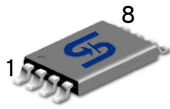


# TSM6968SD

## 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

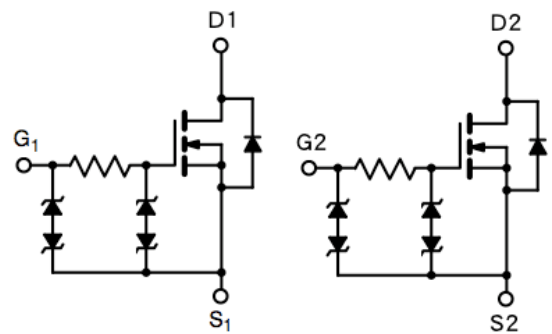
**Application**

- 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:

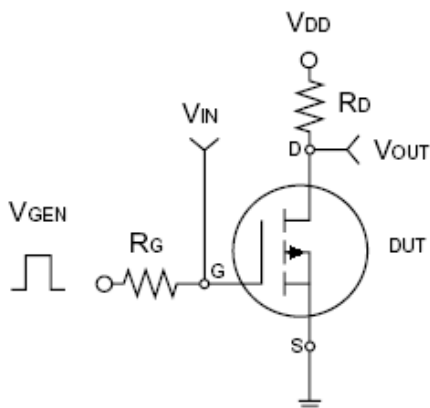
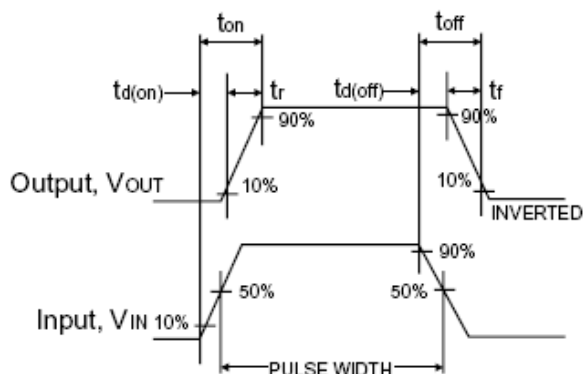
- Pulse width limited by the Maximum junction temperature
- Surface Mounted on FR4 Board,  $t \leq 5$  sec.

**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	

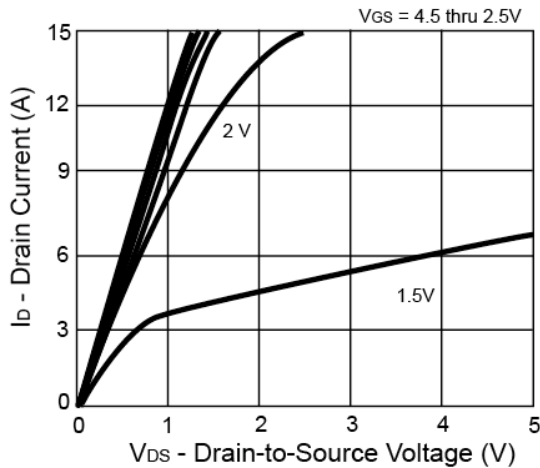
**Notes:**

- 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.

