



# TSM4835

## 30V P-Channel Enhancement Mode MOSFET

SOP-8



Pin assignment:

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

$V_{DS} = -30V$

$R_{DS(on)}, V_{GS} @ -10V, I_{DS} @ -9.5A = 18m\Omega$

$R_{DS(on)}, V_{GS} @ -4.5V, I_{DS} @ -7.5A = 30m\Omega$

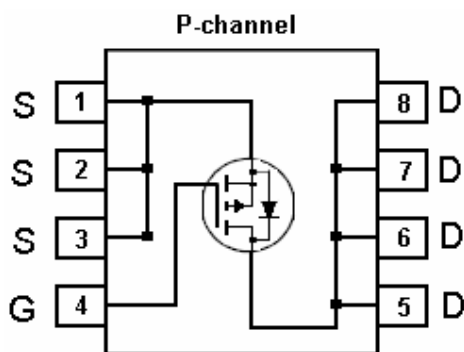
### Features

- ✧ Advanced trench process technology
- ✧ High density cell design for ultra low on-resistance
- ✧ High gate voltage

### Ordering Information

| Part No.  | Packing     | Package |
|-----------|-------------|---------|
| TSM4835CS | Tape & Reel | SOP-8   |

### Block Diagram



### Absolute Maximum Rating (Ta = 25 °C unless otherwise noted)

| Parameter                                        | Symbol         | Limit        | Unit |
|--------------------------------------------------|----------------|--------------|------|
| Drain-Source Voltage                             | $V_{DS}$       | - 30         | V    |
| Gate-Source Voltage                              | $V_{GS}$       | ± 25         | V    |
| Continuous Drain Current, $V_{GS} @ 4.5V$ .      | $I_D$          | - 9.5        | A    |
| Pulsed Drain Current, $V_{GS} @ 4.5V$            | $I_{DM}$       | - 50         | A    |
| Maximum Power Dissipation                        | $P_D$          | 2.5          | W    |
|                                                  |                | 1.6          | W    |
| Operating Junction Temperature                   | $T_J$          | +150         | °C   |
| Operating Junction and Storage Temperature Range | $T_J, T_{STG}$ | - 55 to +150 | °C   |

### Thermal Performance

| Parameter                                            | Symbol          | Limit | Unit |
|------------------------------------------------------|-----------------|-------|------|
| Junction to Ambient Thermal Resistance (PCB mounted) | $R_{\theta ja}$ | 50    | °C/W |

Note: Surface mounted on FR4 board  $t \leq 5sec$ .

