



SOP-8



Pin Definition:

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

PRODUCT SUMMARY

V _{DS} (V)	R _{DS(on)} (mΩ)	I _D (A)
20	30 @ V _{GS} = 4.5V	6.0
	40 @ V _{GS} = 2.5V	5.2
	41 @ V _{GS} = 2.0V	2.0
	42 @ V _{GS} = 1.8V	2.0

Features

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

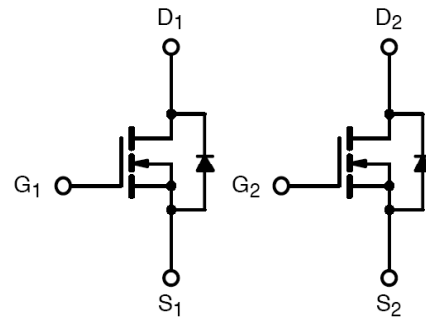
Application

- Load Switch
- PA Switch

Ordering Information

Part No.	Package	Packing
TSM9428DCS RL	SOP-8	2.5Kpcs / 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	6	A
Pulsed Drain Current, V _{GS} @4.5V	I _{DM}	20	A
Continuous Source Current (Diode Conduction) ^{a,b}	I _S	1.7	A
Maximum Power Dissipation	P _D	Ta = 25°C	2.5
		Ta = 70°C	1.6
Operating Junction Temperature	T _J	+150	°C
Operating Junction and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

Thermal Performance

Parameter	Symbol	Limit	Unit
Junction to Foot (Drain) Thermal Resistance	R _{θJF}	30	°C/W
Junction to Ambient Thermal Resistance (PCB mounted)	R _{θJA}	50	°C/W

Notes:

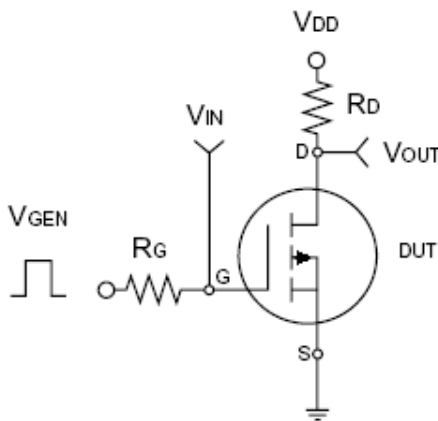
- a. Pulse width limited by the Maximum junction temperature
- b. Surface Mounted on FR4 Board, t ≤ 10 sec.

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

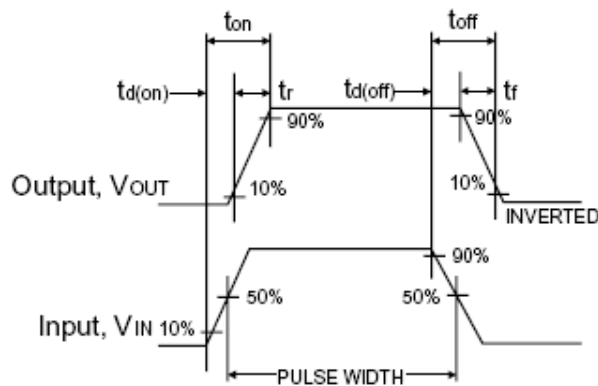
Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	BV_{DSS}	20	--	--	V
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	$V_{GS(TH)}$	0.45	0.65	0.85	V
Gate Body Leakage	$V_{GS} = \pm 8V, V_{DS} = 0V$	I_{GSS}	--	--	± 100	nA
Zero Gate Voltage Drain Current	$V_{DS} = 20V, V_{GS} = 0V$	I_{DSS}	--	--	1.0	μA
On-State Drain Current	$V_{DS} \geq 5V, V_{GS} = 4.5V$	$I_{D(ON)}$	20	--	--	A
Drain-Source On-State Resistance	$V_{GS} = 4.5V, I_D = 6.0A$	$R_{DS(ON)}$	--	23	30	m Ω
	$V_{GS} = 2.5V, I_D = 5.2A$		--	28	40	
	$V_{GS} = 2.0V, I_D = 2.0A$		--	29	41	
	$V_{GS} = 1.8V, I_D = 2.0A$		--	30	42	
Forward Transconductance	$V_{DS} = 10V, I_D = 6.0A$	g_{fs}	--	24	--	S
Diode Forward Voltage	$I_S = 1.0A, V_{GS} = 0V$	V_{SD}	--	--	1.2	V
Dynamic^b						
Total Gate Charge	$V_{DS} = 10V, I_D = 6A, V_{GS} = 4.5V$	Q_g	--	11	14	nC
Gate-Source Charge		Q_{gs}	--	1.5	--	
Gate-Drain Charge		Q_{gd}	--	2.1	--	
Input Capacitance	$V_{DS} = 10V, V_{GS} = 0V, f = 1.0MHz$	C_{iss}	--	900	--	pF
Output Capacitance		C_{oss}	--	140	--	
Reverse Transfer Capacitance		C_{rss}	--	100	--	
Switching^c						
Turn-On Delay Time	$V_{DD} = 10V, R_L = 10\Omega, I_D = 1A, V_{GEN} = 4.5V, R_G = 6\Omega$	$t_{d(on)}$	--	0.53	0.8	nS
Turn-On Rise Time		t_r	--	1.4	2.2	
Turn-Off Delay Time		$t_{d(off)}$	--	13.5	20	
Turn-Off Fall Time		t_f	--	5.9	9	

