

## Dual N-Channel Power MOSFET

20V, 6.0A, 30mΩ

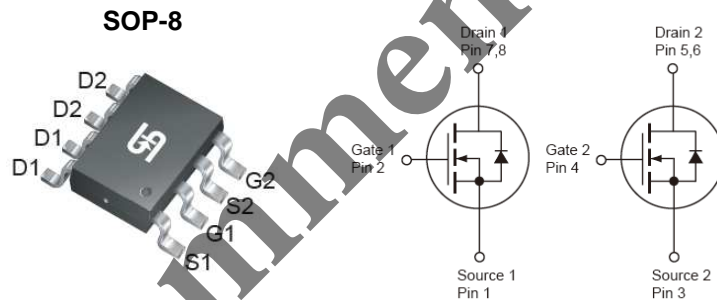
### FEATURES

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

### APPLICATION

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

KEY PERFORMANCE PARAMETERS		
PARAMETER	VALUE	UNIT
$V_{DS}$	20	V
$R_{DS(on)}$ (max)	$V_{GS} = 4.5V$	30
	$V_{GS} = 2.5V$	40
$Q_g$	4.86	nC



**Notes:** Moisture sensitivity level: level 3. Per J-STD-020

ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ C$ 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 (Note 1)	$I_D$	6	A
Pulsed Drain Current (Note 2)	$I_{DM}$	30	A
Continuous Source Current (Diode Conduction)	$I_S$	1.7	A
Total Power Dissipation	$P_{DTOT}$	$T_A = 25^\circ C$	1.6
		$T_A = 75^\circ C$	1.1
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	- 55 to +150	$^\circ C$

THERMAL PERFORMANCE			
PARAMETER	SYMBOL	LIMIT	UNIT
Junction to Case Thermal Resistance	$R_{\theta JC}$	40	$^\circ C/W$
Junction to Ambient Thermal Resistance	$R_{\theta JA}$	77	$^\circ C/W$

**Notes:**  $R_{\theta JA}$  is the sum of the junction-to-case and case-to-ambient thermal resistances. The case thermal reference is defined at the solder mounting surface of the drain pins.  $R_{\theta JA}$  is guaranteed by design while  $R_{\theta CA}$  is determined by the user's board design.  $R_{\theta JA}$  shown below for single device operation on FR-4 PCB in still air.

<b>ELECTRICAL SPECIFICATIONS</b> ( $T_A = 25^\circ\text{C}$ unless otherwise noted)						
PARAMETER	CONDITIONS	SYMBOL	MIN	TYP	MAX	UNIT
<b>Static</b> (Note 3)						
Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	$BV_{DSS}$	20	--	--	V
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	$V_{GS(TH)}$	0.6	--	--	V
Gate Body Leakage	$V_{GS} = \pm 12V, V_{DS} = 0V$	$I_{GSS}$	--	--	$\pm 100$	nA
Zero Gate Voltage Drain Current	$V_{DS} = 20V, V_{GS} = 0V$	$I_{DSS}$	--	--	1	$\mu A$
On-State Drain Current	$V_{DS} = 5V, V_{GS} = 4.5V$	$I_{D(ON)}$	30	--	--	A
Drain-Source On-State Resistance	$V_{GS} = 4.5V, I_D = 6.0A$	$R_{DS(ON)}$	--	21	30	m $\Omega$
	$V_{GS} = 2.5V, I_D = 5.2A$		--	30	40	
Forward Transconductance	$V_{DS} = 10V, I_D = 6A$	$g_{fs}$	--	30	--	S
<b>Dynamic</b> (Note 4)						
Total Gate Charge	$V_{DS} = 10V, I_D = 6A,$ $V_{GS} = 4.5V$	$Q_g$	--	4.86	--	nC
Gate-Source Charge		$Q_{gs}$	--	0.92	--	
Gate-Drain Charge		$Q_{gd}$	--	1.4	--	
Input Capacitance	$V_{DS} = 8V, V_{GS} = 0V,$ $F = 1.0MHz$	$C_{iss}$	--	562	--	pF
Output Capacitance		$C_{oss}$	--	106	--	
Reverse Transfer Capacitance		$C_{rss}$	--	75	--	
<b>Switching</b> (Note 5)						
Turn-On Delay Time	$V_{DD} = 10V,$ $R_{GEN} = 6\Omega,$ $I_D = 1A, V_{GS} = 4.5V,$	$t_{d(on)}$	--	8.1	--	ns
Turn-On Rise Time		$t_r$	--	9.95	--	
Turn-Off Delay Time		$t_{d(off)}$	--	21.85	--	
Turn-Off Fall Time		$t_f$	--	5.35	--	
<b>Source-Drain Diode</b> (Note 3)						
Forward Voltage	$I_S = 1.7A, V_{GS} = 0V$	$V_{SD}$	--	0.7	1.2	V

**Notes:**

1. Pulse width limited by the Maximum junction temperature.
2. Surface Mounted on FR4 Board,  $t \leq 5$  sec.
3. Pulse test:  $PW \leq 300\mu s$ , duty cycle  $\leq 2\%$ .
4. For DESIGN AID ONLY, not subject to production testing.
5. Switching time is essentially independent of operating temperature.

