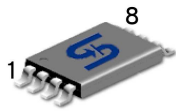


**TSSOP-8**

**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   |

# TSM6866SD

## 20V Dual N-Channel MOSFET

**PRODUCT SUMMARY**

$V_{DS}$ (V)	$R_{DS(on)}$ (m $\Omega$ )	$I_D$ (A)
20	30 @ $V_{GS} = 4.5V$	6.0
	40 @ $V_{GS} = 2.5V$	5.2

**Features**

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

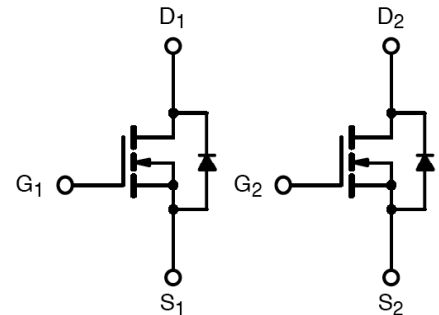
**Application**

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

**Ordering Information**

Part No.	Package	Packing
TSM6866SDCA RV	TSSOP-8	3Kpcs / 13" Reel
TSM6866SDCA RVG	TSSOP-8	3Kpcs / 13" Reel

**Note:** "G" denote for Halogen Free Product

**Block Diagram**


Dual N-Channel MOSFET

**Absolute Maximum Rating** ( $T_a = 25^\circ\text{C}$  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	$I_D$	6	A
Pulsed Drain Current	$I_{DM}$	30	A
Continuous Source Current (Diode Conduction) <sup>a,b</sup>	$I_S$	1.7	A
Maximum Power Dissipation	$P_D$	1.6	W
		1.1	
Operating Junction Temperature	$T_J$	+150	$^\circ\text{C}$
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

**Thermal Performance**

Parameter	Symbol	Limit	Unit
Junction to Case Thermal Resistance	$R_{\theta JC}$	30	$^\circ\text{C/W}$
Junction to Ambient Thermal Resistance (PCB mounted)	$R_{\theta JA}$	62.5	$^\circ\text{C/W}$

**Notes:**

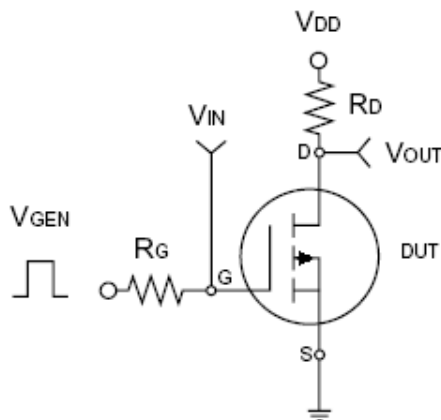
- a. Pulse width limited by the Maximum junction temperature  
b. Surface Mounted on FR4 Board,  $t \leq 5$  sec.

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

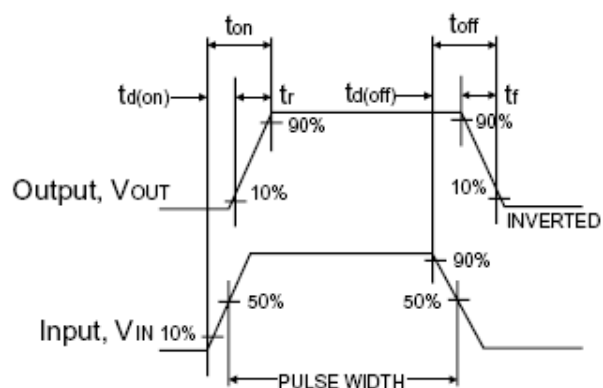
Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250uA	BV <sub>DSS</sub>	20	--	--	V
Gate Threshold Voltage	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250uA	V <sub>GS(TH)</sub>	0.6	--	--	V
Gate Body Leakage	V <sub>GS</sub> = ±12V, V <sub>DS</sub> = 0V	I <sub>GSS</sub>	--	--	±100	nA
Zero Gate Voltage Drain Current	V <sub>DS</sub> = 20V, 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> = 6.0A	R <sub>DS(ON)</sub>	--	21	30	mΩ
	V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 5.2A		--	30	40	
Forward Transconductance	V <sub>DS</sub> = 10V, I <sub>D</sub> = 6A	g <sub>fs</sub>	--	30	--	S
Diode Forward Voltage	I <sub>S</sub> = 1.7A, V <sub>GS</sub> = 0V	V <sub>SD</sub>	--	0.7	1.2	V
Dynamic <sup>b</sup>						
Total Gate Charge	V <sub>DS</sub> = 10V, I <sub>D</sub> = 6A, V <sub>GS</sub> = 4.5V	Q <sub>g</sub>	--	5	7	nC
Gate-Source Charge		Q <sub>gs</sub>	--	1	--	
Gate-Drain Charge		Q <sub>gd</sub>	--	1.5	--	
Input Capacitance	V <sub>DS</sub> = 8V, V <sub>GS</sub> = 0V, f = 1.0MHz	C <sub>iss</sub>	--	565	--	pF
Output Capacitance		C <sub>oss</sub>	--	105	--	
Reverse Transfer Capacitance		C <sub>rss</sub>	--	75	--	
Switching <sup>b,C</sup>						
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>	--	8	20	nS
Turn-On Rise Time		t <sub>r</sub>	--	10	20	
Turn-Off Delay Time		t <sub>d(off)</sub>	--	22	45	
Turn-Off Fall Time		t <sub>f</sub>	--	6	15	

