

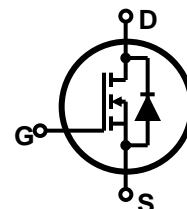
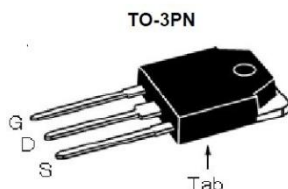
**Features**

- Low gate charge
- 100% avalanche tested
- Improved dv/dt capability
- RoHS compliant
- JEDEC Qualification

$$V_{DSS} = 880 \text{ V @ } T_{jmax}$$

$$I_D = 10 \text{ A}$$

$$R_{DS(on)} = 1.05 \text{ } \Omega(\text{max}) \text{ @ } V_{GS} = 10 \text{ V}$$



| Device    | Package | Marking   | Remark |
|-----------|---------|-----------|--------|
| TMAN10N80 | TO-3P   | TMAN10N80 | RoHS   |

**Absolute Maximum Ratings**

| Parameter   | Symbol         | TMAN10N80                                | Unit             |
|---|----------------|--|------------------|
| Drain-Source Voltage  | $V_{DS}$       | 900                                      | V                |
| Gate-Source Voltage   | $V_{GS}$       | $\pm 30$                                 | V                |
| Continuous Drain Current  | $I_D$          | $T_C = 25 \text{ }^\circ\text{C}$        | 10               |
|   |                | $T_C = 100 \text{ }^\circ\text{C}$       | 6.6              |
| Pulsed Drain Current (Note 1)   | $I_{DM}$       | 40                                       | A                |
| Single Pulse Avalanche Energy (Note 2)  | $E_{AS}$       | 267                                      | mJ               |
| Repetitive Avalanche Current (Note 1)   | $I_{AR}$       | 10                                       | A                |
| Repetitive Avalanche Energy (Note 1)  | $E_{AR}$       | 31.2                                     | mJ               |
| Power Dissipation   | $P_D$          | $T_C = 25 \text{ }^\circ\text{C}$        | 312              |
|   |                | Derate above $25 \text{ }^\circ\text{C}$ | 2.5              |
| Peak Diode Recovery dv/dt (Note 3)  | dv/dt          | 4.5                                      | V/ns             |
| Operating Junction and Storage Temperature Range                              | $T_J, T_{STG}$ | -55~150                                  | $^\circ\text{C}$ |
| Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds | $T_L$          | 300                                      | $^\circ\text{C}$ |

\* Limited only by maximum junction temperature

**Thermal Characteristics**

| Parameter   | Symbol          | TMAN10N80 | Unit               |
|---|-----------------|-----------|--------------------|
| Maximum Thermal resistance, Junction to Case      | $R_{\theta JC}$ | 0.4       | $^\circ\text{C/W}$ |
| Typical Thermal resistance, Case to Sink(Typical) | $R_{\theta CS}$ | 0.24      | $^\circ\text{C/W}$ |
| Maximum Thermal resistance, Junction to Ambient   | $R_{\theta JA}$ | 40        | $^\circ\text{C/W}$ |

**Electrical Characteristics :  $T_C=25^\circ\text{C}$ , unless otherwise noted**

| Parameter                           | Symbol     | Test condition                                   | Min | Typ | Max  | Units         |
|-------------------------------------|------------|--|-----|-----|------|---------------|
| <b>OFF</b>                          |            |  |     |     |      |               |
| Drain-Source Breakdown Voltage      | $BV_{DSS}$ | $V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$    | 800 | --  | --   | V             |
| Zero Gate Voltage Drain Current     | $I_{DSS}$  | $V_{DS} = 800\text{ V}, V_{GS} = 0\text{ V}$     | --  | --  | 10   | $\mu\text{A}$ |
|                                     |            | $V_{DS} = 640\text{ V}, T_C = 125^\circ\text{C}$ | --  | --  | 100  | $\mu\text{A}$ |
| Forward Gate-Source Leakage Current | $I_{GSSF}$ | $V_{GS} = 30\text{ V}, V_{DS} = 0\text{ V}$      | --  | --  | 100  | nA            |
| Reverse Gate-Source Leakage Current | $I_{GSSR}$ | $V_{GS} = -30\text{ V}, V_{DS} = 0\text{ V}$     | --  | --  | -100 | nA            |