**ORDERING INFORMATION**

<b>PART NO.</b>	<b>PACKAGE</b>	<b>PACKING</b>
TSM9926DCS RLG	SOP-8	2,500pcs / 13" Reel

**Note:**

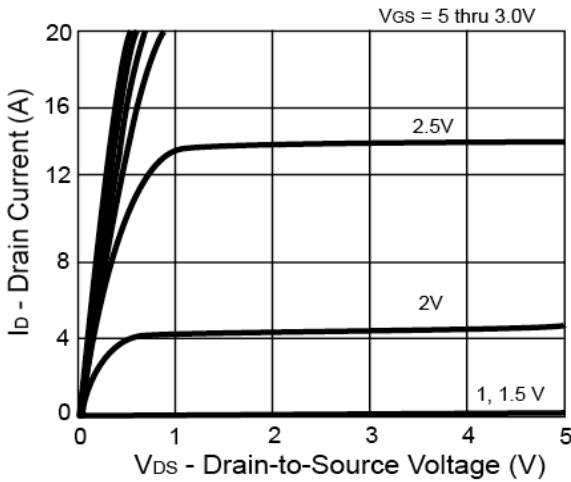
1. Compliant to RoHS Directive 2011/65/EU and in accordance to WEEE 2002/96/EC
2. Halogen-free according to IEC 61249-2-21 definition

**Not Recommended**

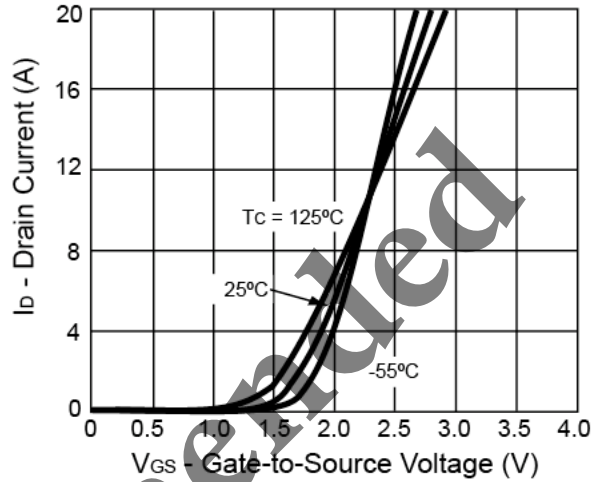
**CHARACTERISTICS CURVES**

( $T_A = 25^\circ\text{C}$  unless otherwise noted)

