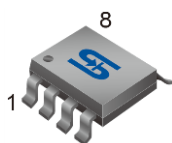


### SOP-8



### Pin Definition:

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

### Note:

MSL 1 (Moisture Sensitivity Level) per J-STD-020

### Key Parameter Performance

Parameter	Value	Unit
$V_{DS}$	20	V
$R_{DS(on)}$ (max)	$V_{GS} = 4.5V$	20
	$V_{GS} = 2.5V$	25
	$V_{GS} = 1.8V$	31
$Q_g$	12.3	nC

### Features

- Advanced High Cell Density Trench Technology.
- Low Gate Charge.

### Application

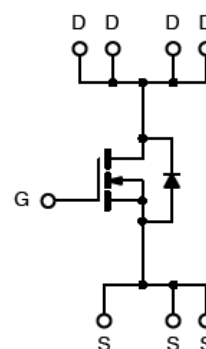
- Networking DC-DC Power System.
- Load Switch.

### Ordering Information

Part No.	Package	Packing
TSM4806CS RLG	SOP-8	2.5kpcs / 13" Reel

•Note: Halogen-free according to IEC 61249-2-21 definition

### Block Diagram



N-Channel MOSFET

### 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	$V_{GS}$	$\pm 8$	V
Continuous Drain Current <sup>a</sup>	$I_D$	28	A
Pulsed Drain Current <sup>b</sup>	$I_{DM}$	70	A
Continuous Source Current (Diode Conduction) <sup>a,c</sup>	$I_S$	28	A
Total Power Dissipation	$P_D$	2	W
	$T_A=25^{\circ}C$		
Storage Temperature Range	$T_{STG}$	-55 to +150	$^{\circ}C$
Operating Junction Temperature Range	$T_J$	-55 to +150	$^{\circ}C$

### Thermal Performance

Parameter	Symbol	Limit	Unit
Thermal Resistance Junction to Lead	$R_{\theta_{JL}}$	40	$^{\circ}C/W$
Thermal Resistance Junction to Ambient	$R_{\theta_{JA}}$	62.5	$^{\circ}C/W$

### Notes:

- The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2oz copper.
- The data tested by pulsed, pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$  surface mounted on FR4 Board,  $t \leq 5s$ .
- The data is theoretically the same as  $I_D$  and  $I_{DM}$ , in real applications, should be limited by total power dissipation.

### Electrical Specifications

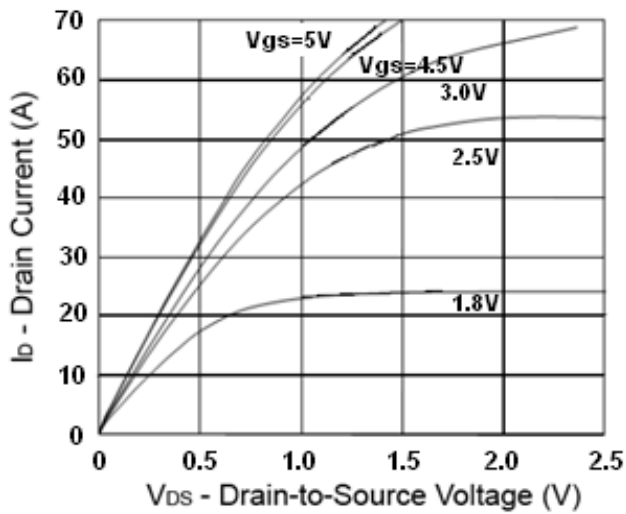
Parameter	Conditions	Symbol	Min	Typ	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	$BV_{DSS}$	20	--	--	V
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	$V_{GS(TH)}$	0.3	0.6	1.0	V
Gate-Source Leakage Current	$V_{GS} = \pm 8V, V_{DS} = 0V$	$I_{GSS}$	--	--	$\pm 100$	nA
Drain-Source Leakage Current	$V_{DS} = 16V, V_{GS} = 0V$	$I_{DSS}$	--	--	1	$\mu A$
Drain-Source On-State Resistance	$V_{GS} = 4.5V, I_D = 20A$	$R_{DS(ON)}$	--	16	20	m $\Omega$
	$V_{GS} = 2.5V, I_D = 15A$		--	20	25	
	$V_{GS} = 1.8V, I_D = 10A$		--	25	31	
Forward Transconductance	$V_{DS} = 5V, I_D = 15A$	$g_{fs}$	--	27	--	S
Diode Forward Voltage	$I_S = 1A, V_{GS} = 0V$	$V_{SD}$	--	--	1.2	V
<b>Dynamic<sup>b</sup></b>						
Gate Resistance	$V_{DS} = 0V, V_{GS} = 0V, f = 1MHz$	$R_g$	--	1.4	2.8	$\Omega$
Total Gate Charge	$V_{DS} = 15V, I_D = 15A, V_{GS} = 4.5V$	$Q_g$	--	12.3	--	nC
Gate-Source Charge		$Q_{gs}$	--	1.95	--	
Gate-Drain Charge		$Q_{gd}$	--	3.08	--	
Input Capacitance	$V_{DS} = 15V, V_{GS} = 0V, f = 1MHz$	$C_{iss}$	--	961	--	pF
Output Capacitance		$C_{oss}$	--	92.3	--	
Reverse Transfer Capacitance		$C_{rss}$	--	80.4	--	
Reverse Recovery Time	$I_F = 15A, dI/dt = 100A/\mu s, T_J = 25^\circ C$	$t_{rr}$	--	6	--	ns
Reverse Recovery Charge		$Q_{rr}$	--	1.38	--	nC
<b>Switching<sup>b,c</sup></b>						
Turn-On Delay Time	$V_{DD} = 10V, I_D = 15A, V_{GS} = 4.5V, R_G = 3.3\Omega$	$t_{d(on)}$	--	3.02	--	ns
Turn-On Rise Time		$t_r$	--	13.1	--	
Turn-Off Delay Time		$t_{d(off)}$	--	28	--	
Turn-Off Fall Time		$t_f$	--	8.3	--	

