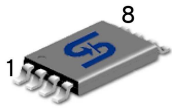


# TSM6968SD

## 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)	$R_{DS(on)}$ (m $\Omega$ )	$I_D$ (A)
20	22 @ $V_{GS} = 4.5V$	6.5
	29 @ $V_{GS} = 2.5V$	5.5

**Features**

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

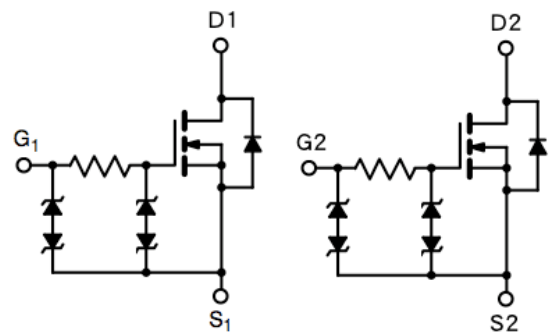
**Application**

- Specially Designed for Li-on Battery Packs
- Battery Switch Application

**Ordering Information**

Part No.	Package	Packing
TSM6968SDCA RVG	TSSOP-8	3Kpcs / 13" Reel

**Note:** "G" denotes for Halogen Free

**Block Diagram**


Dual N-Channel MOSFET

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	20	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	V
Continuous Drain Current, $V_{GS} @ 4.5V$ .	$I_D$	6.5	A
Pulsed Drain Current, $V_{GS} @ 4.5V$	$I_{DM}$	30	A
Continuous Source Current (Diode Conduction) <sup>a,b</sup>	$I_S$	1.4	A
Maximum Power Dissipation	$P_D$	$T_a = 25^\circ C$	1.04
		$T_a = 75^\circ C$	0.625
Operating Junction Temperature	$T_J$	+150	$^\circ C$
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ C$

**Thermal Performance**

Parameter	Symbol	Limit	Unit
Junction to Foot (Drain) Thermal Resistance	$R_{\theta_{JF}}$	83	$^\circ C/W$
Junction to Ambient Thermal Resistance (PCB mounted)	$R_{\theta_{JA}}$	120	$^\circ C/W$

Notes:

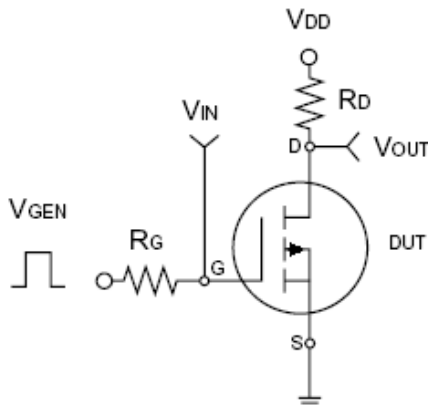
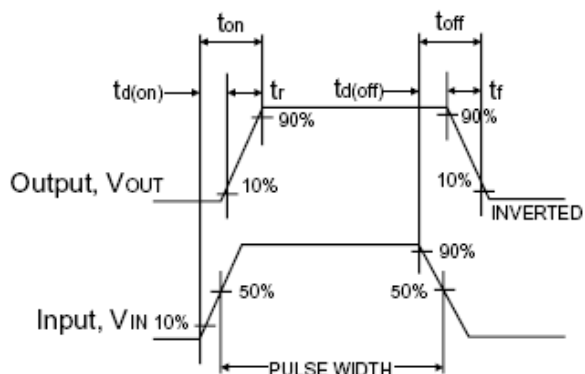
- Pulse width limited by the Maximum junction temperature
- Surface Mounted on FR4 Board,  $t \leq 5$  sec.