**Notes:**

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



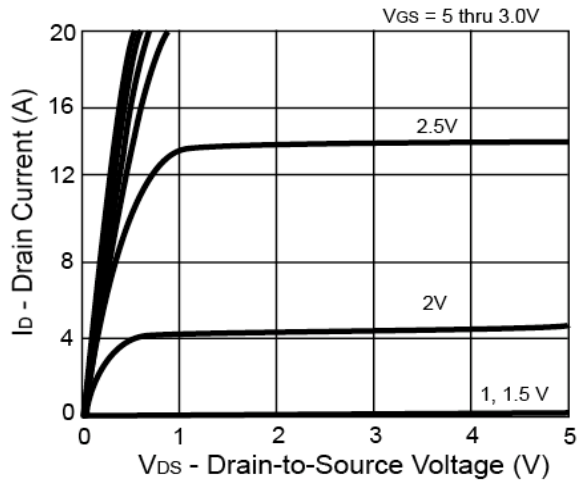
**Switching Test Circuit**



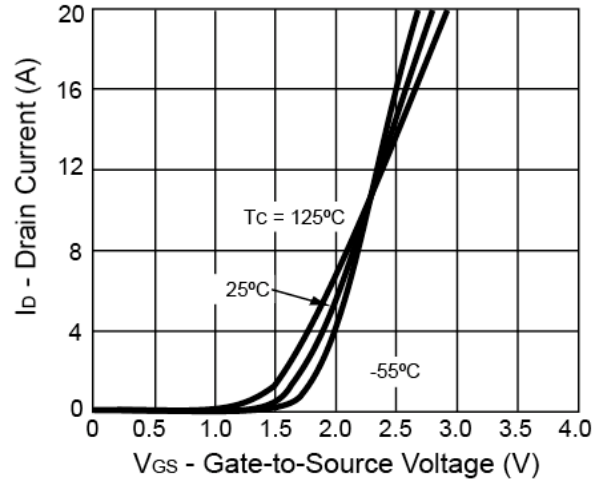
**Switchin Waveforms**

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

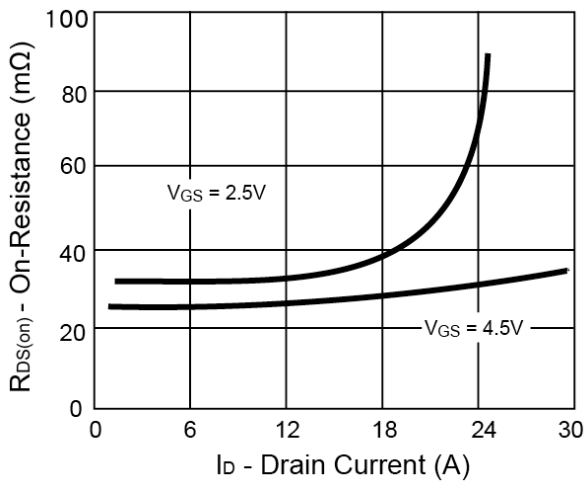
**Output Characteristics**



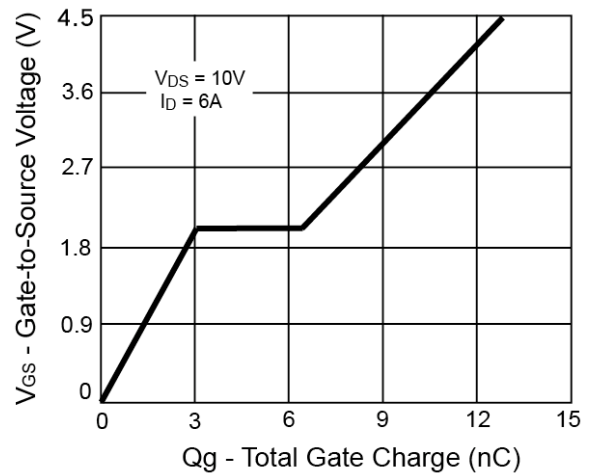
**Transfer Characteristics**



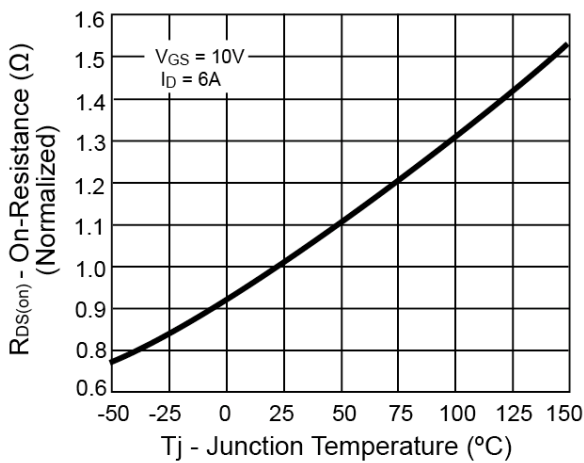