**Notes:**

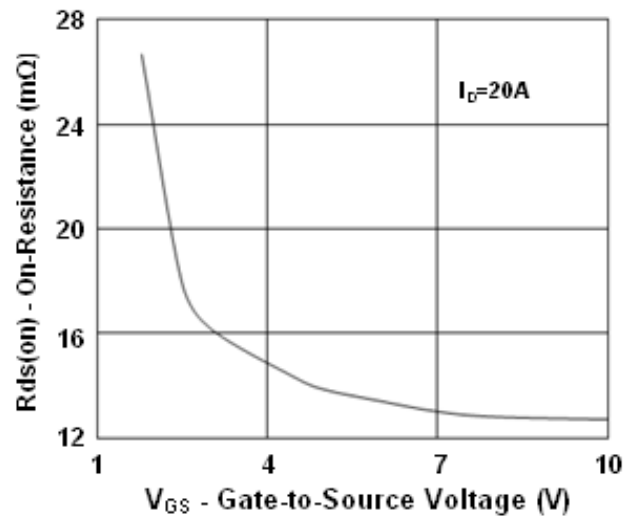
- a. Pulse test:  $PW \leq 300\mu s$ , duty cycle  $\leq 2\%$
- b. For DESIGN AID ONLY, not subject to production testing.
- c. Switching time is essentially independent of operating temperature.

