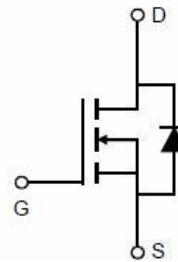




## N-Channel Enhancement Mode Power MOSFET

### Description

The MXN4015 uses advanced trench technology to provide excellent  $R_{DS(ON)}$  and low gate charge. This device can be used for a variety of applications

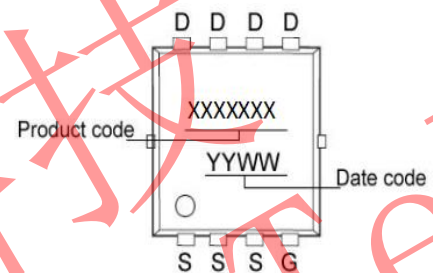


### General Features

- ◆  $V_{DS} = 40V$ ,  $I_D = 35A$
- ◆ @ $V_{GS} = 10V$   $R_{DS(ON)}$ (Typ.)=7.4m $\Omega$
- ◆ @ $V_{GS} = 4.5V$   $R_{DS(ON)}$ (Typ.)=10m $\Omega$

High power and current handling capability  
Lead free product is acquired  
Surface mount package

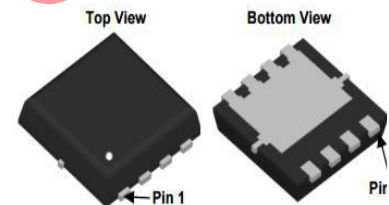
Schematic diagram



Marking and pin assignment

### Application

PWM applications  
Load switch  
Power management



PDFN3X3-8L

### Absolute Maximum Ratings (TA=25°C unless otherwise noted)

| Parameter  | Symbol         | Limit      | Unit       |
|--|----------------|------------|------------|
| Drain-Source Voltage                             | $V_{DS}$       | 40         | V          |
| Gate-Source Voltage                              | $V_{GS}$       | $\pm 20$   | V          |
| Drain Current-Continuous ( $T_C = 25^\circ C$ )  | $I_D$          | 35         | A          |
| Drain Current-Continuous ( $T_A = 25^\circ C$ )  | $I_{DSM}$      | 15         | A          |
| Pulsed Drain Current (Note 1)                    | $I_{DM}$       | 110        | A          |
| Maximum Power Dissipation                        | $P_D$          | 3.1        | W          |
| Operating Junction and Storage Temperature Range | $T_J, T_{STG}$ | -55 To 150 | $^\circ C$ |



**Thermal Characteristic**

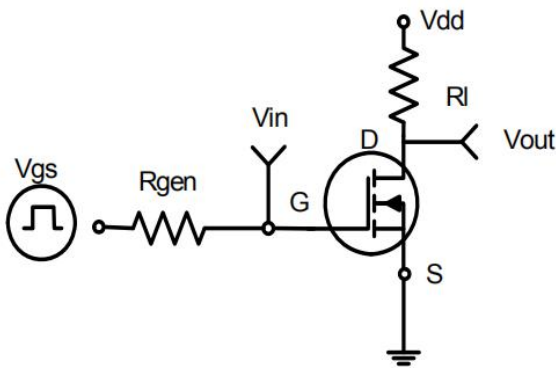
|  |                 |    |               |
|--|-----------------|----|---------------|
| Thermal Resistance, Junction-to-Ambient (Note 2) | $R_{\theta JA}$ | 40 | $^{\circ}C/W$ |
|--|-----------------|----|---------------|

