
**Pin Definition:**

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

**PRODUCT SUMMARY**

$V_{DS}$ (V)	$R_{DS(on)}$ (m $\Omega$ )	$I_D$ (A)
-20	40 @ $V_{GS} = -4.5V$	-6.4
	60 @ $V_{GS} = -2.5V$	-5.1

**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
TSM9434CS RL	SOP-8	2.5Kpcs / 13" Reel
TSM9434CS RLG	SOP-8	2.5Kpcs / 13" Reel

Note: "G" denotes Halogen Free Product.

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

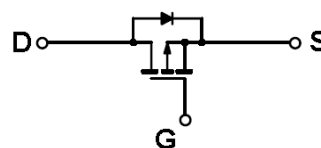
Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	-20	V
Gate-Source Voltage	$V_{GS}$	$\pm 8$	V
Continuous Drain Current	$I_D$	-6.4	A
Pulsed Drain Current	$I_{DM}$	$\pm 10$	A
Continuous Source Current (Diode Conduction) <sup>a,b</sup>	$I_S$	-2.5	A
Maximum Power Dissipation	$P_D$	$T_a = 25^\circ C$	2.5
		$T_a = 70^\circ C$	1.6
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 Case Thermal Resistance	$R_{\theta JC}$	30	$^\circ C/W$
Junction to Ambient Thermal Resistance (PCB mounted)	$R_{\theta JA}$	50	$^\circ C/W$

Notes:

- Surface Mounted on 1" x 1" FR4 Board.
- Pulse width limited by maximum junction temperature

**Block Diagram**


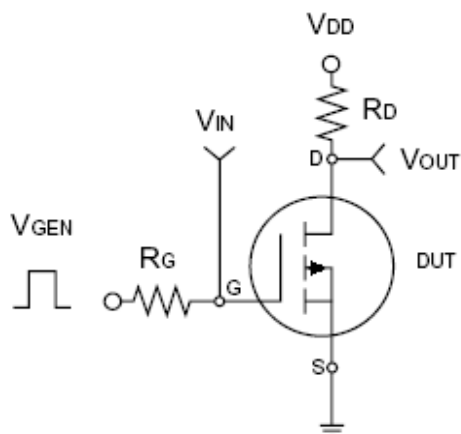
P-Channel MOSFET

### Electrical Specifications

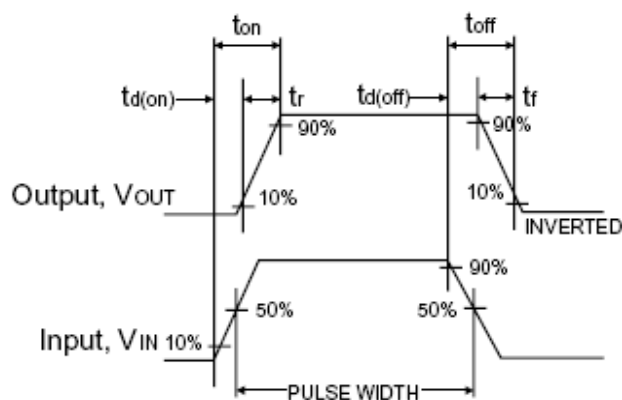
Parameter	Conditions	Symbol	Min	Typ	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = -250\mu A$	$BV_{DSS}$	-20	--	--	V
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = -250\mu A$	$V_{GS(TH)}$	-0.4	--	-1.0	V
Zero Gate Voltage Drain Current	$V_{DS} = -16V, V_{GS} = 0V$	$I_{DSS}$	--	--	-1.0	$\mu A$
Gate Body Leakage	$V_{GS} = \pm 8V, V_{DS} = 0V$	$I_{GSS}$	--	--	$\pm 100$	nA
On-State Drain Current	$V_{DS} \leq -5V, V_{GS} = -4.5V$	$I_{D(ON)}$	-10	--	--	A
Drain-Source On-State Resistance	$V_{GS} = -4.5V, I_D = -6.4A$	$R_{DS(ON)}$	--	31	40	m $\Omega$
	$V_{GS} = -2.5V, I_D = -5.1A$		--	45	60	
Forward Transconductance	$V_{DS} = -9V, I_D = -6.4A$	$g_{fs}$	--	14	--	S
Diode Forward Voltage	$I_S = -2.5A, V_{GS} = 0V$	$V_{SD}$	--	-0.9	-1.2	V
<b>Dynamic<sup>b</sup></b>						
Total Gate Charge	$V_{DS} = -10V, I_D = -6.4A,$ $V_{GS} = -4.5V$	$Q_g$	--	12.5	19	nC
Gate-Source Charge		$Q_{gs}$	--	1.7	--	
Gate-Drain Charge		$Q_{gd}$	--	3.3	--	
Input Capacitance	$V_{DS} = -10V, V_{GS} = 0V,$ $f = 1.0MHz$	$C_{iss}$	--	1020	--	pF
Output Capacitance		$C_{oss}$	--	191	--	
Reverse Transfer Capacitance		$C_{rss}$	--	140	--	
<b>Switching<sup>c</sup></b>						
Turn-On Delay Time	$V_{DD} = -10V, R_L = 10\Omega,$ $I_D = -1A, V_{GEN} = -4.5V,$ $R_G = 6\Omega$	$t_{d(on)}$	--	25	40	nS
Turn-On Rise Time		$t_r$	--	43	65	
Turn-Off Delay Time		$t_{d(off)}$	--	71	110	
Turn-Off Fall Time		$t_f$	--	48	75	