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.



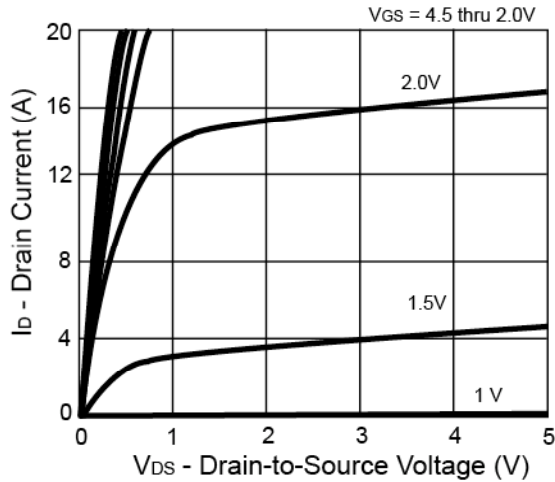
Switching Test Circuit



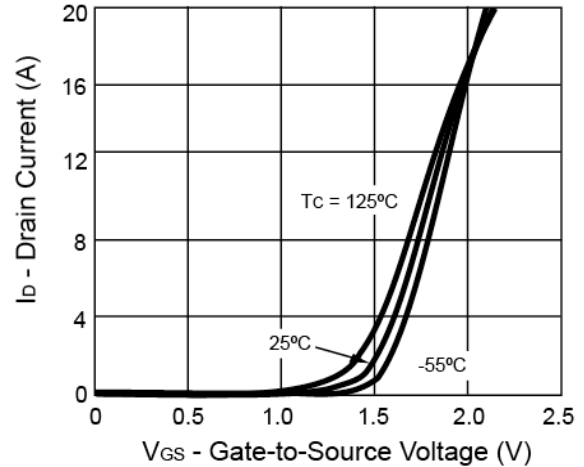
Switchin Waveforms

Electrical Characteristics Curve (Ta = 25°C, unless otherwise noted)