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

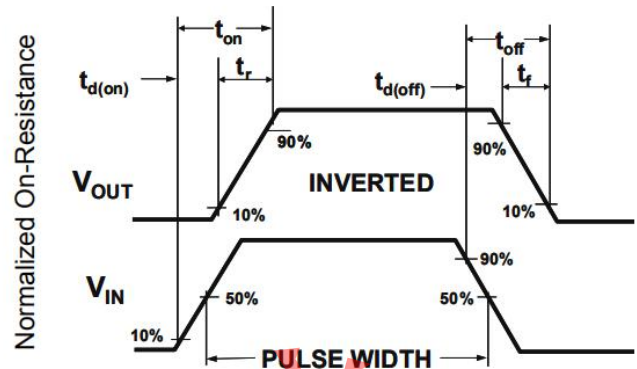
| Parameter                                 | Symbol       | Condition                              | Min | Typ  | Max       | Unit       |
|---|--------------|--|-----|------|-----------|------------|
| <b>Off Characteristics</b>                |              |  |     |      |           |            |
| Drain-Source Breakdown Voltage            | $BV_{DSS}$   | $V_{GS}=0V, I_D=250\mu A$              | 40  | -    | -         | V          |
| Zero Gate Voltage Drain Current           | $I_{DSS}$    | $V_{DS}=40V, V_{GS}=0V$                | -   | -    | 1         | $\mu A$    |
| Gate-Body Leakage Current                 | $I_{GSS}$    | $V_{GS}=\pm 20V, V_{DS}=0V$            | -   | -    | $\pm 100$ | nA         |
| <b>On Characteristics (Note 3)</b>        |              |  |     |      |           |            |
| Gate Threshold Voltage                    | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$          | 1   | 1.5  | 3         | V          |
| Drain-Source On-State Resistance          | $R_{DS(on)}$ | $V_{GS}=10V, I_D=12A$                  | -   | 7.4  | 9         | m $\Omega$ |
|   |              | $V_{GS}=4.5V, I_D=11A$                 | -   | 10   | 12.5      | m $\Omega$ |
| Forward Transconductance                  | $g_{FS}$     | $V_{DS}=5V, I_D=15A$                   | -   | 64   | -         | S          |
| <b>Dynamic Characteristics (Note 4)</b>   |              |  |     |      |           |            |
| Input Capacitance                         | $C_{iss}$    | $V_{DS}=25V, V_{GS}=0V,$<br>$F=1.0MHz$ | -   | 1820 | -         | PF         |
| Output Capacitance                        | $C_{oss}$    |  | -   | 510  | -         | PF         |
| Reverse Transfer Capacitance              | $C_{rss}$    |  | -   | 40   | -         | PF         |
| <b>Switching Characteristics (Note 4)</b> |              |  |     |      |           |            |
| Turn-on Delay Time                        | $t_{d(on)}$  | $V_{DS}=20V, R_L=0.75\Omega$           | -   | 7.2  | -         | nS         |
| Turn-on Rise Time                         | $t_r$        |  | -   | 3    | -         | nS         |
| Turn-Off Delay Time                       | $t_{d(off)}$ | $V_{GS}=10V, R_{GEN}=3\Omega$          | -   | 23   | -         | nS         |
| Turn-Off Fall Time                        | $t_f$        |  | -   | 3.5  | -         | nS         |
| Total Gate Charge                         | $Q_g$        | $V_{DS}=25V, I_D=15A,$<br>$V_{GS}=10V$ | -   | 26   | -         | nC         |
| Gate-Source Charge                        | $Q_{gs}$     |  | -   | 4    | -         | nC         |
| Gate-Drain Charge                         | $Q_{gd}$     |  | -   | 6    | -         | nC         |
| <b>Drain-Source Diode Characteristics</b> |              |  |     |      |           |            |
| Diode Forward Voltage (Note 3)            | $V_{SD}$     | $V_{GS}=0V, I_S=20A$                   | -   | -    | 1.2       | V          |

**Notes:**

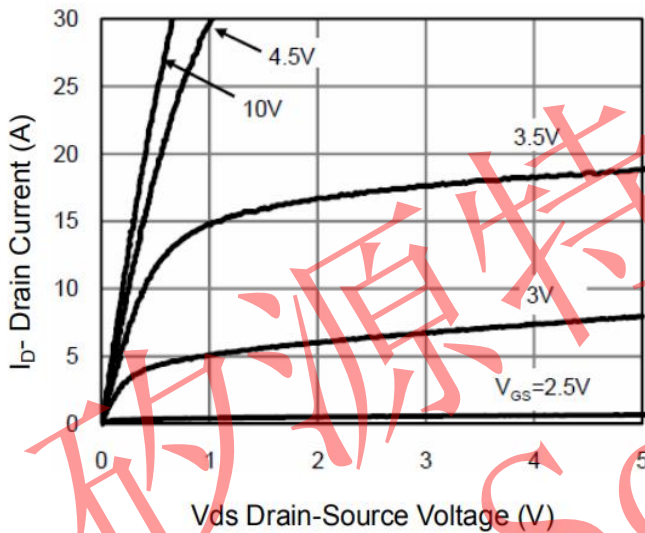
- 1.Repetitive Rating: Pulse width limited by maximum junction temperature.
- 2.Surface Mounted on FR4 Board,  $t \leq 10$  sec.
- 3.Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production