**Notes:**

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



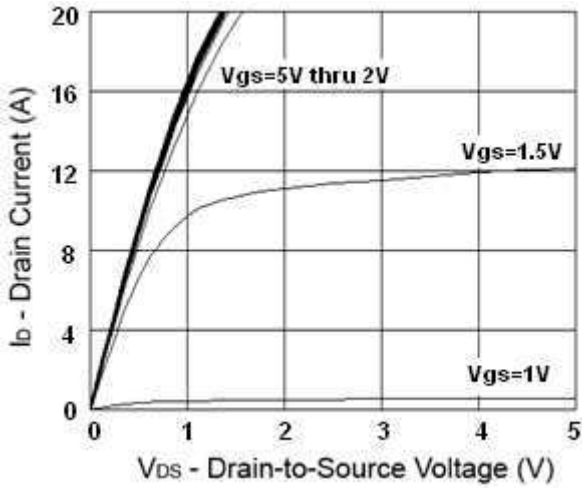
**Switching Test Circuit**



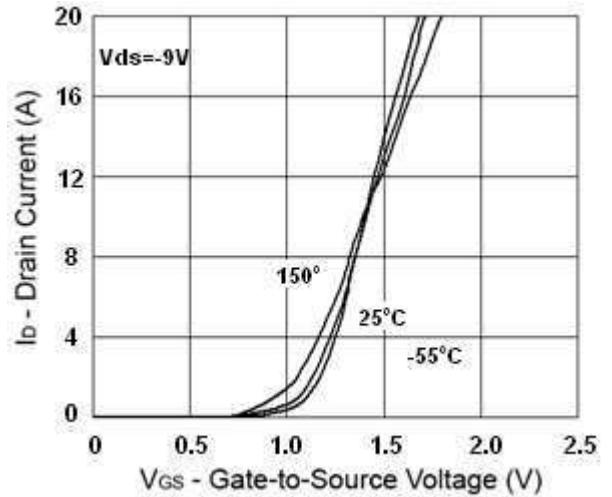
**Switchin Waveforms**

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

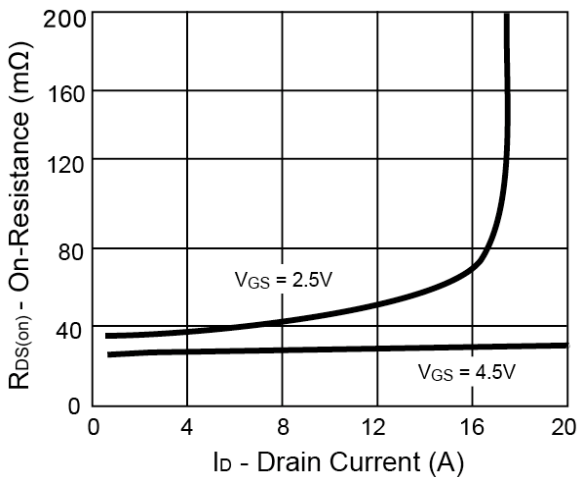
**Output Characteristics**



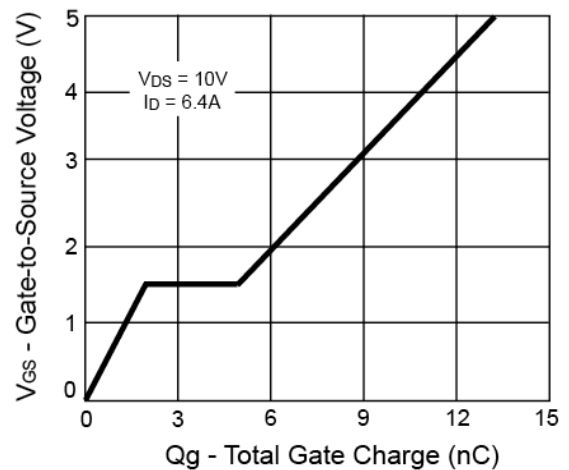
**Transfer Characteristics**



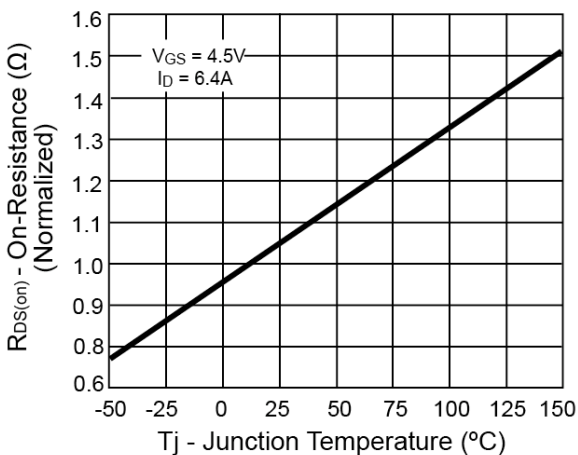