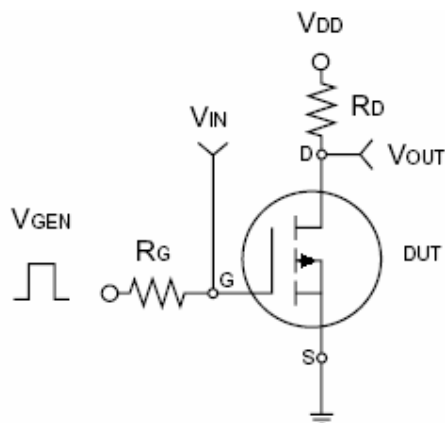


## Electrical Characteristics

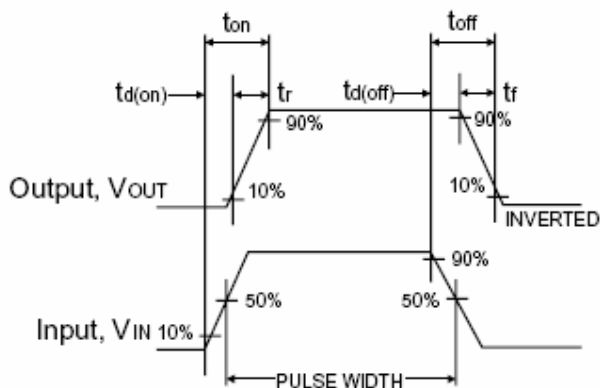
Ta = 25°C, unless otherwise noted

| Parameter                        | Conditions                                                                          | Symbol       | Min  | Typ    | Max   | Unit |
|----------------------------------|-------------------------------------------------------------------------------------|--------------|------|--------|-------|------|
| Static                           |                                                                                     |              |      |        |       |      |
| Drain-Source Breakdown Voltage   | $V_{GS} = 0V, I_D = -250\mu A$                                                      | $BV_{DSS}$   | - 30 | --     | --    | V    |
| Drain-Source On-State Resistance | $V_{GS} = -10V, I_D = -9.5A$                                                        | $R_{DS(ON)}$ | --   | 13     | 18    | mΩ   |
| Drain-Source On-State Resistance | $V_{GS} = -4.5V, I_D = -7.5A$                                                       | $R_{DS(ON)}$ | --   | 22     | 30    |      |
| Gate Threshold Voltage           | $V_{DS} = V_{GS}, I_D = -250\mu A$                                                  | $V_{GS(TH)}$ | - 1  | --     | - 3   | V    |
| Zero Gate Voltage Drain Current  | $V_{DS} = -30V, V_{GS} = 0V$                                                        | $I_{DSS}$    | --   | --     | - 1.0 | μA   |
| Gate Body Leakage                | $V_{GS} = \pm 25V, V_{DS} = 0V$                                                     | $I_{GSS}$    | --   | --     | ± 100 | nA   |
| Forward Transconductance         | $V_{DS} = -15V, I_D = -8A$                                                          | $g_{fs}$     | --   | 22     | --    | S    |
| Dynamic                          |                                                                                     |              |      |        |       |      |
| Total Gate Charge                | $V_{DS} = -15V, I_D = -4.6A,$<br>$V_{GS} = -5V$                                     | $Q_g$        | --   | 23     | 34    | nC   |
|                                  | $V_{DS} = -15V, I_D = -4.6A,$<br>$V_{GS} = -10V$                                    |              | --   | 54     | 60    |      |
| Gate-Source Charge               | $V_{GS} = -10V$                                                                     | $Q_{gs}$     | --   | 8.5    | --    |      |
| Gate-Drain Charge                |                                                                                     | $Q_{gd}$     | --   | 10.3   | --    |      |
| Turn-On Delay Time               | $V_{DD} = -15V, R_L = 15\Omega,$<br>$I_D = -1A, V_{GEN} = -10V,$<br>$R_G = 6\Omega$ | $t_{d(on)}$  | --   | 24     | 30    | nS   |
| Turn-On Rise Time                |                                                                                     | $t_r$        | --   | 12     | 30    |      |
| Turn-Off Delay Time              |                                                                                     | $t_{d(off)}$ | --   | 78     | 120   |      |
| Turn-Off Fall Time               |                                                                                     | $t_f$        | --   | 37     | 80    |      |
| Input Capacitance                | $V_{DS} = -15V, V_{GS} = 0V,$<br>$f = 1.0MHz$                                       | $C_{iss}$    | --   | 2520   | --    | pF   |
| Output Capacitance               |                                                                                     | $C_{oss}$    | --   | 490    | --    |      |
| Reverse Transfer Capacitance     |                                                                                     | $C_{rss}$    | --   | 330    | --    |      |
| Source-Drain Diode               |                                                                                     |              |      |        |       |      |
| Max. Diode Forward Current       |                                                                                     | $I_S$        | --   | --     | - 2.1 | A    |
| Diode Forward Voltage            | $I_S = -2.1A, V_{GS} = 0V$                                                          | $V_{SD}$     | --   | - 0.77 | - 1.2 | V    |