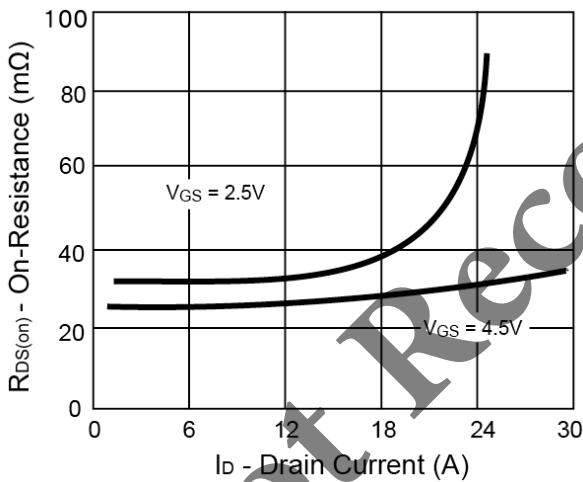
**Output Characteristics**



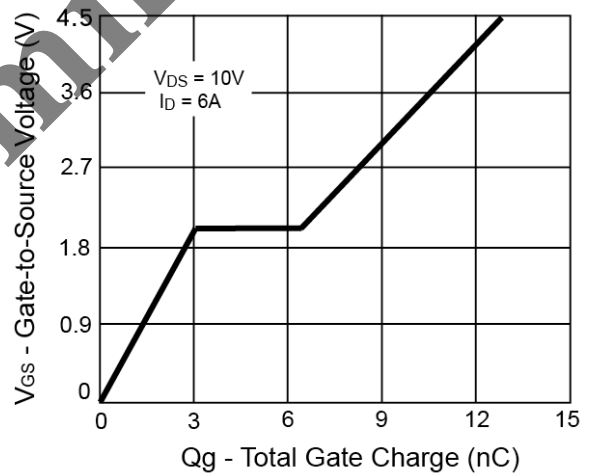
**Transfer Characteristics**



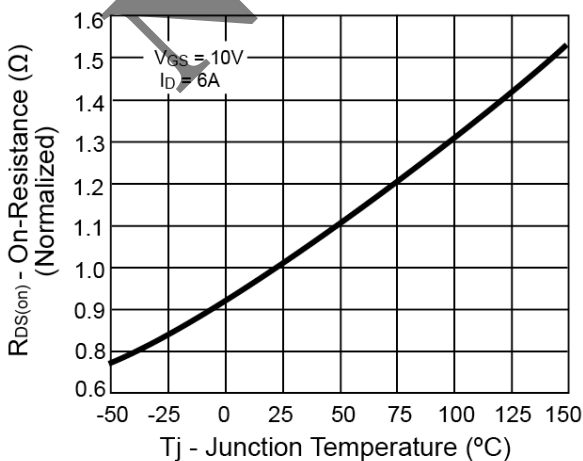
**On-Resistance vs. Drain Current**



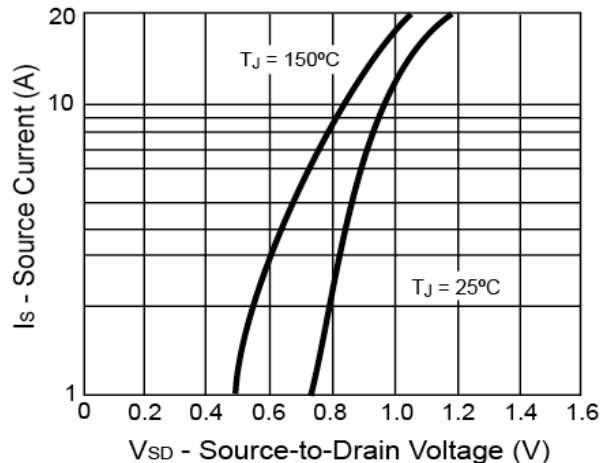
**Gate Charge**



**On-Resistance vs. Junction Temperature**



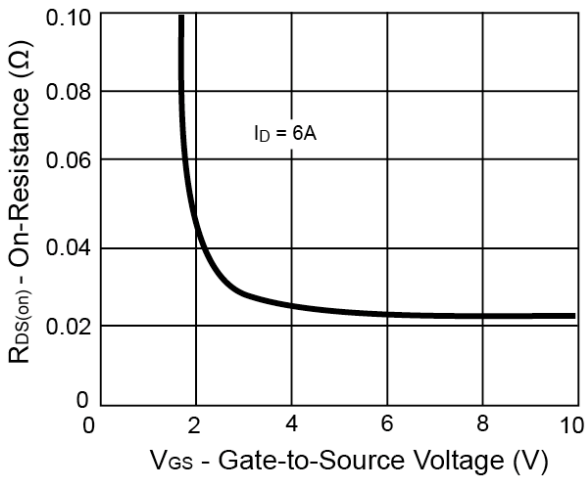
**Source-Drain Diode Forward Voltage**



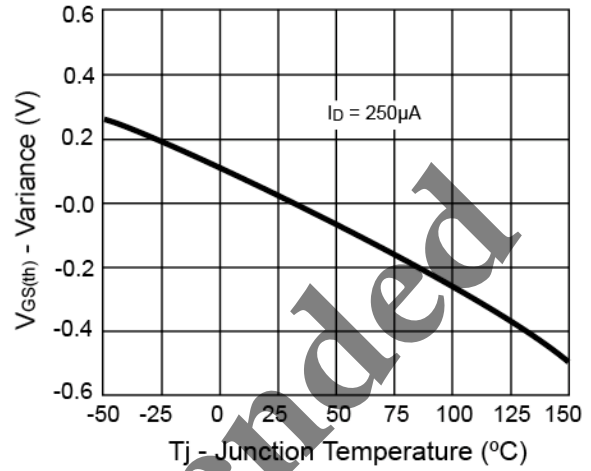
**CHARACTERISTICS CURVES**

( $T_A = 25^\circ\text{C}$  unless otherwise noted)