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

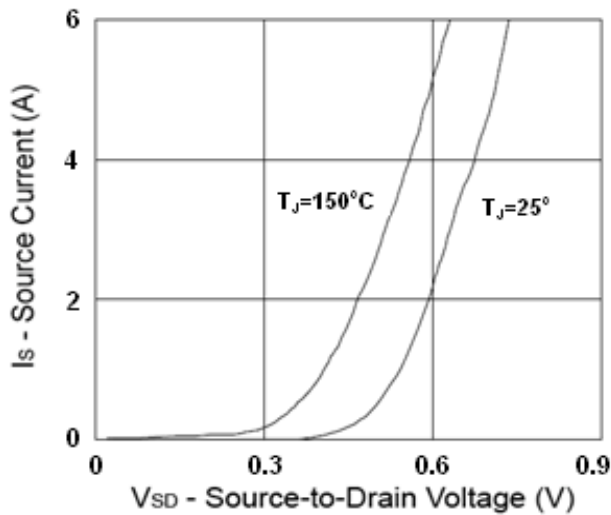
Output Characteristics



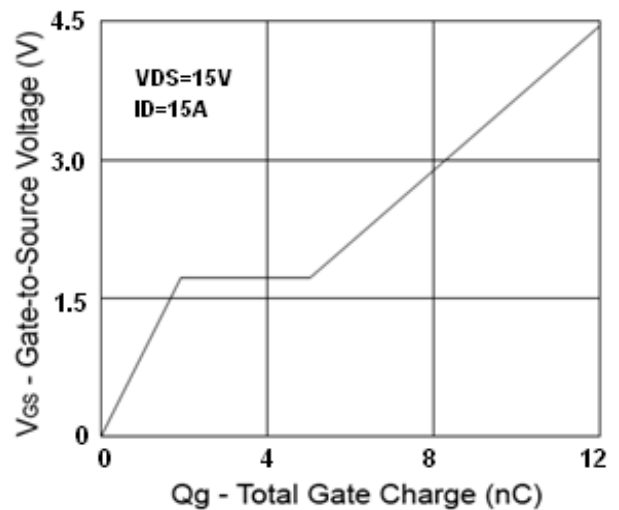
On-Resistance vs. Gate-Source Voltage



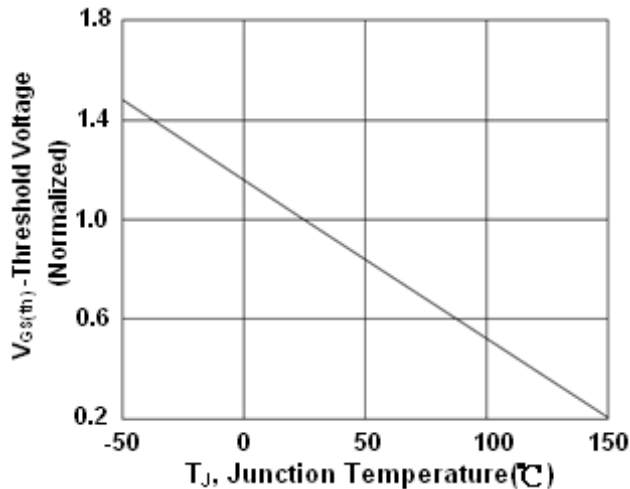
Source-Drain Diode Forward Voltage



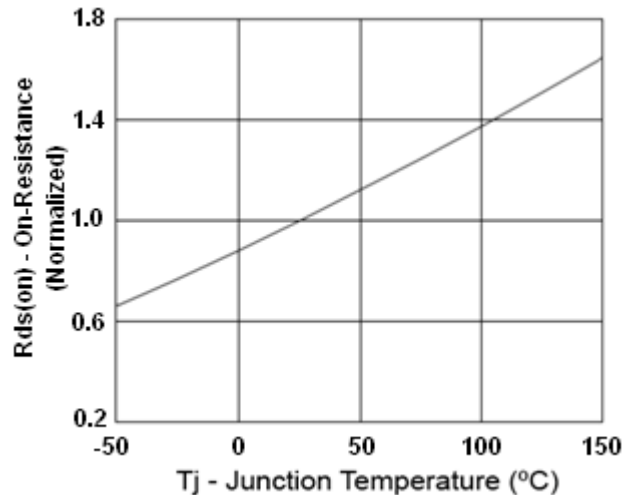
Gate Charge



Normalized  $V_{GS(th)}$  vs.  $T_J$

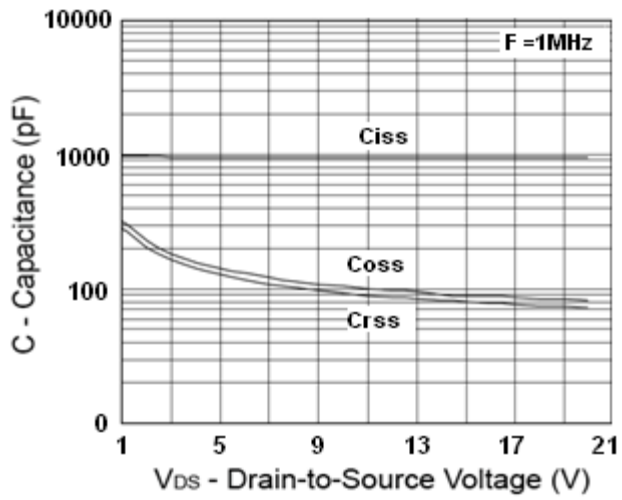


Normalized  $R_{DS(on)}$  vs.  $T_J$

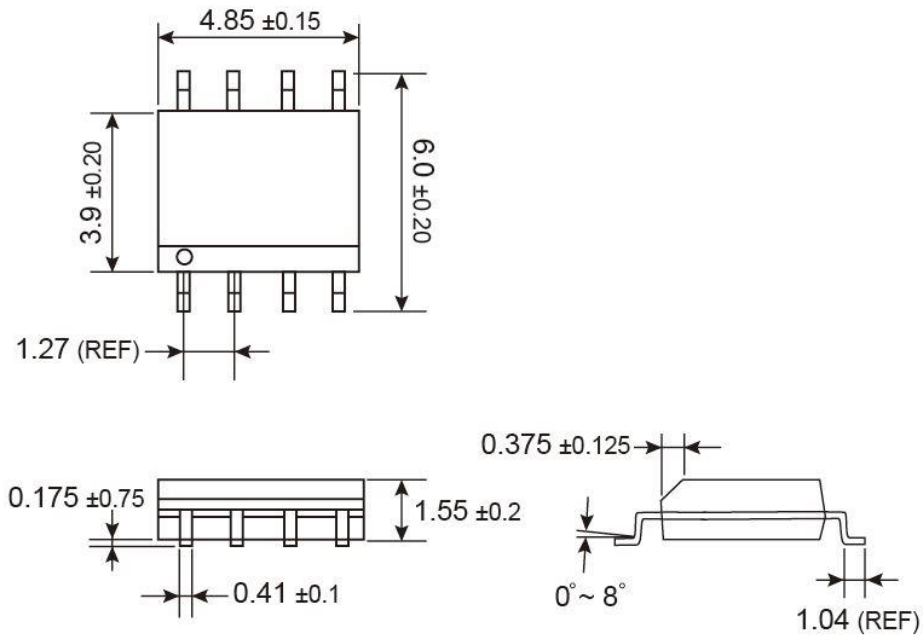


### Electrical Characteristics Curve ( $T_A=25^{\circ}\text{C}$ , unless otherwise noted)

#### Capacitance

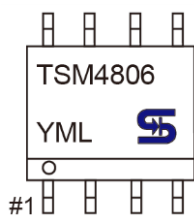


**SOP-8 Mechanical Drawing**



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



# TSM4806

## 20V N-Channel MOSFET

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