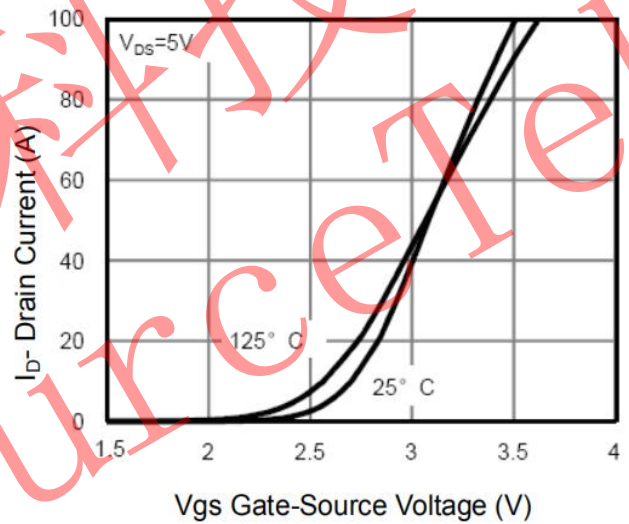
**Figure 1: Switching Test Circuit**



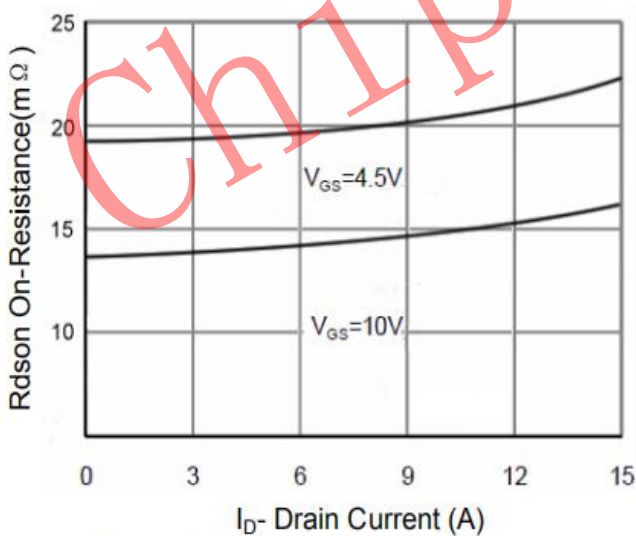
**Figure 2: Switching Waveforms**



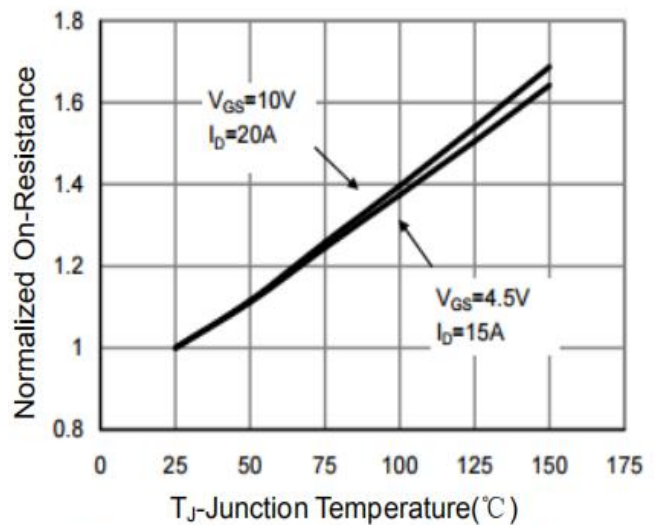
**Figure 3 Output Characteristics**



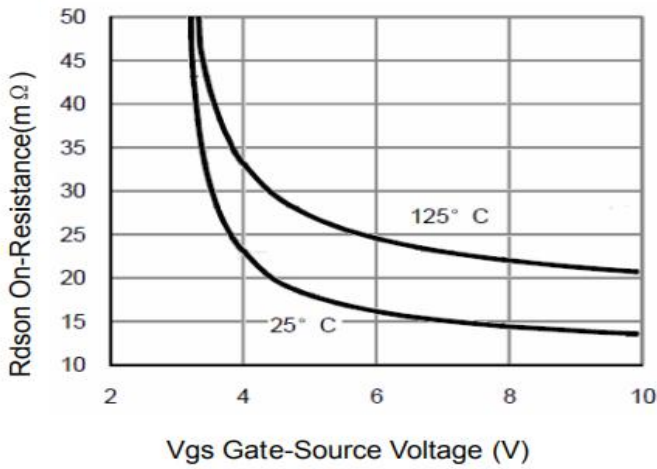
