

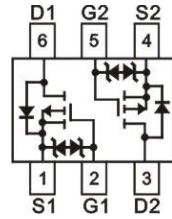


### MT 7801

#### 20V P-Channel Enhancement Mode MOSFET

##### Features

- RDS(ON) , VGS@-4.5V, ID@-0.7A<325mΩ
- RDS(ON) , VGS@-2.5V, ID@-0.6A<420mΩ
- RDS(ON) , VGS@-1.8V, ID@-0.5A<600mΩ
- Advanced Trench Process Technology
- Specially Designed for Switch Load, PWM Application, etc.
- ESD Protected 2KV HBM
- Lead free in compliance with EU RoHS 2011/65/EU directive
- Green molding compound as per IEC61249 Std.  
(Halogen Free)



SOT-363

##### Mechanical Data

- Case: SOT-363 Package
- Terminals: Solderable per MIL-STD-750, Method 2026
- Approx. Weight: 0.0002 ounces, 0.006 grams  
Marking: T01

#### Maximum Ratings and Thermal Characteristics (T<sub>A</sub>=25°C unless otherwise noted)

| PARAMETER  |                      | SYMBOL                            | LIMIT   | UNITS |
|--|----------------------|-----------------------------------|---------|-------|
| Drain-Source Voltage                             |                      | V <sub>DS</sub>                   | -20     | V     |
| Gate-Source Voltage                              |                      | V <sub>GS</sub>                   | ±8      | V     |
| Continuous Drain Current                         |                      | I <sub>D</sub>                    | -0.7    | A     |
| Pulsed Drain Current <sup>(Note 4)</sup>         |                      | I <sub>DM</sub>                   | -2.8    | A     |
| Power Dissipation                                | T <sub>a</sub> =25°C | P <sub>D</sub>                    | 350     | mW    |
|  | Derate above 25°C    |                                   | 2.8     | mW/°C |
| Operating Junction and Storage Temperature Range |                      | T <sub>J</sub> , T <sub>STG</sub> | -55~150 | °C    |
| Typical Thermal resistance                       |                      | R <sub>θJA</sub>                  | 357     | °C/W  |
| - Junction to Ambient <sup>(Note 3)</sup>        |                      |                                   |         |       |



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

| PARAMETER   | SYMBOL       | TEST CONDITION   | MIN. | TYP.      | MAX.     | UNITS      |
|---|--------------|--|------|-----------|----------|------------|
| <b>Static</b>   |              |  |      |           |          |            |
| Drain-Source Breakdown Voltage                        | $BV_{DSS}$   | $V_{GS}=0V, I_D=-250\mu A$   | -20  | -         | -        | V          |
| Gate Threshold Voltage                                | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=-250\mu A$   | -0.5 | -0.64     | -1.0     | V          |
| Drain-Source On-State Resistance                      | $R_{DS(on)}$ | $V_{GS}=-4.5V, I_D=-0.7A$  | -    | 260       | 325      | m $\Omega$ |
|   |              | $V_{GS}=-2.5V, I_D=-0.6A$  | -    | 310       | 420      |            |
|   |              | $V_{GS}=-1.8V, I_D=-0.5A$  | -    | 400       | 600      |            |
| Zero Gate Voltage Drain Current                       | $I_{DSS}$    | $V_{DS}=-20V, V_{GS}=0V$   | -    | -0.01     | -1       | $\mu A$    |
| Gate-Source Leakage Current                           | $I_{GSS}$    | $V_{GS}=\pm 8V, V_{DS}=0V$   | -    | $\pm 3.5$ | $\pm 10$ | $\mu A$    |
| <b>Dynamic</b>  |              |  |      |           |          |            |
| Total Gate Charge                                     | $Q_g$        | $V_{DS}=-10V, I_D=-0.7A,$<br>$V_{GS}=-4.5V$ (Note 1,2)                   | -    | 2.2       | -        | nC         |
| Gate-Source Charge                                    | $Q_{gs}$     |  | -    | 0.4       | -        |            |
| Gate-Drain Charge                                     | $Q_{gd}$     |  | -    | 0.5       | -        |            |
| Input Capacitance                                     | $C_{iss}$    | $V_{DS}=-10V, V_{GS}=0V,$<br>$f=1.0\text{MHz}$                           | -    | 165       | -        | pF         |
| Output Capacitance                                    | $C_{oss}$    |  | -    | 25        | -        |            |
| Reverse Transfer Capacitance                          | $C_{rss}$    |  | -    | 14.7      | -        |            |
| <b>Switching</b>                                      |              |  |      |           |          |            |
| Turn-On Delay Time                                    | $t_{d(on)}$  | $V_{DD}=-10V, I_D=-0.7A,$<br>$V_{GS}=-4.5V,$<br>$R_G=6\Omega$ (Note 1,2) | -    | 8.9       | -        | ns         |
| Turn-On Rise Time                                     | $t_r$        |  | -    | 37        | -        |            |
| Turn-Off Delay Time                                   | $t_{d(off)}$ |  | -    | 127       | -        |            |
| Turn-Off Fall Time                                    | $t_f$        |  | -    | 70        | -        |            |
| <b>Drain-Source Diode</b>                             |              |  |      |           |          |            |
| Maximum Continuous Drain-Source Diode Forward Current | $I_S$        | ---  | -    | -         | -1       | A          |
| Diode Forward Voltage                                 | $V_{SD}$     | $I_S=-1A, V_{GS}=0V$   | -    | -0.86     | -1.2     | V          |