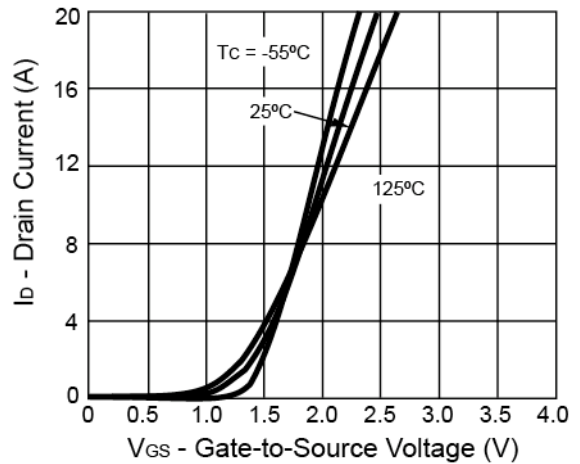

**Switching Test Circuit**

**Switchin Waveforms**

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

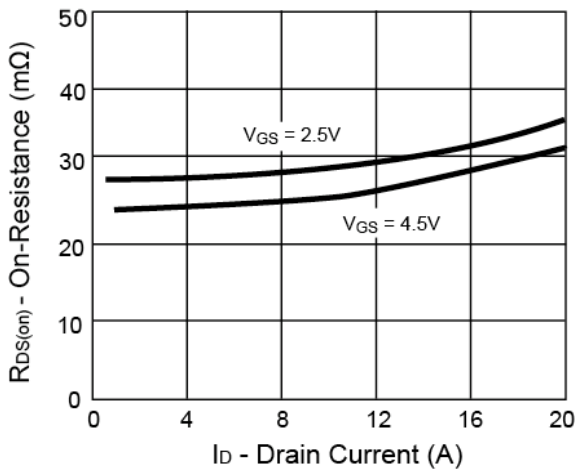
**Output Characteristics**



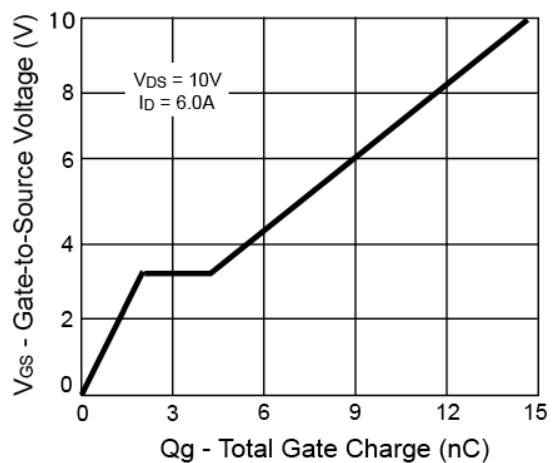
**Transfer Characteristics**



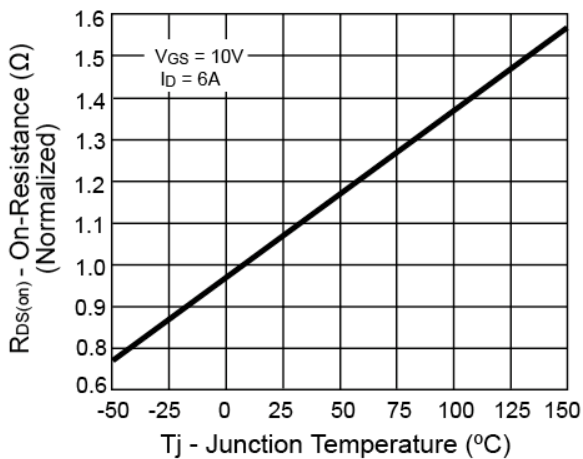
**On-Resistance vs. Drain Current**



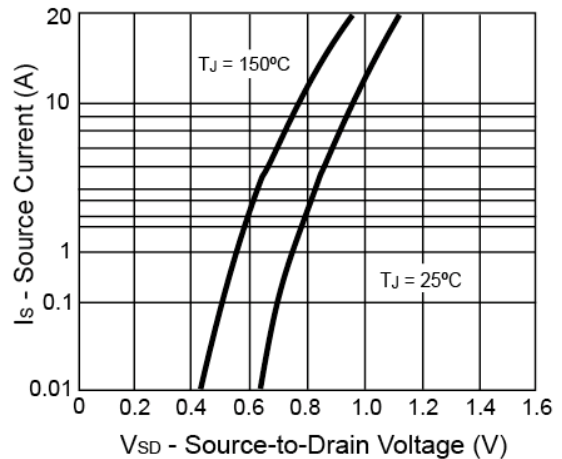