Note : pulse test: pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$

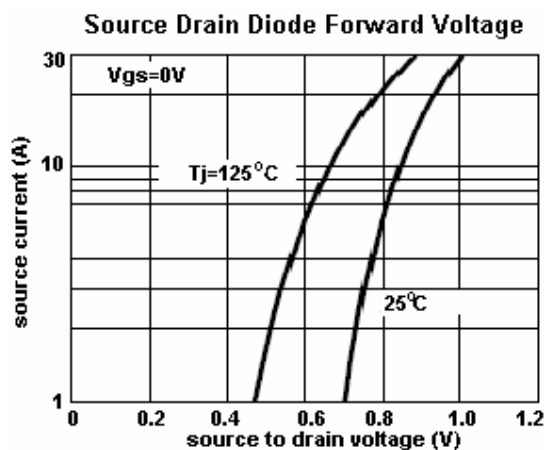
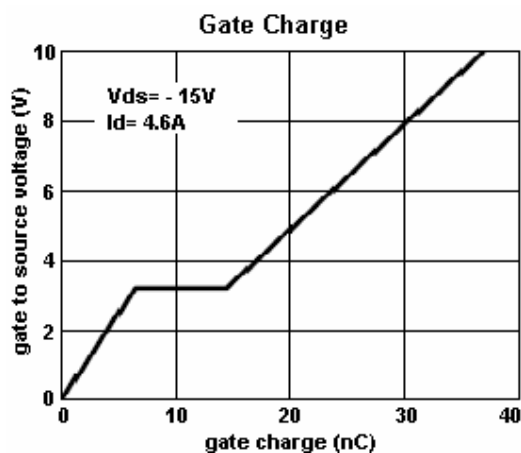
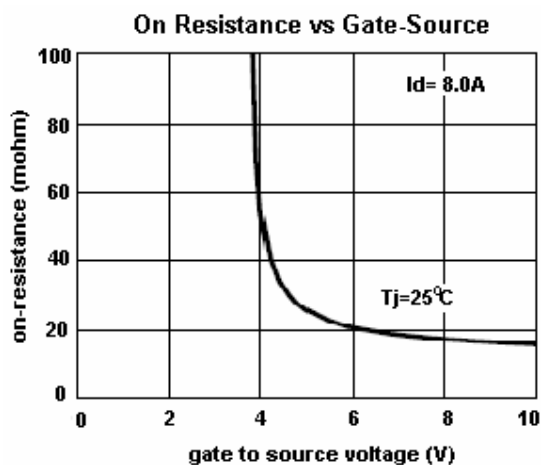
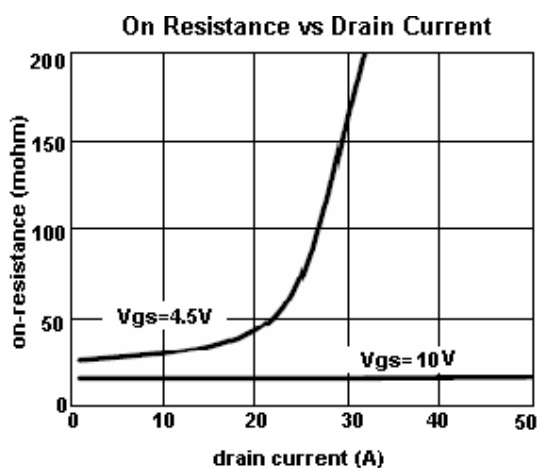
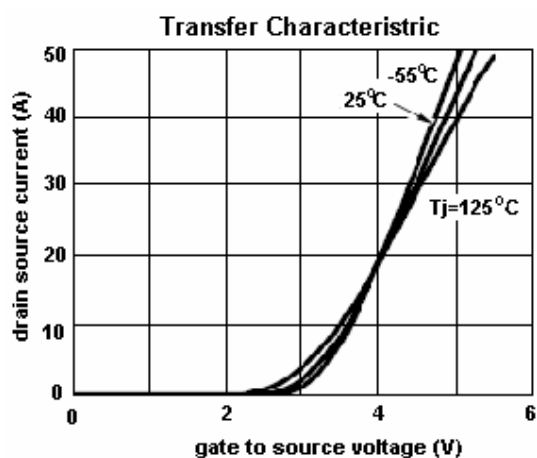
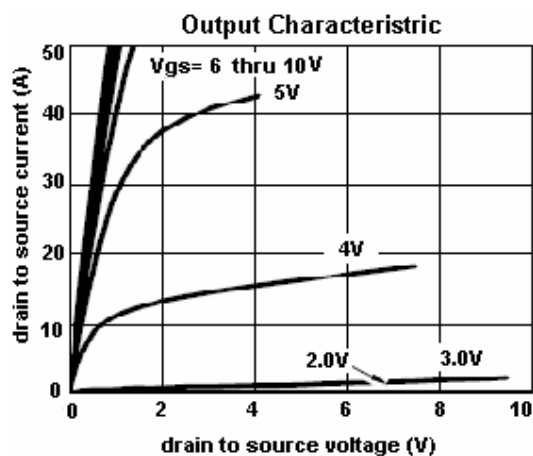