**ON**

|  |              |   |    |     |      |          |
|--|--------------|---|----|-----|------|----------|
| Gate Threshold Voltage                       | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$ | 2  | --  | 4    | V        |
| Drain-Source On-Resistance                   | $R_{DS(on)}$ | $V_{GS} = 10\text{ V}, I_D = 5\text{ A}$  | -- | 0.9 | 1.05 | $\Omega$ |
| Forward Transconductance <sup>(Note 4)</sup> | $g_{FS}$     | $V_{DS} = 30\text{ V}, I_D = 5\text{ A}$  | -- | 6.3 | --   | S        |

**DYNAMIC**

|                              |           |  |    |      |    |    |
|------------------------------|-----------|--|----|------|----|----|
| Input Capacitance            | $C_{iss}$ | $V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V},$<br>$f = 1.0\text{ MHz}$ | -- | 2336 | -- | pF |
| Output Capacitance           | $C_{oss}$ |  | -- | 214  | -- | pF |
| Reverse Transfer Capacitance | $C_{rss}$ |  | -- | 29   | -- | pF |

**SWITCHING**

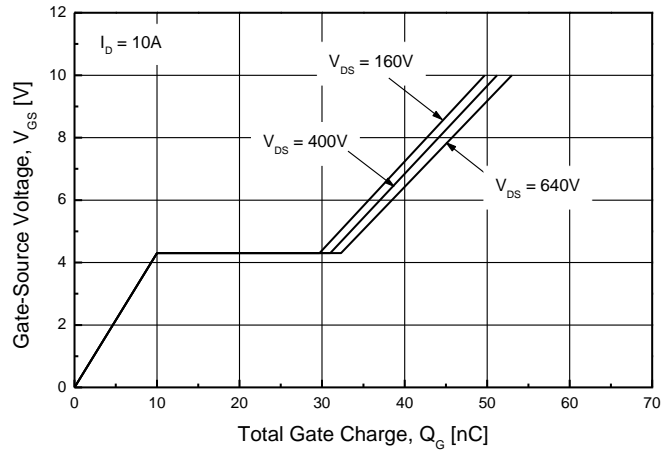