**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> = 250uA	BV <sub>DSS</sub>	20	--	--	V
Gate Threshold Voltage	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250uA	V <sub>GS(TH)</sub>	0.6	0.8	1.0	V
Gate Body Leakage	V <sub>GS</sub> = ±12V, V <sub>DS</sub> = 0V	I <sub>GSS</sub>	--	--	±10	uA
Zero Gate Voltage Drain Current	V <sub>DS</sub> = 16V, V <sub>GS</sub> = 0V	I <sub>DSS</sub>	--	--	1.0	uA
On-State Drain Current	V <sub>DS</sub> = 5V, V <sub>GS</sub> = 4.5V	I <sub>D(ON)</sub>	30	--	--	A
Drain-Source On-State Resistance	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 6.5A	R <sub>DS(ON)</sub>	--	15	22	mΩ
	V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 5.5A		--	20	29	
Forward Transconductance	V <sub>DS</sub> = 10V, I <sub>D</sub> = 6.5A	g <sub>fs</sub>	--	30	--	S
Diode Forward Voltage	I <sub>S</sub> = 1.7A, V <sub>GS</sub> = 0V	V <sub>SD</sub>	--	0.6	1.2	V
<b>Dynamic<sup>b</sup></b>						
Total Gate Charge	V <sub>DS</sub> = 10V, I <sub>D</sub> = 6.5A, V <sub>GS</sub> = 4.5V	Q <sub>g</sub>	--	15	20	nC
Gate-Source Charge		Q <sub>gs</sub>	--	3.4	--	
Gate-Drain Charge		Q <sub>gd</sub>	--	1.2	--	
Input Capacitance	V <sub>DS</sub> = 10V, V <sub>GS</sub> = 0V, f = 1.0MHz	C <sub>iss</sub>	--	950	--	pF
Output Capacitance		C <sub>oss</sub>	--	450	--	
Reverse Transfer Capacitance		C <sub>rss</sub>	--	135	--	
<b>Switching<sup>c</sup></b>						
Turn-On Delay Time	V <sub>DD</sub> = 10V, R <sub>L</sub> = 10Ω, I <sub>D</sub> = 1A, V <sub>GEN</sub> = 4.5V, R <sub>G</sub> = 6Ω	t <sub>d(on)</sub>	--	140	200	nS
Turn-On Rise Time		t <sub>r</sub>	--	210	250	
Turn-Off Delay Time		t <sub>d(off)</sub>	--	3700	4800	
Turn-Off Fall Time		t <sub>f</sub>	--	2000	2600	

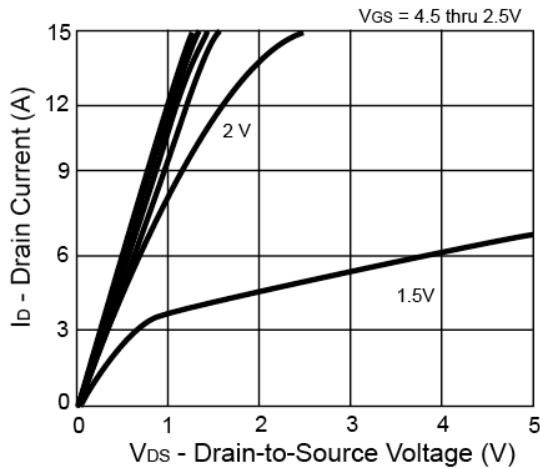
**Notes:**

- 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.