**On-Resistance vs. Drain Current**



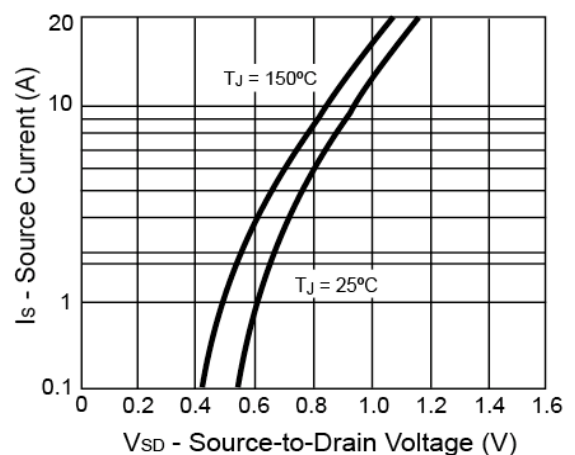
**Gate Charge**



**On-Resistance vs. Junction Temperature**

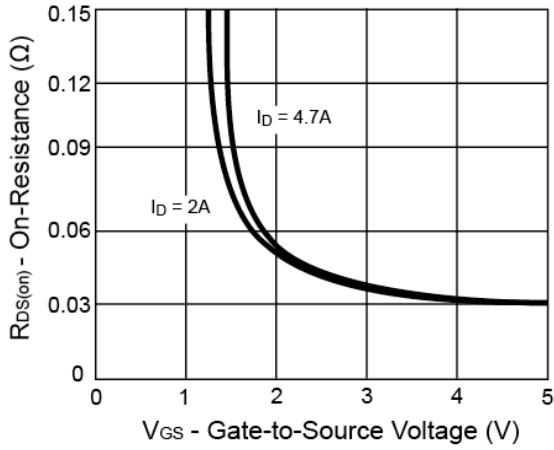


**Source-Drain Diode Forward Voltage**

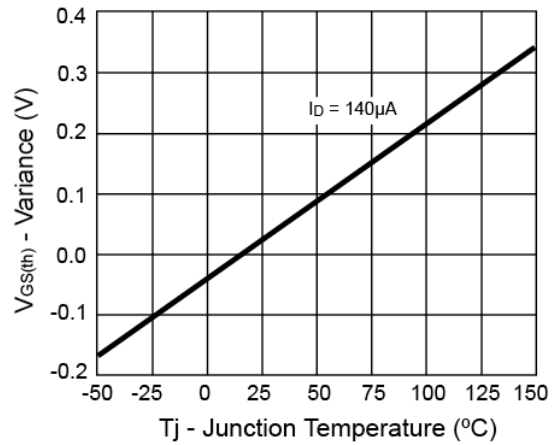


**Electrical Characteristics Curve** ( $T_a = 25^\circ\text{C}$ , unless otherwise noted)

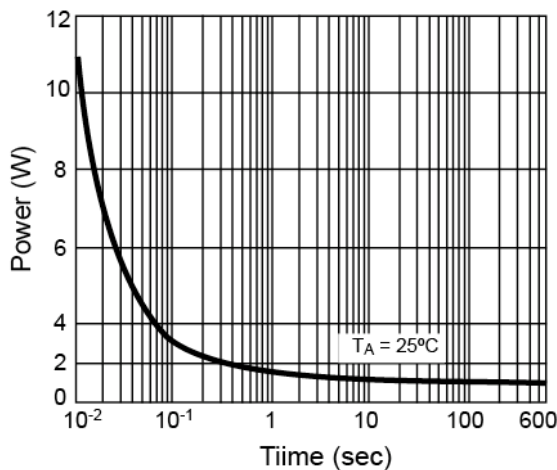
**On-Resistance vs. Gate-Source Voltage**