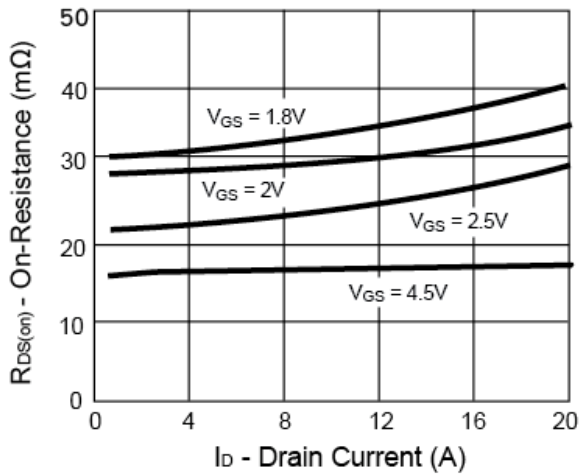
Output Characteristics



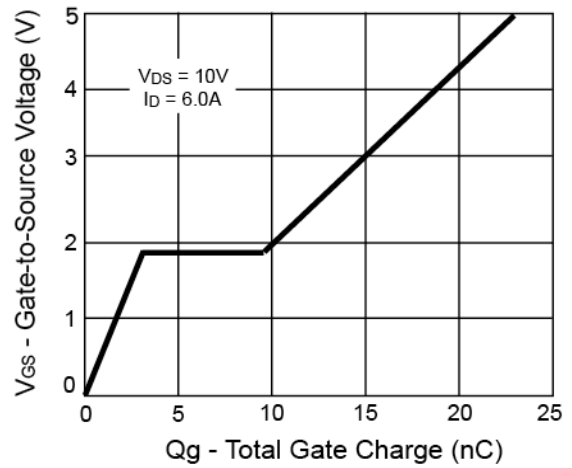
Transfer Characteristics



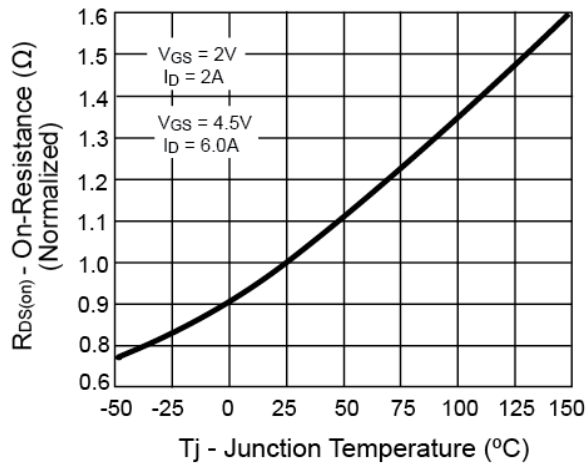
On-Resistance vs. Drain Current



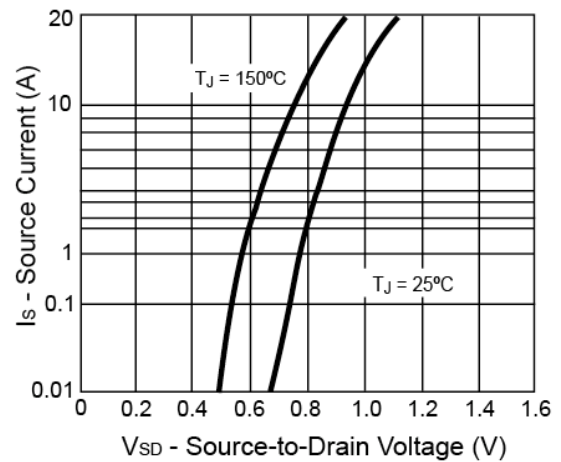
Gate Charge



On-Resistance vs. Junction Temperature

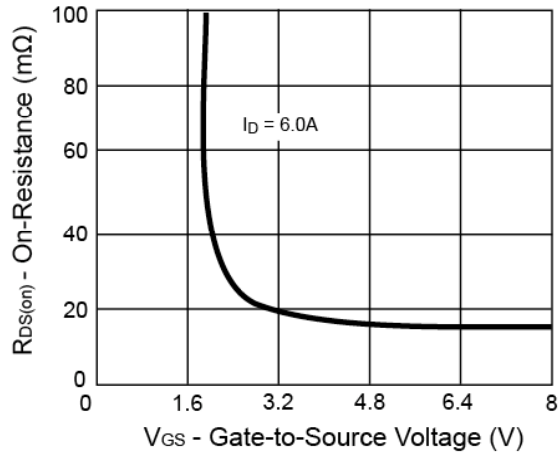


Source-Drain Diode Forward Voltage

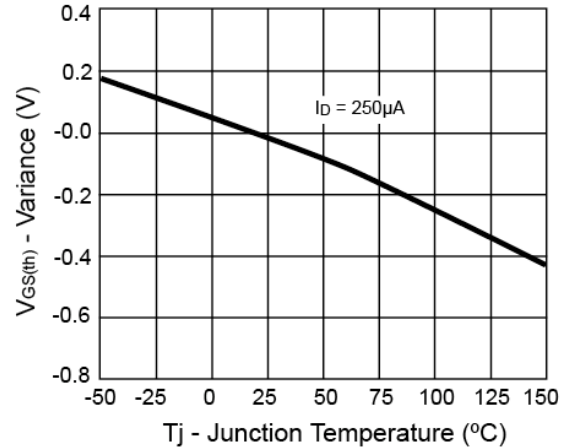


Electrical Characteristics Curve ($T_a = 25^\circ\text{C}$, unless otherwise noted)