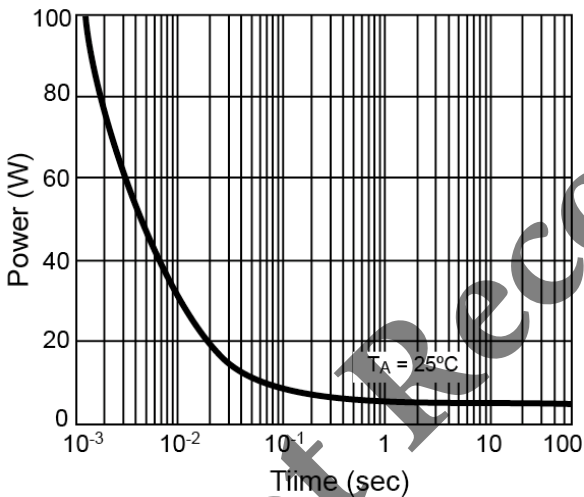
**On-Resistance vs. Gate-Source Voltage**



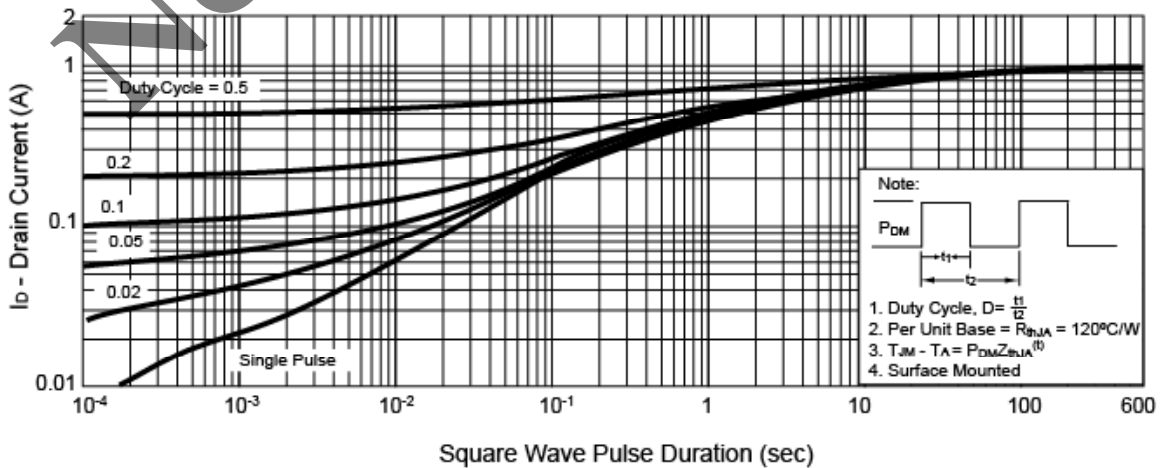
**Threshold Voltage**



**Single Pulse Power**

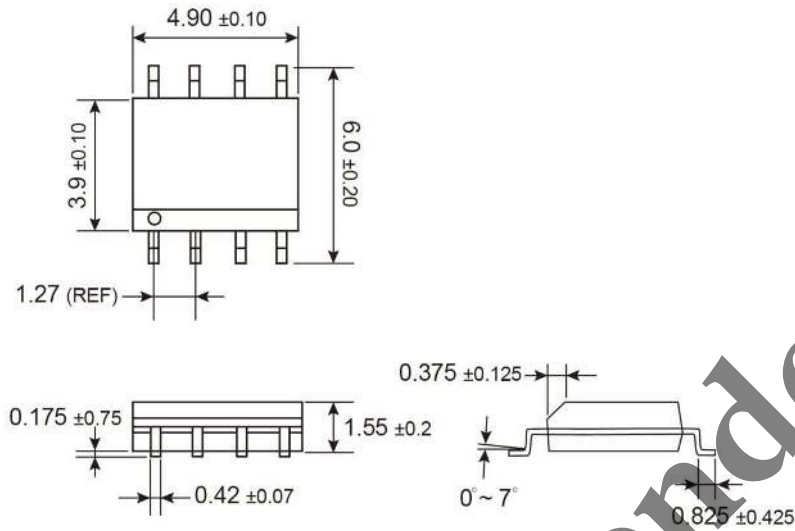


**Normalized Thermal Transient Impedance, Junction-to-Ambient**

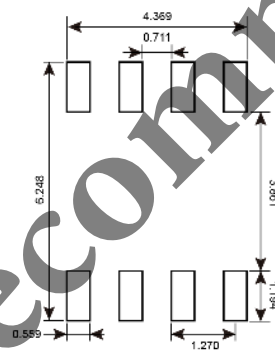


**PACKAGE OUTLINE DIMENSIONS** (Unit: Millimeters)

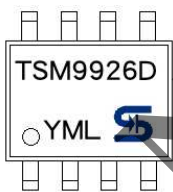
**SOP-8**



**SUGGESTED PAD LAYOUT** (Unit: Millimeters)



**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 (1~9, A~Z)

**Not Recommended**

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