**On-Resistance vs. Drain Current**



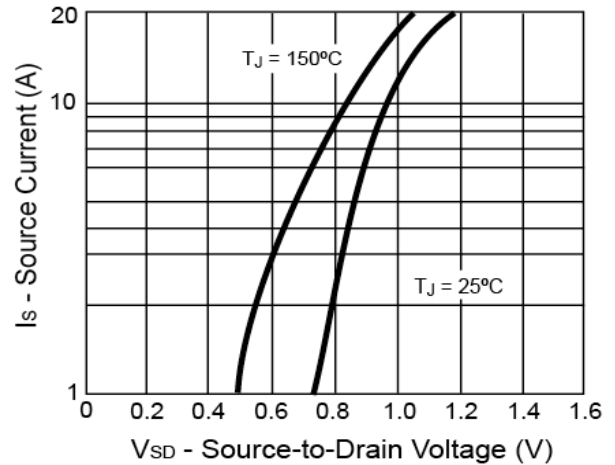
**Gate Charge**



**On-Resistance vs. Junction Temperature**

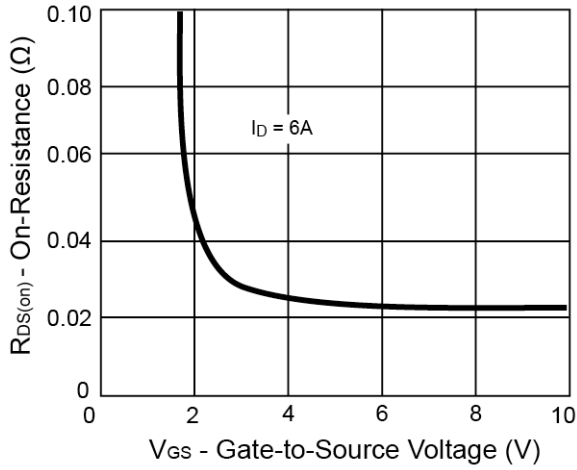


**Source-Drain Diode Forward Voltage**

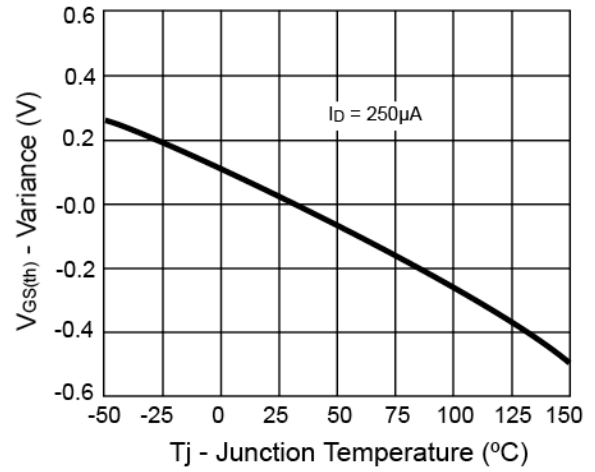


### Electrical Characteristics Curve (Ta = 25°C, unless otherwise noted)

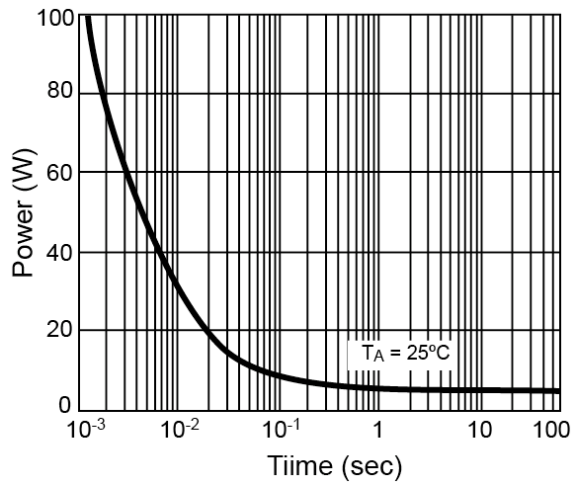
**On-Resistance vs. Gate-Source Voltage**