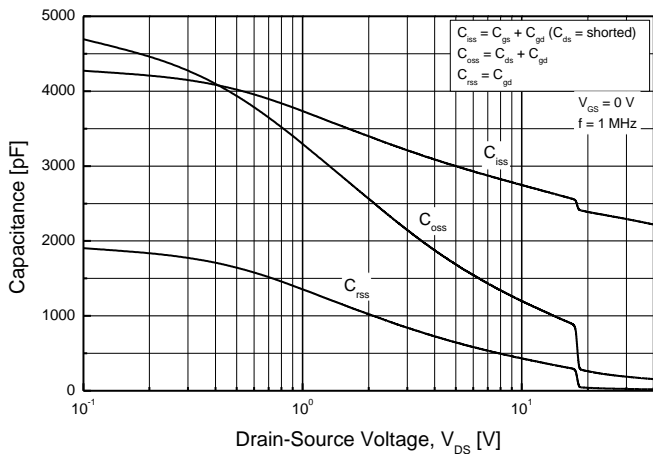
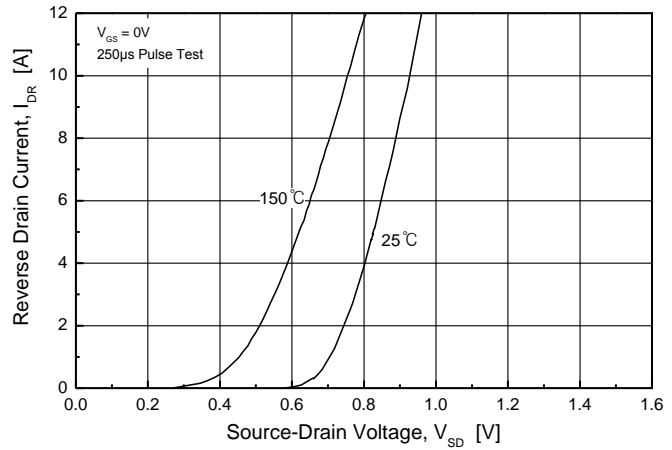
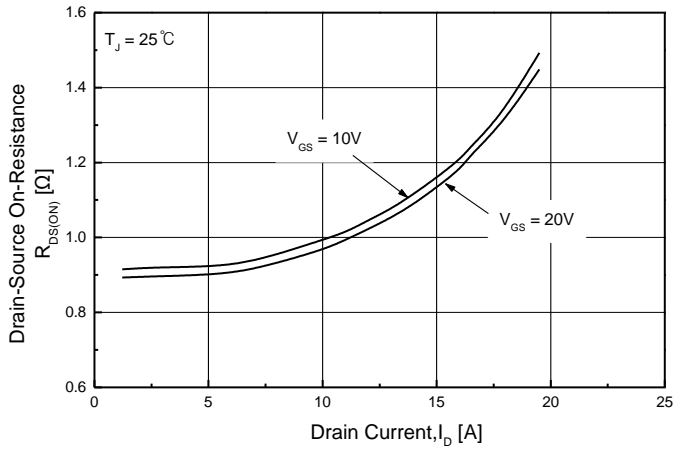
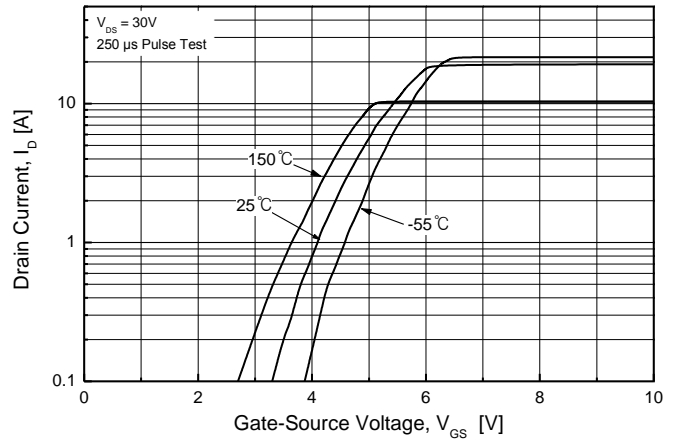
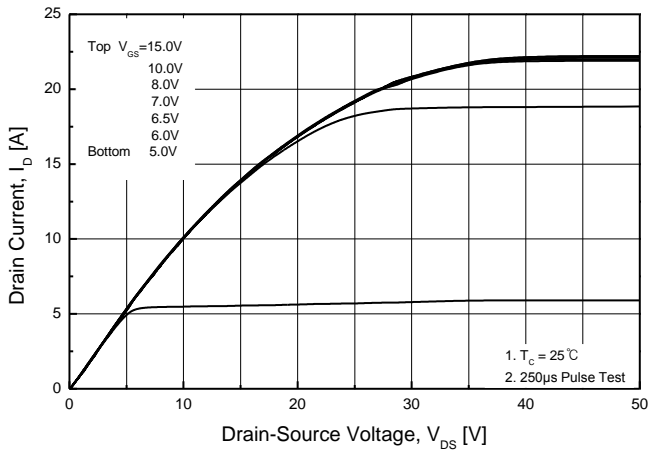
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|---|--------------|---|----|------|----|----|
| Turn-On Delay Time <sup>(Note 4,5)</sup>  | $t_{d(on)}$  | $V_{DD} = 400\text{ V}, I_D = 10\text{ A},$<br>$R_G = 25\ \Omega$     | -- | 63   | -- | ns |
| Turn-On Rise Time <sup>(Note 4,5)</sup>   | $t_r$        |   | -- | 62   | -- | ns |
| Turn-Off Delay Time <sup>(Note 4,5)</sup> | $t_{d(off)}$ |   | -- | 256  | -- | ns |
| Turn-Off Fall Time <sup>(Note 4,5)</sup>  | $t_f$        |   | -- | 72   | -- | ns |
| Total Gate Charge <sup>(Note 4,5)</sup>   | $Q_g$        | $V_{DS} = 640\text{ V}, I_D = 10\text{ A},$<br>$V_{GS} = 10\text{ V}$ | -- | 53   | -- | nC |
| Gate-Source Charge <sup>(Note 4,5)</sup>  | $Q_{gs}$     |   | -- | 10   | -- | nC |
| Gate-Drain Charge <sup>(Note 4,5)</sup>   | $Q_{gd}$     |   | -- | 22.3 | -- | nC |

