TAIWAN SEMICONDUCTOR

Pb RoHS COMPLIANCE

Preliminary **TSM6970D**

20V Dual N-Channel MOSFET w/ESD Protected

TSSOP-8

Pin Definition:
1. Drain 1   8. Drain 2
2. Source 1   7. Source 2
3. Source 1   6. Source 2
4. Gate 1   5. Gate 2

PRODUCT SUMMARY

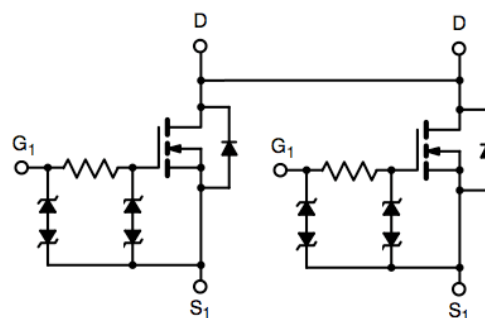| V_{DS} (V)	$R_{DS(on)}$(mΩ)	I_D (A)
20	21 @ V_{GS} = 4.5V	8
	25 @ V_{GS} = 2.5V	7
	33 @ V_{GS} = 1.8V	6

Features

- Advance Trench Process Technology
- High Density Cell Design for Ultra Low On-resistance
- ESD Protect 2KV

Application

- Load Switch
- PA Switch

Ordering Information

Part No.	Package	Packing
TSM6970DCA RV	TSSOP-8	3Kpcs / 13" Reel

Block Diagram

Dual N-Channel MOSFET

Absolute Maximum Rating (Ta = 25°C unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	±8	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)[a,b]		I_S	2.5	A
Maximum Power Dissipation	Ta = 25°C	P_D	2	W
	Ta = 70°C		1.28	
Operating Junction Temperature		T_J	+150	^{o}C
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to +150	^{o}C

Thermal Performance

Parameter	Symbol	Limit	Unit
Junction to Case Thermal Resistance	RΘ$_{JC}$	30	^{o}C/W
Junction to Ambient Thermal Resistance (PCB mounted)	RΘ$_{JA}$	62.5	^{o}C/W

Notes:

a. Pulse width limited by the Maximum junction temperature

b. Surface Mounted on FR4 Board, t ≤ 5 sec.

Electrical Specifications

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 250uA	BV_{DSS}	20	--	--	V
Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250uA	$V_{GS(TH)}$	0.4	--	1	V
Gate Body Leakage	V_{GS} = ±8V, V_{DS} = 0V	I_{GSS}	--	--	±10	uA
Zero Gate Voltage Drain Current	V_{DS} = 16V, V_{GS} = 0V	I_{DSS}	--	--	1	uA
On-State Drain Current	V_{DS} =5V, V_{GS} = 4.5V	$I_{D(ON)}$	10	--	--	A
Drain-Source On-State Resistance	V_{GS} = 4.5V, I_D = 8A	$R_{DS(ON)}$	--	18	21	mΩ
	V_{GS} = 2.5V, I_D = 7A		--	21	25	
	V_{GS} = 1.8V, I_D = 6A		--	26	33	
Forward Transconductance	V_{DS} = 5V, I_D = 8A	g_{fs}	--	13	--	S
Diode Forward Voltage	I_S = 2.5A, V_{GS} = 0V	V_{SD}	--	--	1.7	V
Dynamic[b]						
Total Gate Charge	V_{DS} = 10V, I_D = 8A, V_{GS} = 4.5V	Q_g	--	13.8	--	nC
Gate-Source Charge		Q_{gs}	--	4.1	--	
Gate-Drain Charge		Q_{gd}	--	5.6	--	
Input Capacitance	V_{DS} = 10V, V_{GS} = 0V, f = 1.0MHz	C_{iss}	--	1160	--	pF
Output Capacitance		C_{oss}	--	104	--	
Reverse Transfer Capacitance		C_{rss}	--	29	--	
Switching[c]						
Turn-On Delay Time	V_{DD} = 10V, I_D = 1A, V_{GEN} = 4.5V, R_G = 3Ω	$t_{d(on)}$	--	140	200	nS
Turn-On Rise Time		t_r	--	210	250	
Turn-Off Delay Time		$t_{d(off)}$	--	3700	4800	
Turn-Off Fall Time		t_f	--	2000	2600	