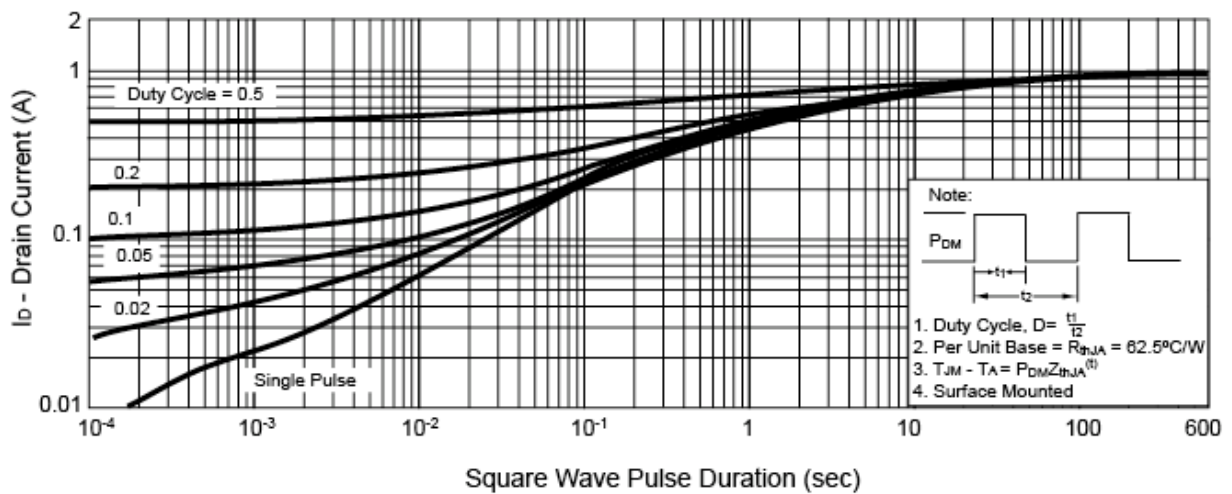
**Threshold Voltage**



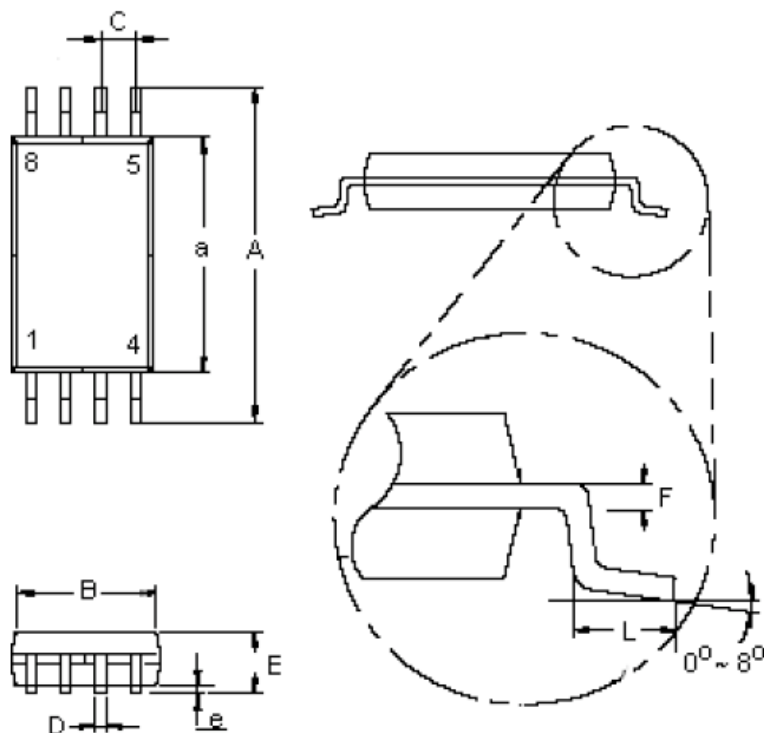
**Single Pulse Power**



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

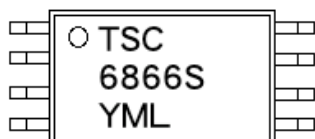


## TSSOP-8 Mechanical Drawing



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

(**A**=Jan, **B**=Feb, **C**=Mar, **D**=Apr, **E**=May, **F**=Jun, **G**=Jul, **H**=Aug, **I**=Sep, **J**=Oct, **K**=Nov, **L**=Dec)

= 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

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