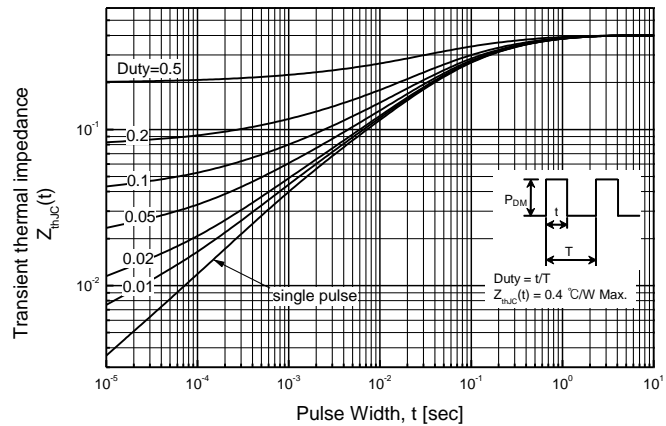
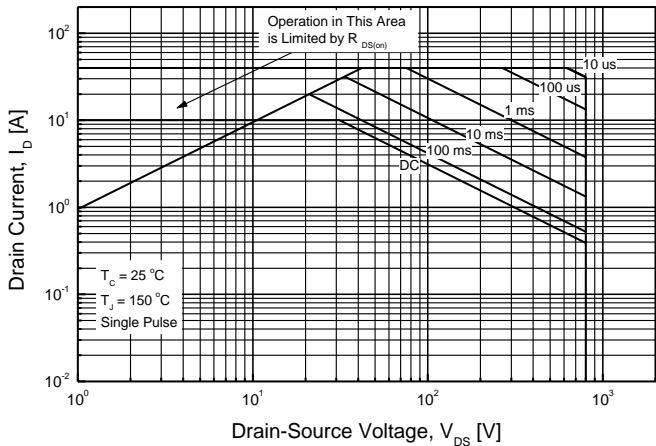
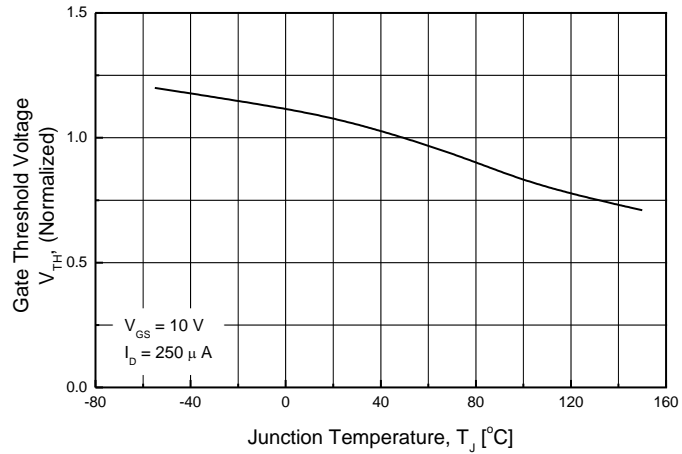