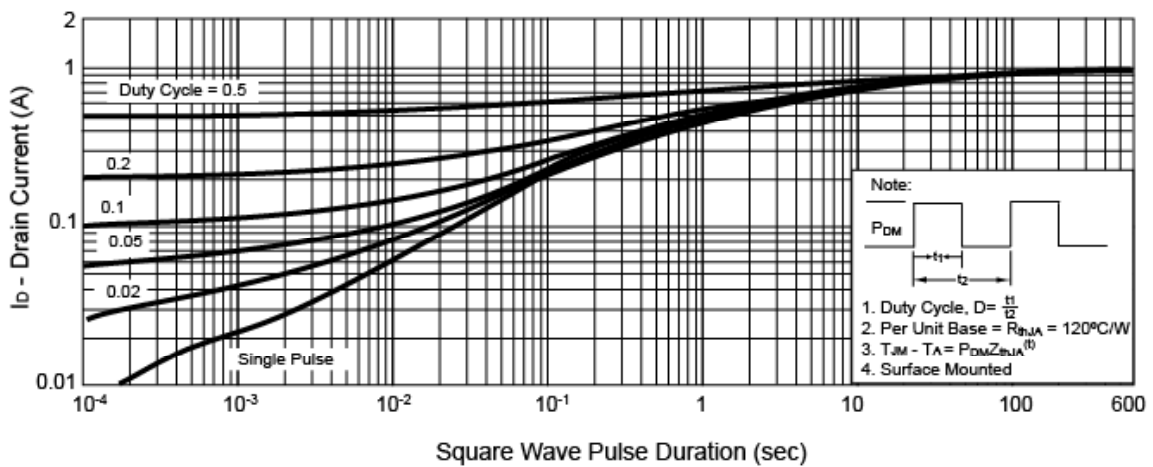
**Threshold Voltage**



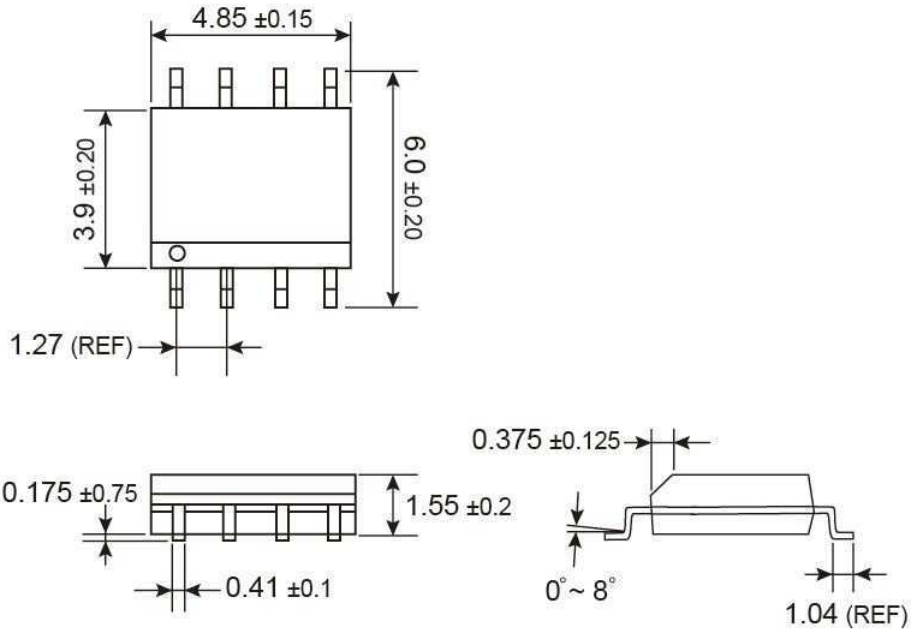
**Single Pulse Power**



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

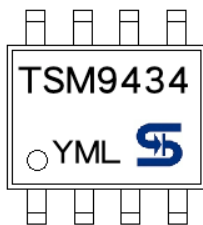


**SOP-8 Mechanical Drawing**



Unit: Millimeters

**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)  
 = Month Code for Halogen Free Product  
 (O=Jan, P=Feb, Q=Mar, R=Apl, S=May, T=Jun, U=Jul, V=Aug, W=Sep, X=Oct, Y=Nov, Z=Dec)
- L** = Lot Code

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