**Gate Charge**



**On-Resistance vs. Junction Temperature**

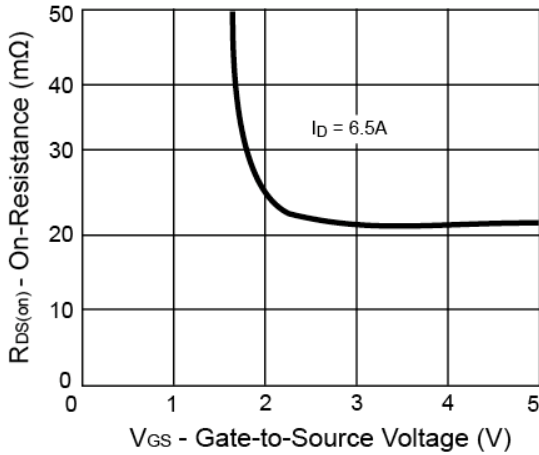


**Source-Drain Diode Forward Voltage**

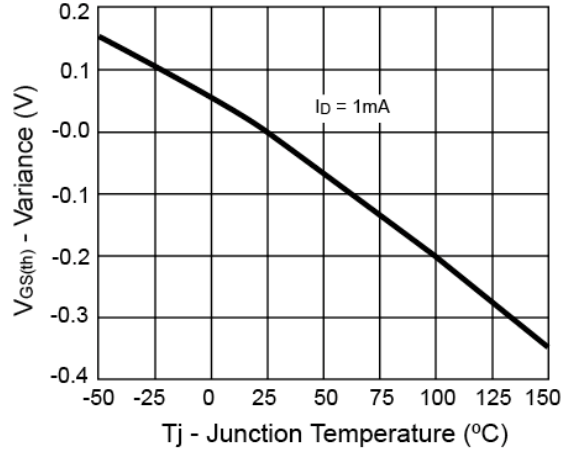


**Electrical Characteristics Curve (Ta = 25°C, unless otherwise noted)**

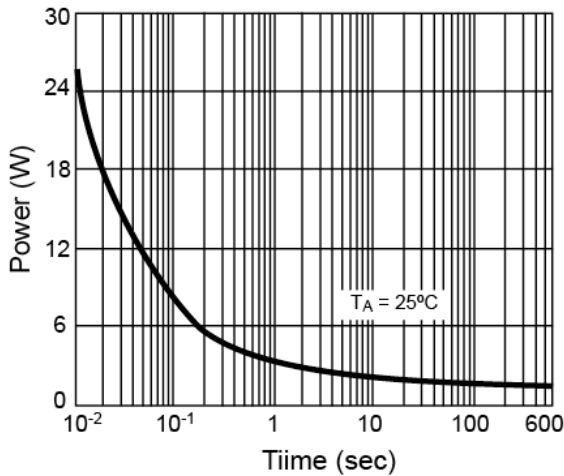
**On-Resistance vs. Gate-Source Voltage**