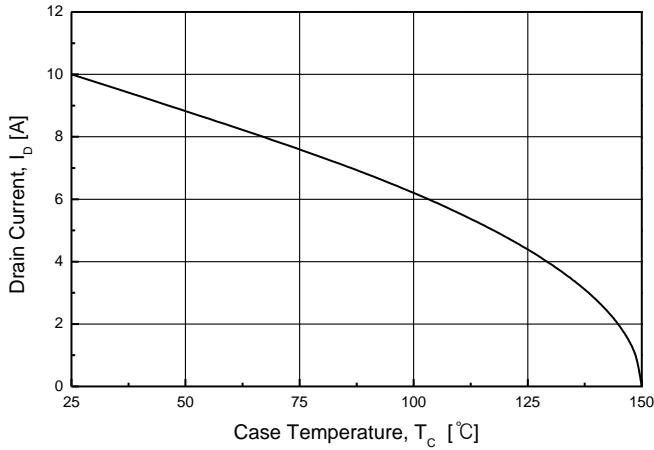
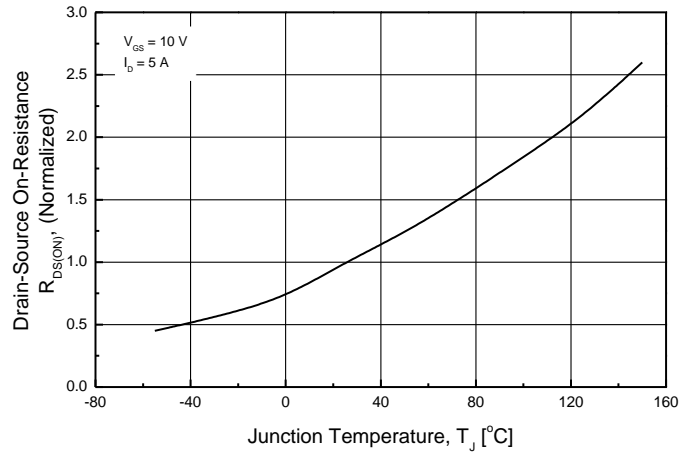
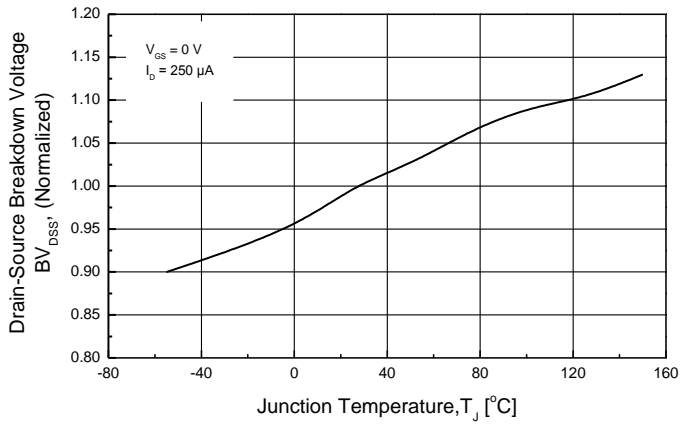
**SOURCE DRAIN DIODE**