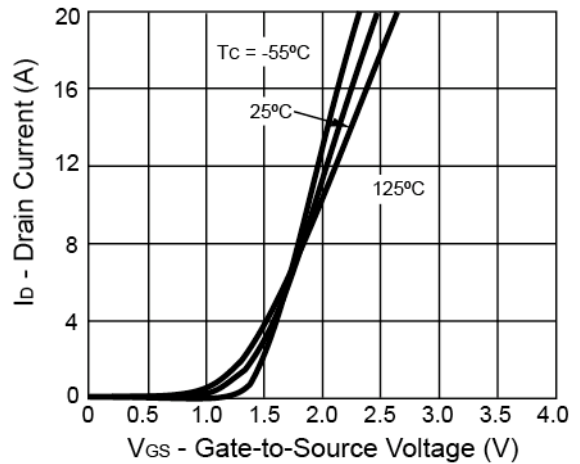

**Switching Test Circuit**

**Switchin Waveforms**

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

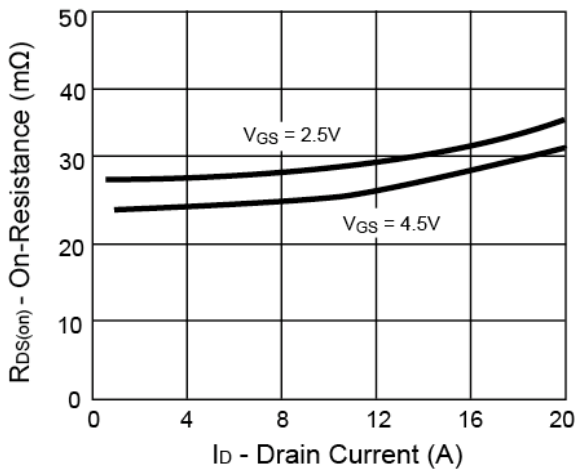
**Output Characteristics**



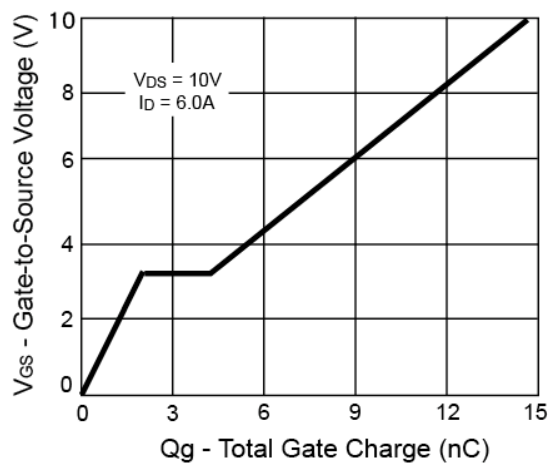
**Transfer Characteristics**



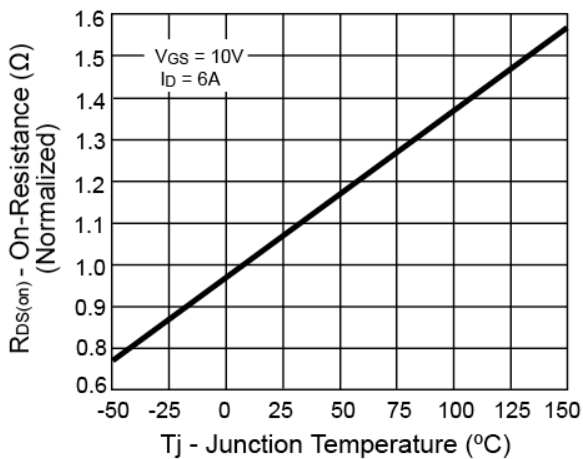
**On-Resistance vs. Drain Current**



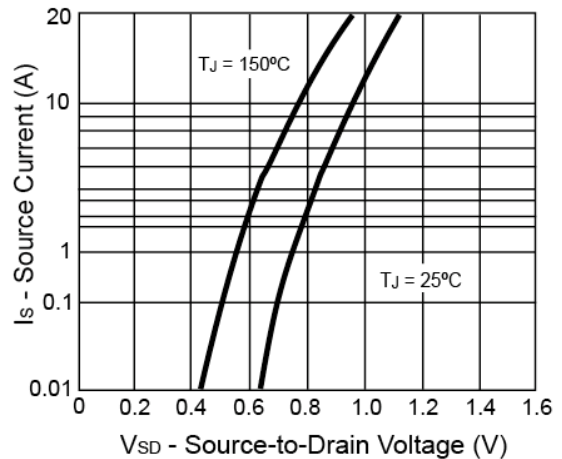
**Gate Charge**



**On-Resistance vs. Junction Temperature**

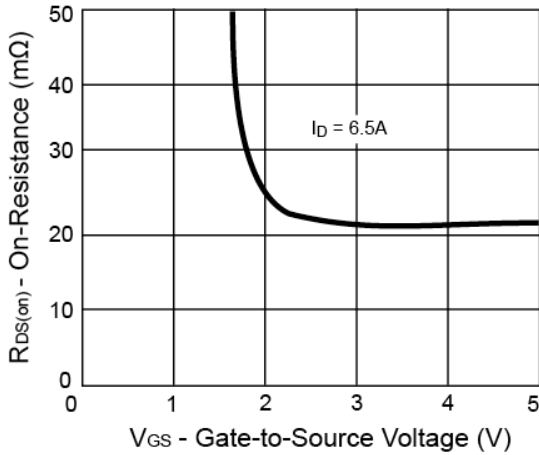


**Source-Drain Diode Forward Voltage**

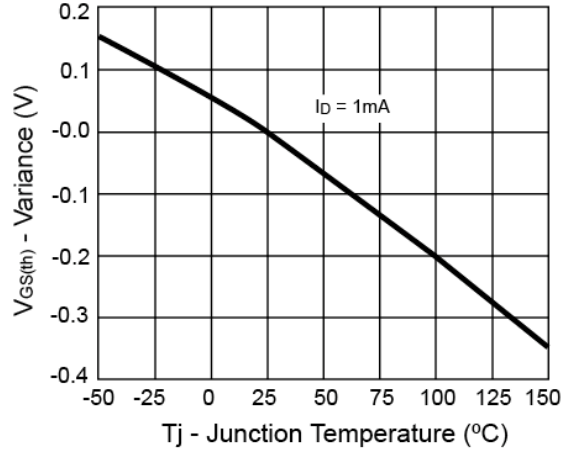


**Electrical Characteristics Curve (Ta = 25°C, unless otherwise noted)**

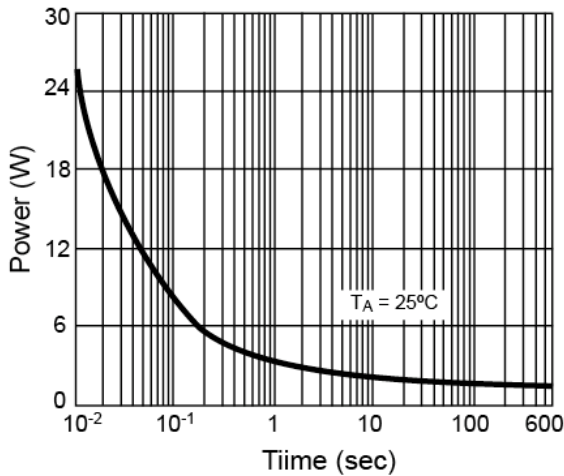
**On-Resistance vs. Gate-Source Voltage**