NOTES :

1. Pulse width $\leq 300\mu s$ , Duty cycle $\leq 2\%$
2. Essentially independent of operating temperature typical characteristics.
3.  $R_{\theta JA}$  is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins mounted on a 1 inch FR-4 with 2oz. square pad of copper.
4. The maximum current rating is package limited.



## TYPICAL CHARACTERISTIC CURVES

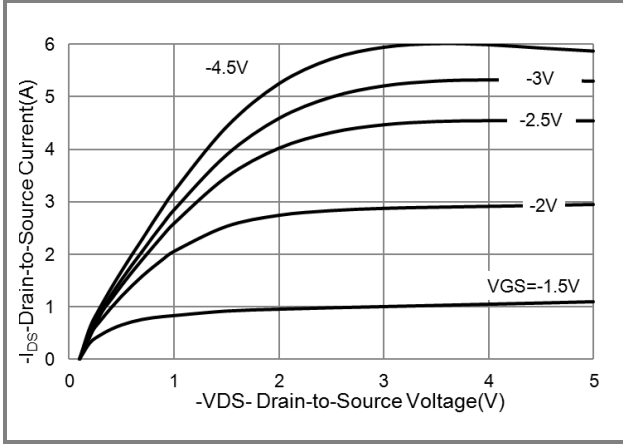


Fig.1 On-Region Characteristics

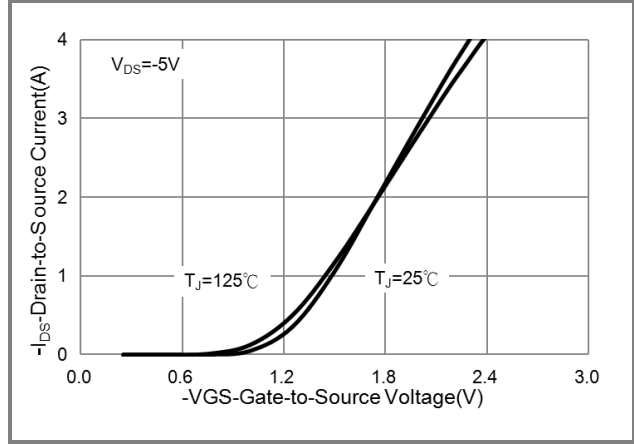


Fig.2 Transfer Characteristics

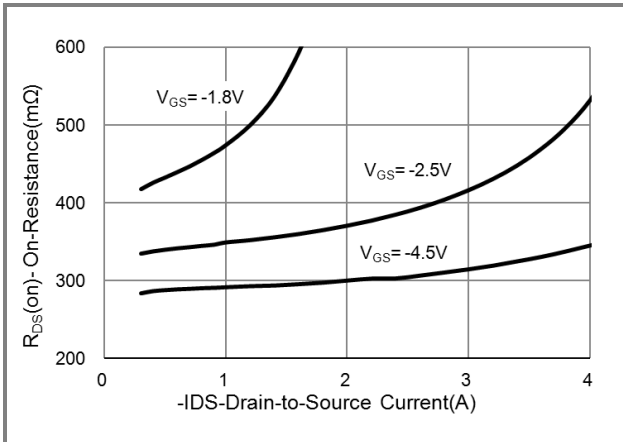


Fig.3 On-Resistance vs. Drain Current

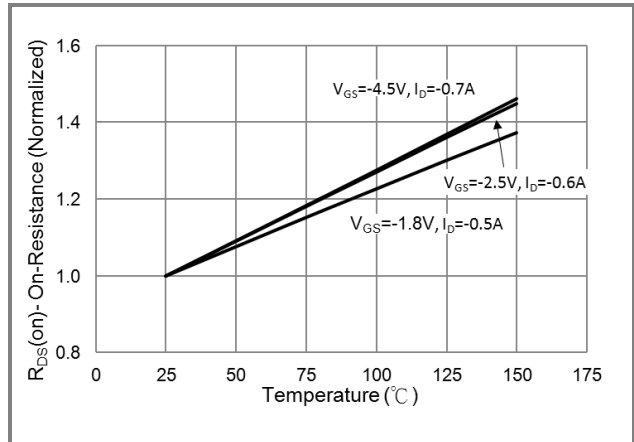


Fig.4 On-Resistance vs. Junction temperature

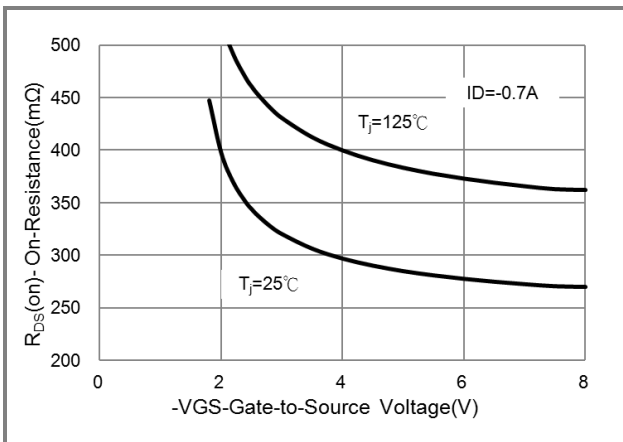


Fig.5 On-Resistance Variation with VGS.

