

SOP-8



**Pin Definition:**

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

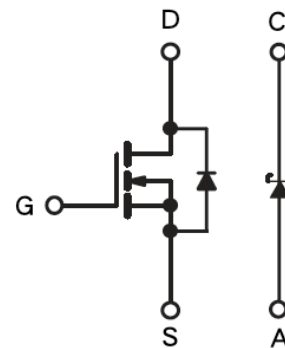
**MOSFET PRODUCT SUMMARY**

$V_{DS}$ (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 <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA	BV <sub>DSS</sub>	30	--	--	V
Gate Threshold Voltage	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	V <sub>GS(TH)</sub>	1	1.4	3	V
Gate Body Leakage	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V	I <sub>GSS</sub>	--	--	±100	nA
Zero Gate Voltage Drain Current	V <sub>DS</sub> = 24V, V <sub>GS</sub> = 0V	I <sub>DSS</sub>	--	--	1.0	μA
On-State Drain Current <sup>a</sup>	V <sub>DS</sub> ≥ 5V, V <sub>GS</sub> = 10V	I <sub>D(ON)</sub>	30	--	--	A
Drain-Source On-State Resistance <sup>a</sup>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 4A	R <sub>DS(ON)</sub>	--	30	45	mΩ
	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 2A		--	40	55	
Forward Transconductance <sup>a</sup>	V <sub>DS</sub> = 5V, I <sub>D</sub> = 4A	g <sub>fs</sub>	--	20	--	S
Diode Forward Voltage	I <sub>S</sub> = 4A, V <sub>GS</sub> = 0V	V <sub>SD</sub>	--	1	1.2	V
<b>Dynamic<sup>b</sup></b>						
Total Gate Charge	V <sub>DS</sub> = 15V, I <sub>D</sub> = 4A, V <sub>GS</sub> = 10V	Q <sub>g</sub>	--	13	--	nC
Gate-Source Charge		Q <sub>gs</sub>	--	4.2	--	
Gate-Drain Charge		Q <sub>gd</sub>	--	3.1	--	
Input Capacitance	V <sub>DS</sub> = 15V, V <sub>GS</sub> = 0V, f = 1.0MHz	C <sub>iss</sub>	--	610	--	pF
Output Capacitance		C <sub>oss</sub>	--	100	--	
Reverse Transfer Capacitance		C <sub>rss</sub>	--	77	--	
<b>Switching<sup>c</sup></b>						
Turn-On Delay Time	V <sub>DD</sub> = 15V, R <sub>L</sub> = 15Ω, I <sub>D</sub> = 1A, V <sub>GEN</sub> = 10V, R <sub>G</sub> = 6Ω	t <sub>d(on)</sub>	--	9.1	--	nS
Turn-On Rise Time		t <sub>r</sub>	--	16.5	--	
Turn-Off Delay Time		t <sub>d(off)</sub>	--	23	--	
Turn-Off Fall Time		t <sub>f</sub>	--	3.5	--	

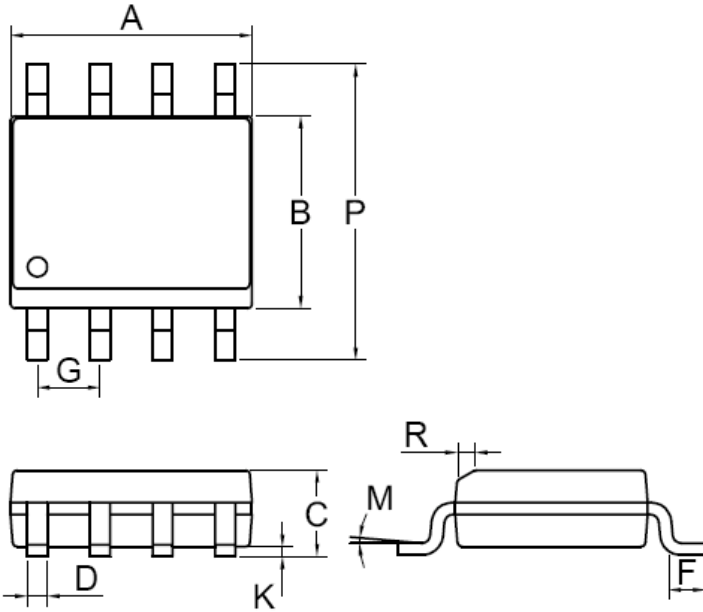
**Schottky Electrical Specifications** (Ta = 25°C unless otherwise noted)

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Forward Voltage Drop	I <sub>F</sub> = 3A	V <sub>FM</sub>	--	--	0.51	V
Reverse Leakage Current	V <sub>R</sub> = 30V, Ta = 25°C	I <sub>R</sub>	--	--	0.05	mA
	V <sub>R</sub> = 30V, Ta = 100°C		--	--	18	
Voltage Rate of Charge	V <sub>R</sub> = 30V	dv/dt	--	10000	--	V/us

Notes:

- a. Pulse test: PW ≤ 300μs, duty cycle ≤ 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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