

**SOP-8**

**Pin Definition:**

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

**PRODUCT SUMMARY**

<b><math>V_{DS}</math> (V)</b>	<b><math>R_{DS(on)}</math>(mΩ)</b>	<b><math>I_D</math> (A)</b>
<b>-30</b>	<b>26 @ <math>V_{GS} = -20V</math></b>	<b>-8.0</b>
	<b>35 @ <math>V_{GS} = -10V</math></b>	<b>-8.0</b>

**Features**

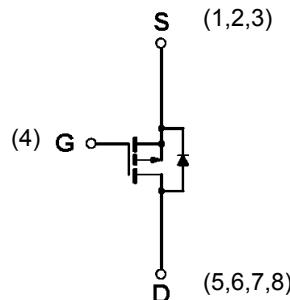
- Advance Trench Process Technology
- High Density Cell Design for Ultra Low On-resistance

**Application**

- Load Switch
- PA Switch

**Ordering Information**

<b>Part No.</b>	<b>Package</b>	<b>Packing</b>
TSM4415CS RL	SOP-8	2.5kpcs/13" reel

**Block Diagram**

**P-Channel MOSFET**
**Absolute Maximum Rating (Ta = 25 °C unless otherwise noted)**

<b>Parameter</b>	<b>Symbol</b>	<b>Limit</b>	<b>Unit</b>
Drain-Source Voltage	$V_{DS}$	-30	V
Gate-Source Voltage	$V_{GS}$	$\pm 25$	V
Continuous Drain Current, $V_{GS}$ @ 4.5V.	$I_D$	-8	A
Pulsed Drain Current, $V_{GS}$ @ 4.5V	$I_{DM}$	-30	A
Continuous Source Current (Diode Conduction) <sup>a,b</sup>	$I_S$	-1	A
Maximum Power Dissipation	$P_D$	3	W
		2.1	
Operating Junction Temperature	$T_J$	+150	°C
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	°C

**Thermal Performance**

<b>Parameter</b>	<b>Symbol</b>	<b>Limit</b>	<b>Unit</b>
Junction to Foot (Drain) Thermal Resistance	$R\theta_{JF}$	30	°C/W
Junction to Ambient Thermal Resistance (PCB mounted)	$R\theta_{JA}$	75	°C/W

**Notes:**

- a. Pulse width limited by the Maximum junction temperature
- b. Surface Mounted on FR4 Board,  $t \leq 5$  sec.

**Electrical Specifications**

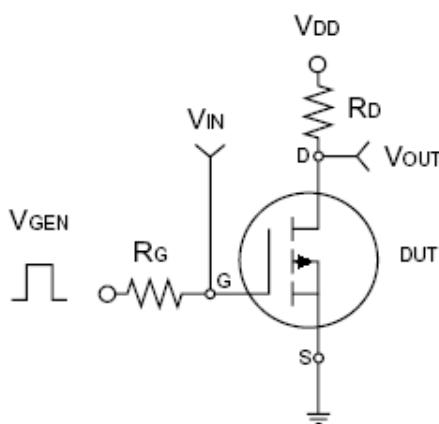
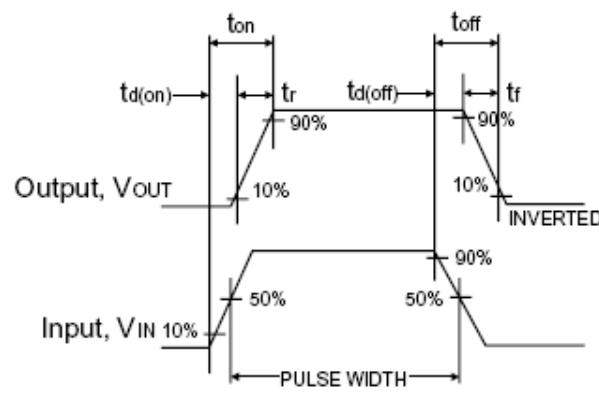
Parameter	Conditions	Symbol	Min	Typ	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = -250\mu A$	$BV_{DSS}$	-30	--	--	V
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = -250\mu A$	$V_{GS(TH)}$	-1.0	--	-3.0	V
Gate Body Leakage	$V_{GS} = \pm 20V, V_{DS} = 0V$	$I_{GSS}$	--	--	$\pm 100$	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>	$V_{DS} \geq -10V, V_{GS} = -5V$	$I_{D(ON)}$	-6	--	--	A
Drain-Source On-State Resistance <sup>a</sup>	$V_{GS} = -20V, I_D = -8A$	$R_{DS(ON)}$	--	21	26	$m\Omega$
	$V_{GS} = -10V, I_D = -8A$		--	28	35	
	$V_{GS} = -6V, I_D = -5A$		--	41	--	
Forward Transconductance <sup>a</sup>	$V_{DS} = -5V, I_D = -8A$	$g_{fs}$	--	11.5	--	S
Diode Forward Voltage	$I_S = -1A, V_{GS} = 0V$	$V_{SD}$	--	-0.8	-1.0	V
<b>Dynamic<sup>b</sup></b>						
Total Gate Charge	$V_{DS} = -15V, I_D = -8A, V_{GS} = -10V$	$Q_g$	--	18.1	--	nC
Gate-Source Charge		$Q_{gs}$	--	6.5	--	
Gate-Drain Charge		$Q_{gd}$	--	3.2	--	
Input Capacitance	$V_{DS} = -15V, V_{GS} = 0V, f = 1.0MHz$	$C_{iss}$	--	1047.9	--	pF
Output Capacitance		$C_{oss}$	--	172.8	--	
Reverse Transfer Capacitance		$C_{rss}$	--	115.5	--	
<b>Switching<sup>c</sup></b>						
Turn-On Delay Time	$V_{DD} = -15V, R_L = 1.8\Omega, I_D = -1A, V_{GEN} = -10V, R_G = 3\Omega$	$t_{d(on)}$	--	20.5	--	nS
Turn-On Rise Time		$t_r$	--	4.4	--	
Turn-Off Delay Time		$t_{d(off)}$	--	42.8	--	
Turn-Off Fall Time		$t_f$	--	7.3	--	

Notes:

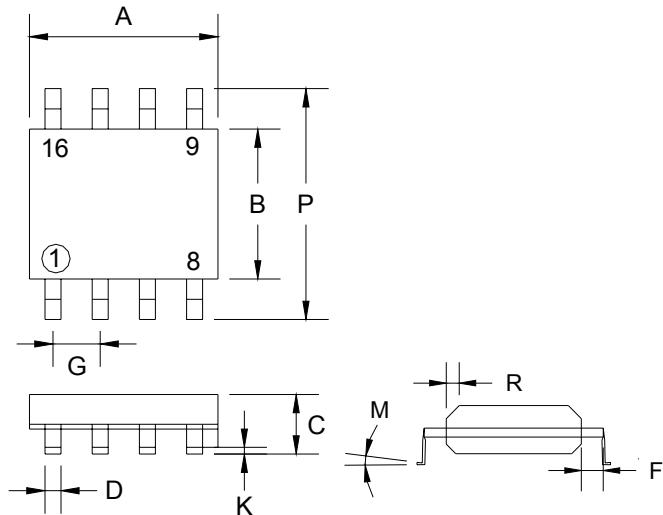
 a. pulse test: PW  $\leq 300\mu S$ , duty cycle  $\leq 2\%$ 

b. For DESIGN AID ONLY, not subject to production testing.

b. Switching time is essentially independent of operating temperature.


**Switching Test Circuit**

**Switchin Waveforms**

**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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