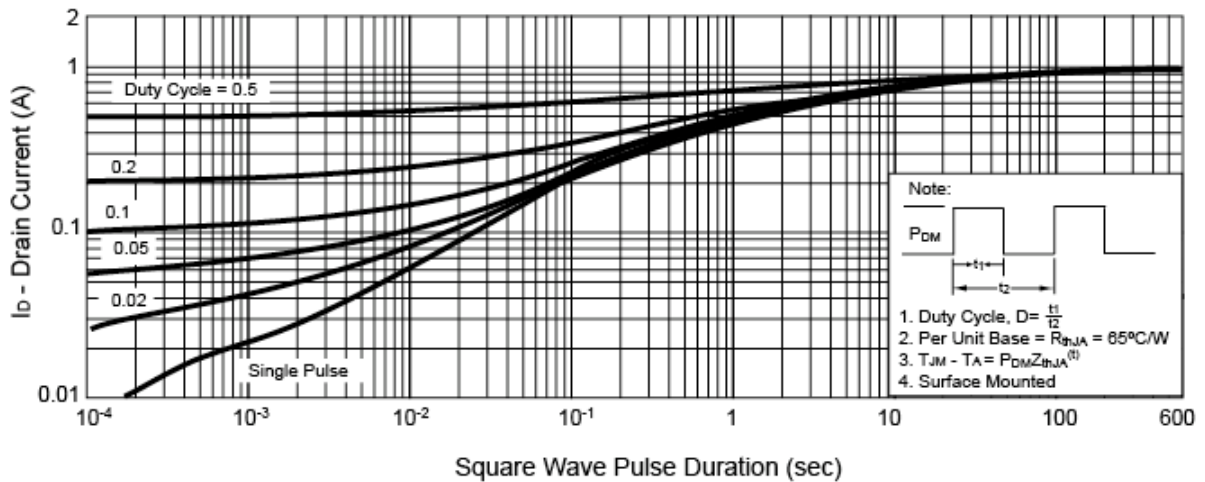
**Threshold Voltage**



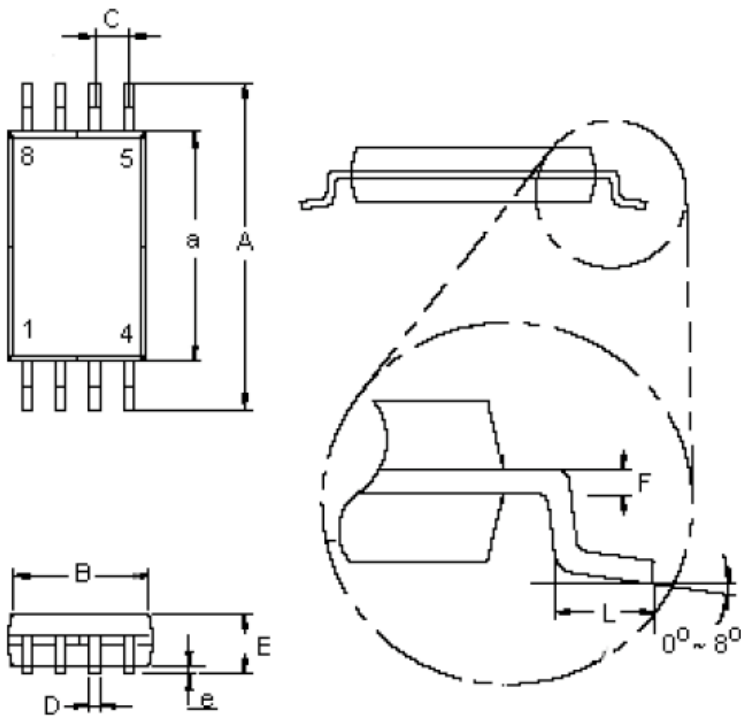
**Single Pulse Power**



**Normalized Thermal Transient Impedance, Junction-to-Ambient**

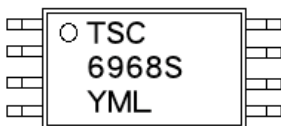


### TSSOP-8 Mechanical Drawing



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

### Marking Diagram



**Y** = Year Code

**M** = Month Code for Halogen Free Product

**O** =Jan    **P** =Feb    **Q** =Mar    **R** =Apr

**S** =May    **T** =Jun    **U** =Jul    **V** =Aug

**W** =Sep    **X** =Oct    **Y** =Nov    **Z** =Dec

**L** = Lot Code



# TSM6968SD

## 20V Dual N-Channel MOSFET w/ESD Protected

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- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



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