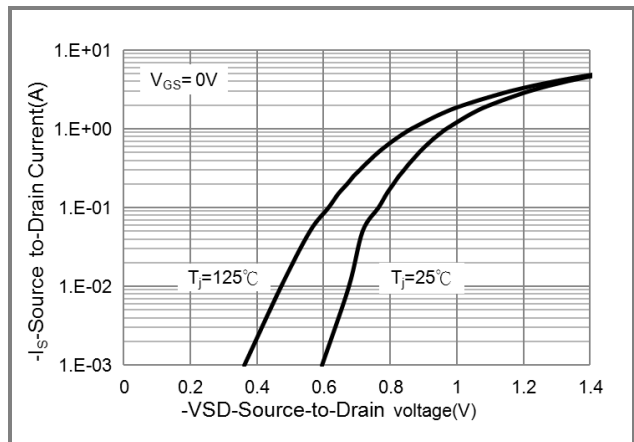


Fig.6 Body Diode Characteristics



## TYPICAL CHARACTERISTIC CURVES

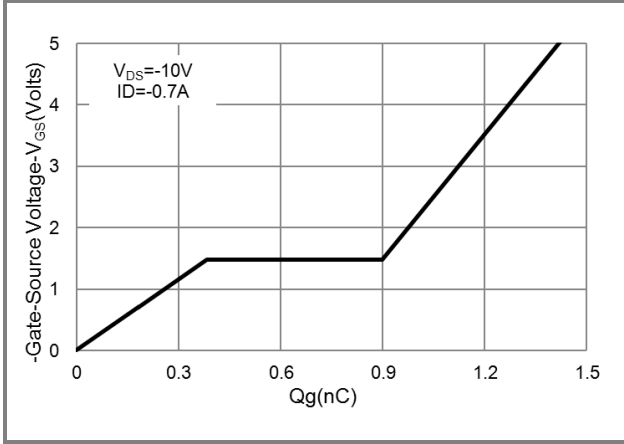


Fig.7 Gate-Charge Characteristics