Switching Test Circuit

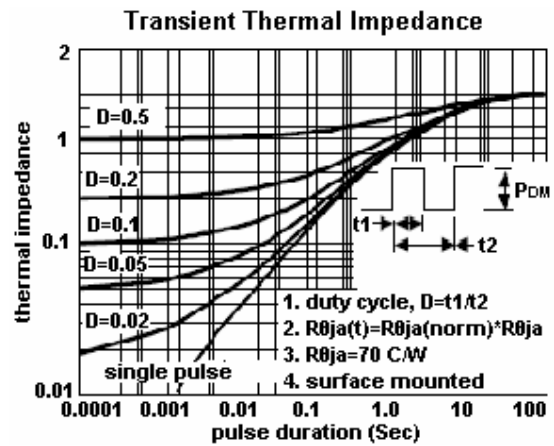
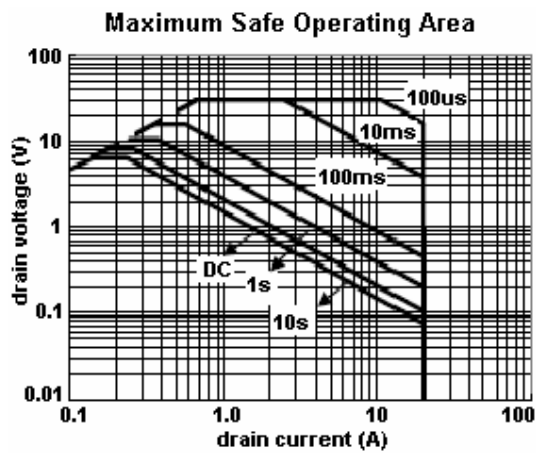
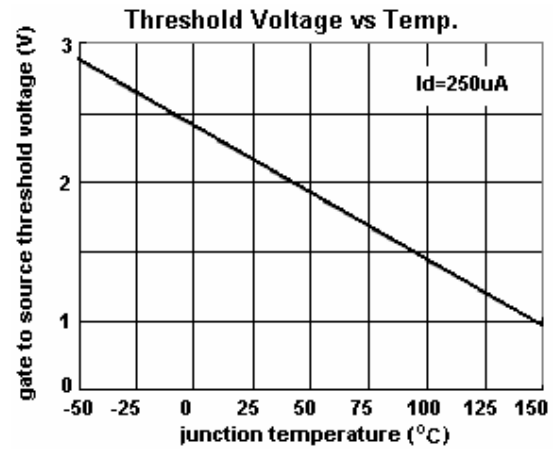
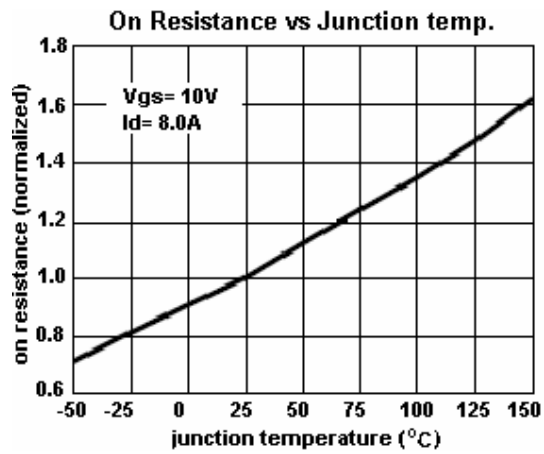


Switchin Waveforms

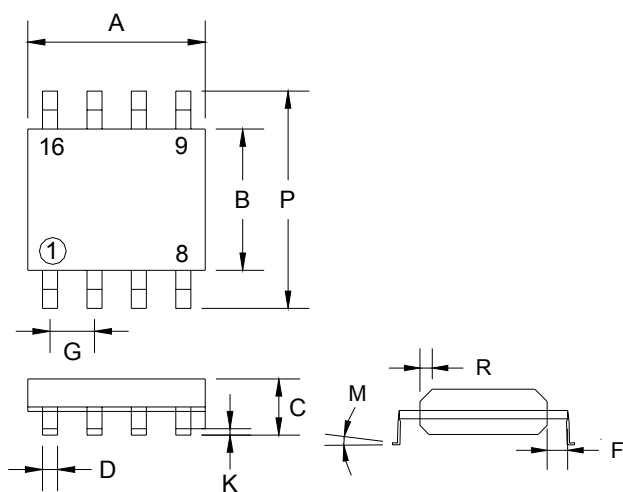
**Typical Characteristics Curve** ( $T_a = 25^\circ\text{C}$  unless otherwise noted)



# Electrical Characteristics Curve (continued)



## SOP-8 Mechanical Drawing



| SOP-8 DIMENSION |             |      |            |       |
|-----------------|-------------|------|------------|-------|
| DIM             | MILLIMETERS |      | INCHES     |       |
|                 | MIN         | MAX  | MIN        | MAX   |
| A               | 4.80        | 5.00 | 0.189      | 0.196 |
| B               | 3.80        | 4.00 | 0.150      | 0.157 |
| C               | 1.35        | 1.75 | 0.054      | 0.068 |
| D               | 0.35        | 0.49 | 0.014      | 0.019 |
| F               | 0.40        | 1.25 | 0.016      | 0.049 |
| G               | 1.27 (typ)  |      | 0.05 (typ) |       |
| K               | 0.10        | 0.25 | 0.004      | 0.009 |
| M               | 0°          | 7°   | 0°         | 7°    |
| P               | 5.80        | 6.20 | 0.229      | 0.244 |
| R               | 0.25        | 0.50 | 0.010      | 0.019 |