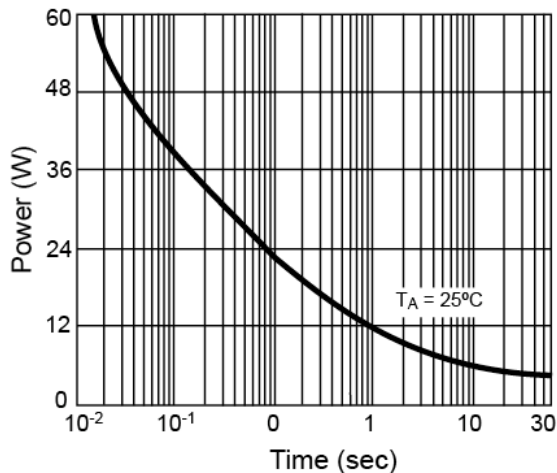
On-Resistance vs. Gate-Source Voltage



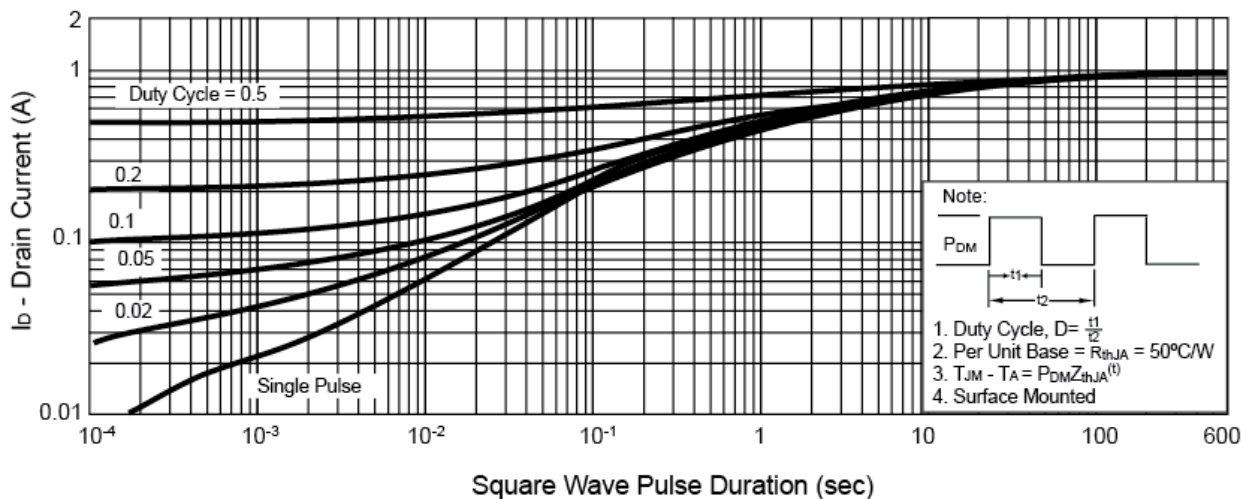
Threshold Voltage



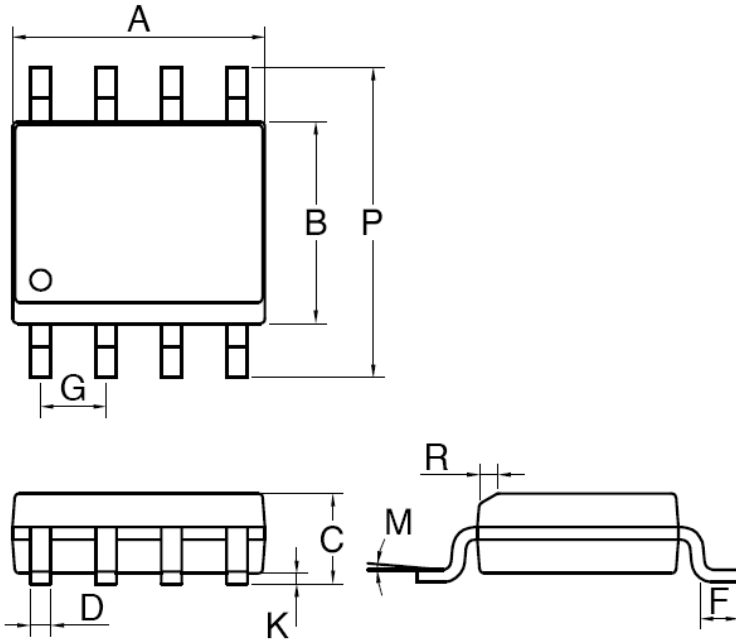
Single Pulse Power



Normalized Thermal Transient Impedance, Junction-to-Ambient

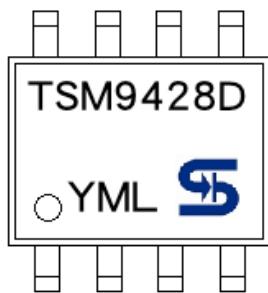


SOP-8 Mechanical Drawing



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

Marking Diagram



- Y** = Year Code
- M** = Month Code
(A=Jan, B=Feb, C=Mar, D=Apl, E=May, F=Jun, G=Jul, H=Aug, I=Sep, J=Oct, K=Nov, L=Dec)
- L** = Lot Code

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