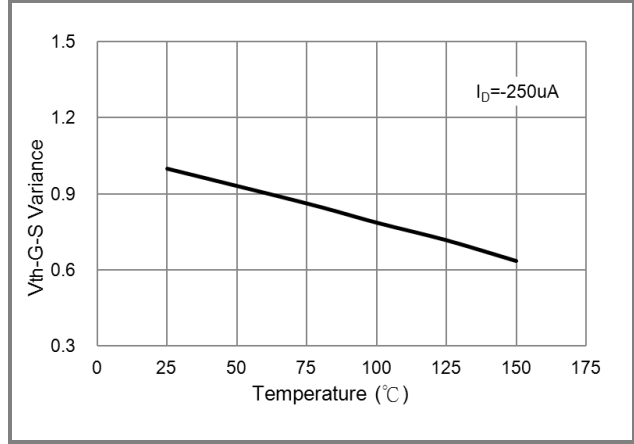


Fig.8 Threshold Voltage Variation with Temperature.

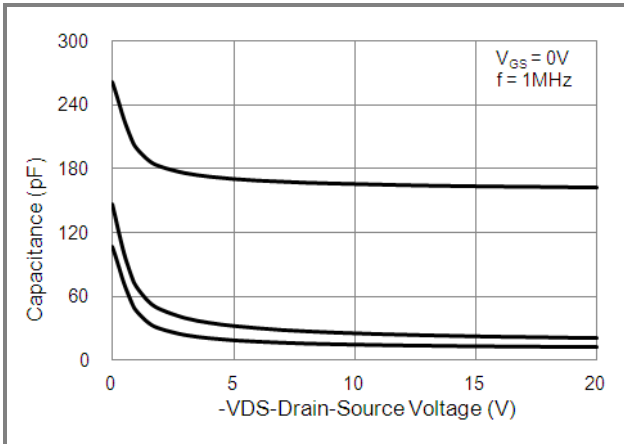
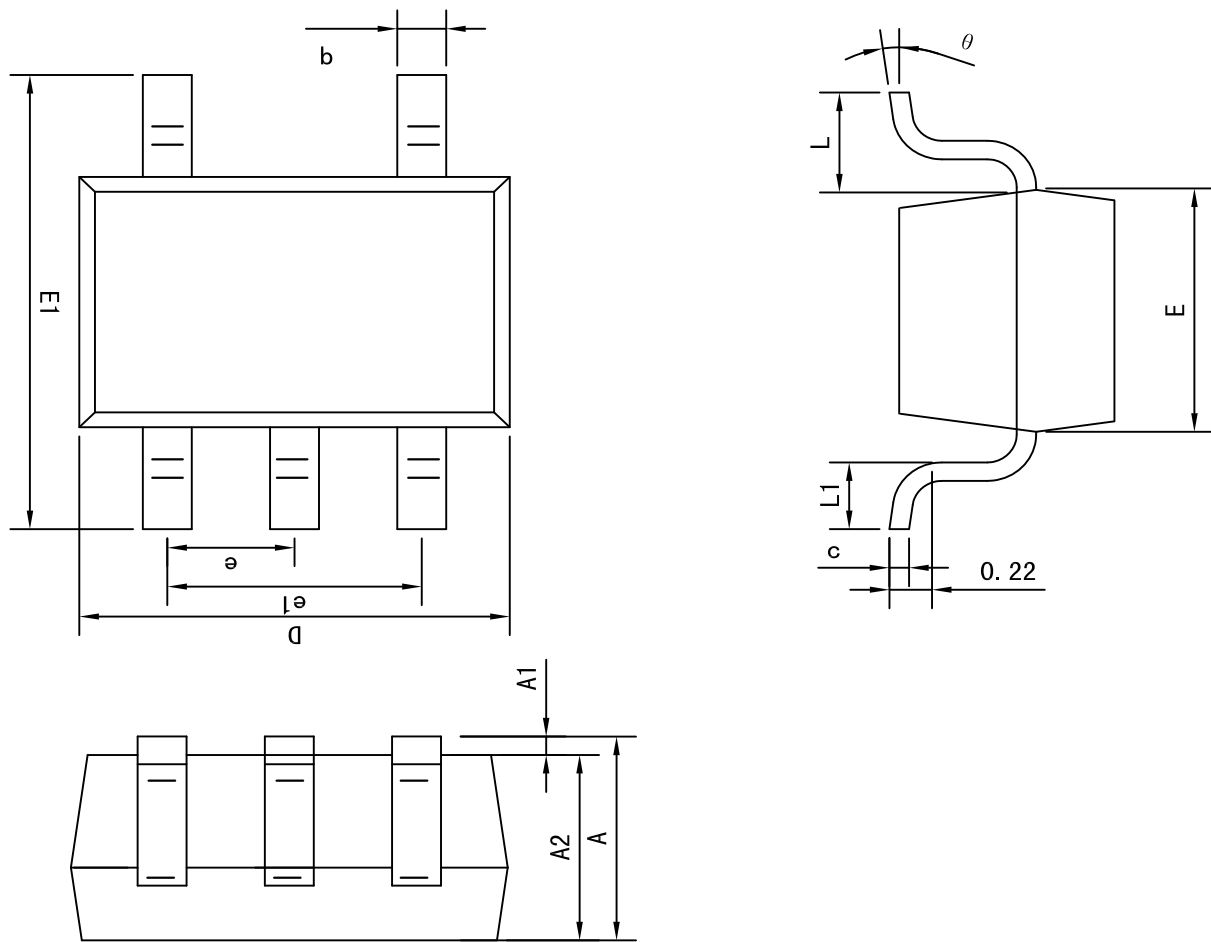