Notes:
a. pulse test: PW ≤300µS, duty cycle ≤2%
b. For DESIGN AID ONLY, not subject to production testing.
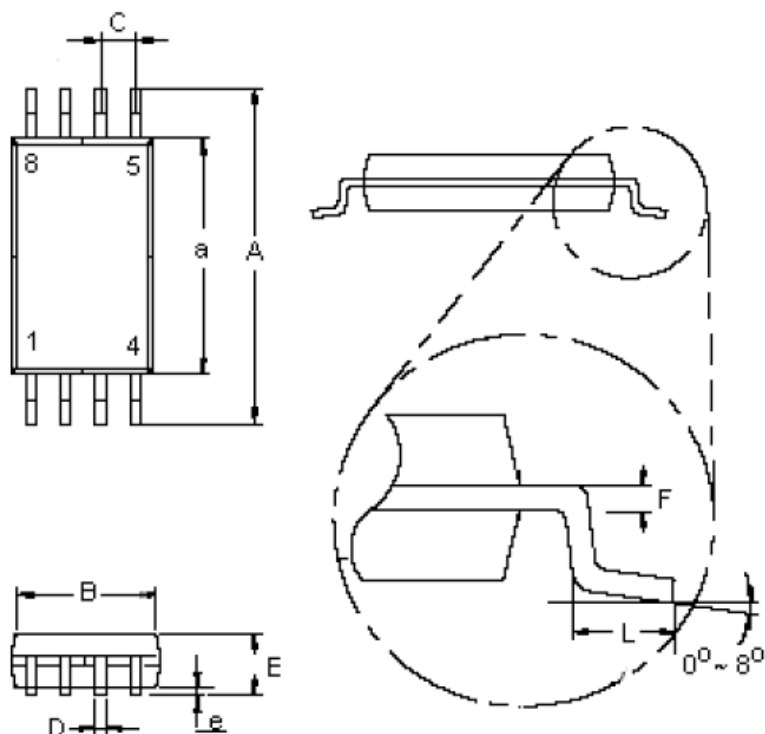b. Switching time is essentially independent of operating temperature.
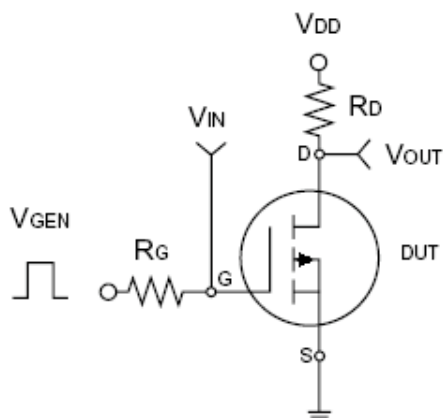
Switching Test Circuit
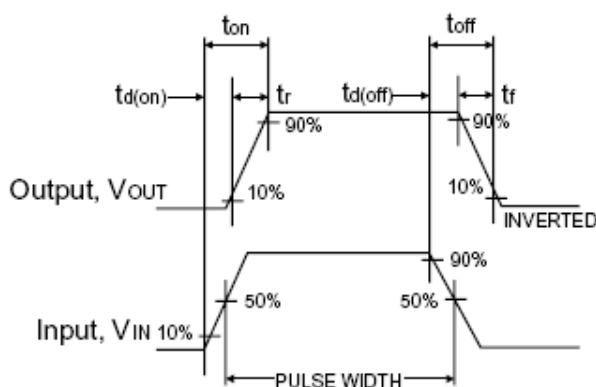
Switchin Waveforms

TSSOP-8 Mechanical Drawing

TSSOP-8 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	6.20	6.60	0.244	0.260
a	4.30	4.50	0.170	0.177
B	2.90	3.10	0.114	0.122
C	0.65 (typ)		0.025 (typ)	
D	0.25	0.30	0.010	0.019
E	1.05	1.20	0.041	0.049
e	0.05	0.15	0.002	0.009
F	0.127		0.005	
L	0.50	0.70	0.020	0.028

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