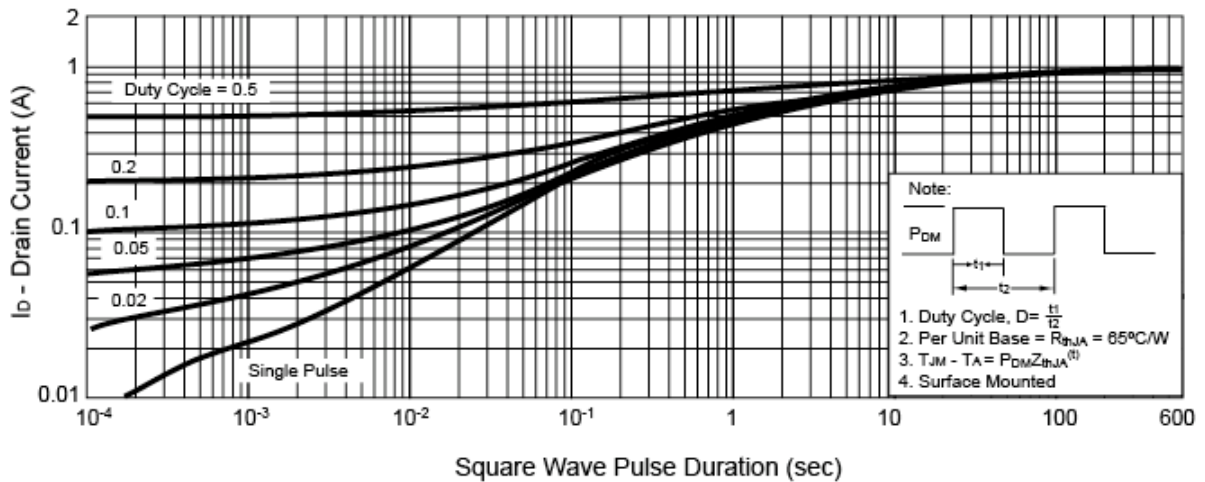
**Threshold Voltage**



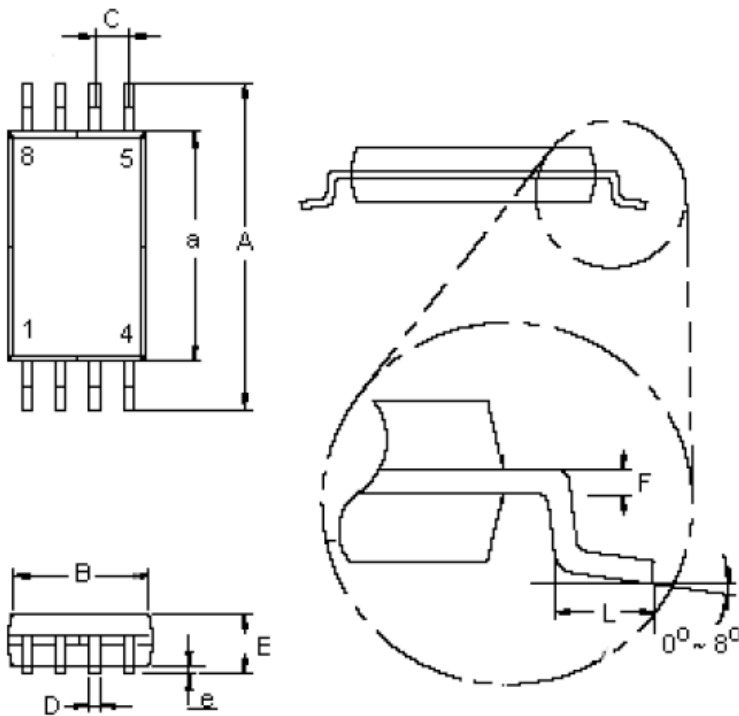
**Single Pulse Power**



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

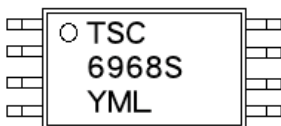


**TSSOP-8 Mechanical Drawing**



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

### Notice

Specifications of the products displayed herein are subject to change without notice. TSC or anyone on its behalf, assumes no responsibility or liability for any errors or inaccuracies.

Information contained herein is intended to provide a product description only. No license, express or implied, to any intellectual property rights is granted by this document. Except as provided in TSC's terms and conditions of sale for such products, TSC assumes no liability whatsoever, and disclaims any express or implied warranty, relating to sale and/or use of TSC products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright, or other intellectual property right.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify TSC for any damages resulting from such improper use or sale.

Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.

С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров

Мы предлагаем:

- Конкурентоспособные цены и скидки постоянным клиентам.
- Специальные условия для постоянных клиентов.
- Подбор аналогов.
- Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.
- Приемлемые сроки поставки, возможна ускоренная поставка.
- Доставку товара в любую точку России и стран СНГ.
- Комплексную поставку.
- Работу по проектам и поставку образцов.
- Формирование склада под заказчика.
- Сертификаты соответствия на поставляемую продукцию (по желанию клиента).
- Тестирование поставляемой продукции.
- Поставку компонентов, требующих военную и космическую приемку.
- Входной контроль качества.
- Наличие сертификата ISO.

В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- Регистрацию проекта у производителя компонентов.
- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



Тел: +7 (812) 336 43 04 (многоканальный)

Email: [org@lifeelectronics.ru](mailto:org@lifeelectronics.ru)