Fig.9 Capacitance vs. Drain-Source Voltage.



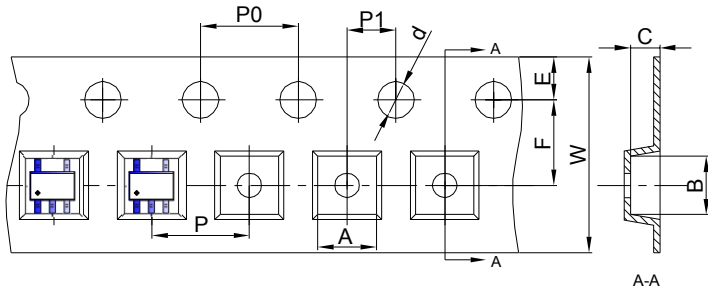
## SOT-353 Package outline dimensions



| Symbol | Dimension in Millimeters |       |
|--------|--------------------------|-------|
|        | Min                      | Max   |
| A      | 0.900                    | 1.100 |
| A1     | 0.000                    | 0.100 |
| A2     | 0.900                    | 1.000 |
| b      | 0.150                    | 0.350 |
| c      | 0.080                    | 0.150 |
| D      | 2.000                    | 2.200 |
| E      | 1.150                    | 1.350 |
| E1     | 2.150                    | 2.450 |
| e      | 0.650 TYP                |       |
| e1     | 1.200                    | 1.400 |
| L      | 0.525 REF                |       |
| L1     | 0.260                    | 0.460 |
| theta  | 0°                       | 8°    |



### SOT-353 Embossed Carrier Tape



**Packaging Description:**  
 SOT-353 parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 3,000 units per 7" or 17.8cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).

| Dimensions are in millimeter |      |      |      |       |      |      |      |      |      |      |
|------------------------------|------|------|------|-------|------|------|------|------|------|------|
| Pkg type                     | A    | B    | C    | d     | E    | F    | P0   | P    | P1   | W    |
| SOT-353                      | 2.25 | 2.55 | 1.20 | Ø1.50 | 1.75 | 3.50 | 4.00 | 4.00 | 2.00 | 8.00 |

### SOT-353 Tape Leader and Trailer

