	pF
Output Capacitance		$C_{oss}$	--	100	--	
Reverse Transfer Capacitance		$C_{rss}$	--	77	--	
<b>Switching<sup>c</sup></b>						
Turn-On Delay Time	$V_{DD} = 15V, R_L = 15\Omega,$ $I_D = 1A, V_{GEN} = 10V,$ $R_G = 6\Omega$	$t_{d(on)}$	--	9.1	--	nS
Turn-On Rise Time		$t_r$	--	16.5	--	
Turn-Off Delay Time		$t_{d(off)}$	--	23	--	
Turn-Off Fall Time		$t_f$	--	3.5	--	

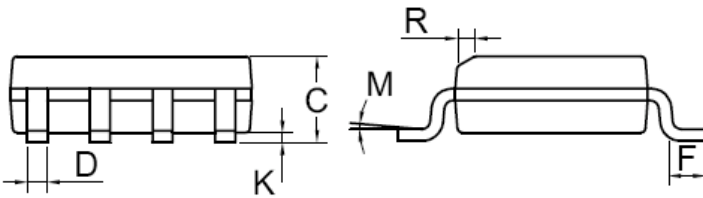
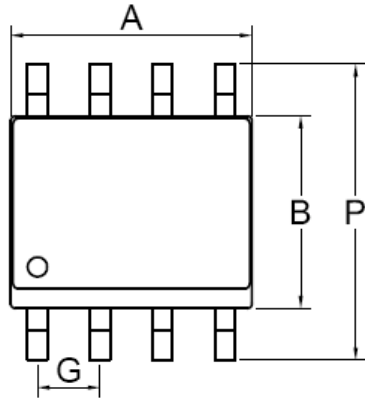
### Schottky Electrical Specifications (Ta = 25°C unless otherwise noted)

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Forward Voltage Drop	$I_F = 3A$	$V_{FM}$	--	--	0.51	V
Reverse Leakage Current	$V_R = 30V, T_a = 25^\circ C$	$I_R$	--	--	0.05	mA
	$V_R = 30V, T_a = 100^\circ C$		--	--	18	
Voltage Rate of Charge	$V_R = 30V$	$dv/dt$	--	10000	--	V/us

**Notes:**

- a. Pulse test: PW  $\leq 300\mu s$ , duty cycle  $\leq 2\%$
- b. For DESIGN AID ONLY, not subject to production testing.
- b. Switching time is essentially independent of operating temperature.

**SOP-8 Mechanical Drawing**



SOP-8 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX.
A	4.80	5.00	0.189	0.196
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.054	0.068
D	0.35	0.49	0.014	0.019
F	0.40	1.25	0.016	0.049
G	1.27BSC		0.05BSC	
K	0.10	0.25	0.004	0.009
M	0°	7°	0°	7°
P	5.80	6.20	0.229	0.244
R	0.25	0.50	0.010	0.019

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