|   |          |  |    |     |     |               |
|---|----------|--|----|-----|-----|---------------|
| Maximum Continuous Drain-Source Diode Forward Current | $I_S$    | ---  | -- | --  | 10  | A             |
| Maximum Pulsed Drain-Source Diode Forward Current     | $I_{SM}$ | ---  | -- | --  | 40  | A             |
| Drain-Source Diode Forward Voltage                    | $V_{SD}$ | $V_{GS} = 0\text{ V}, I_S = 10\text{ A}$   | -- | --  | 1.5 | V             |
| Reverse Recovery Time <sup>(Note 4)</sup>             | $t_{rr}$ | $V_{GS} = 0\text{ V}, I_S = 10\text{ A}$<br>$di_F / dt = 100\text{ A}/\mu\text{s}$ | -- | 453 | --  | ns            |
| Reverse Recovery Charge <sup>(Note 4)</sup>           | $Q_{rr}$ |  | -- | 5.3 | --  | $\mu\text{C}$ |

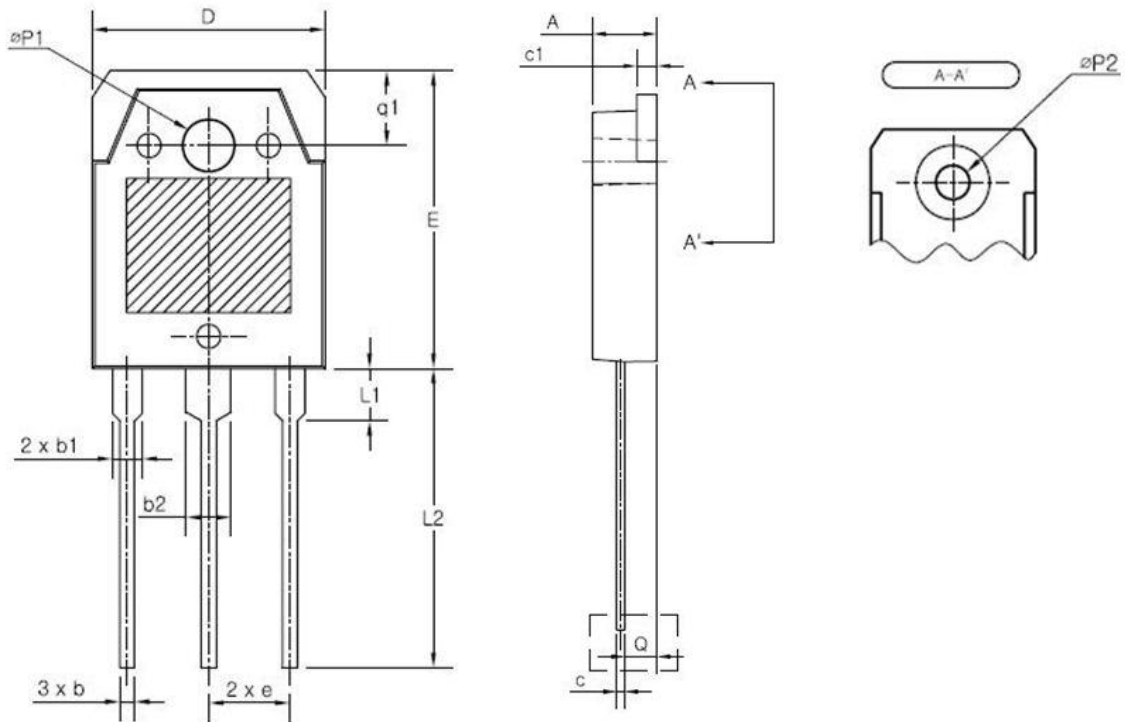
Note :

1. Repeated rating : Pulse width limited by safe operating area
2.  $L=5\text{mH}, I_{AS} = 10\text{ A}, V_{DD} = 50\text{ V}, R_G = 25\ \Omega,$  Starting  $T_J = 25^\circ\text{C}$
3.  $I_{SD} \leq 10\text{ A}, di/dt \leq 200\text{ A}/\mu\text{s}, V_{DD} \leq BV_{DS},$  Starting  $T_J = 25^\circ\text{C}$
4. Pulse Test : Pulse width  $\leq 300\ \mu\text{s},$  Duty Cycle  $\leq 2\%$
5. Essentially Independent of Operating Temperature Typical Characteristics





**TO-3PN MECHANICAL DATA**



| SYMBOL           | MIN    | NOM   | MAX   |
|------------------|--------|-------|-------|
| A                | 4.60   | 4.80  | 5.00  |
| b                | 0.80   | 1.00  | 1.20  |
| b1               | 1.80   | 2.00  | 2.20  |
| b2               | 2.80   | 3.00  | 3.20  |
| c                | 0.55   | 0.60  | 0.75  |
| c1               | 1.45   | 1.50  | 1.65  |
| D                | 15.40  | 15.60 | 15.80 |
| E                | 19.70  | 19.90 | 20.10 |
| e                | 5.15   | 5.45  | 5.75  |
| L1               | 3.30   | 3.50  | 3.70  |
| L2               | 19.80  | 20.00 | 20.20 |
| $\varnothing P1$ | 3.30   | 3.40  | 3.50  |
| $\varnothing P2$ | (3.20) |       |       |
| Q                | 2.20   | 2.40  | 2.60  |
| q1               | 4.80   | 5.00  | 5.20  |