**Figure 4 Transfer Characteristics**



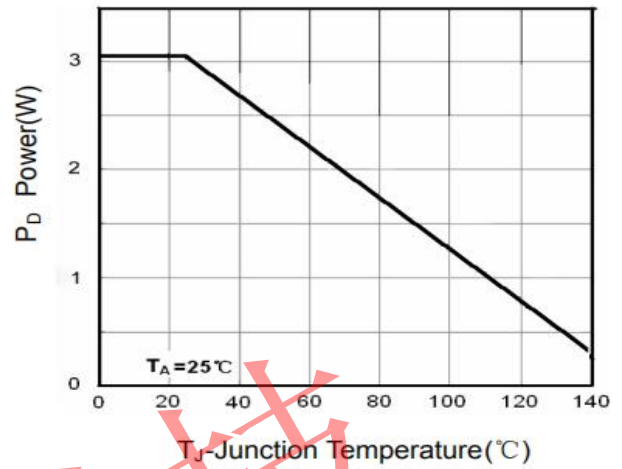
**Figure 5 Drain-Source On-Resistance**



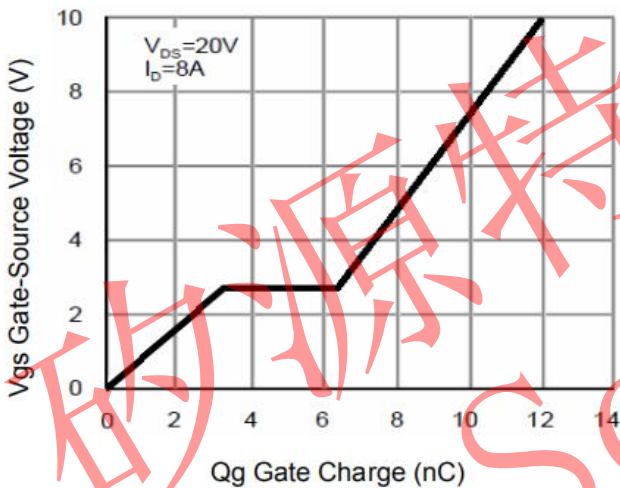
**Figure 6 Drain-Source On-Resistance**



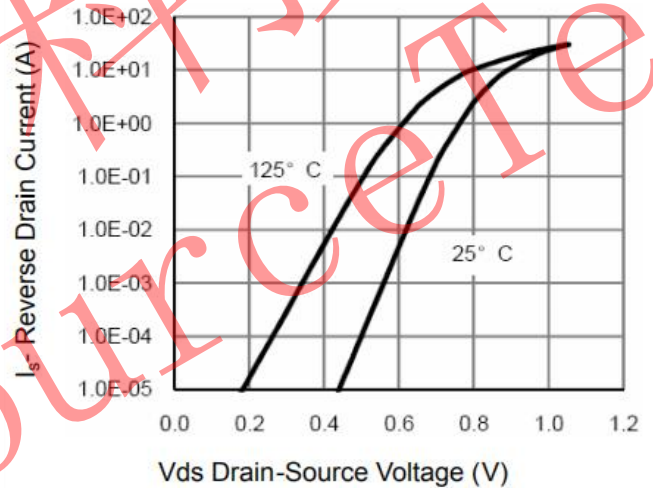
Vgs Gate-Source Voltage (V)  
**Figure 7 Rdson vs Vgs**



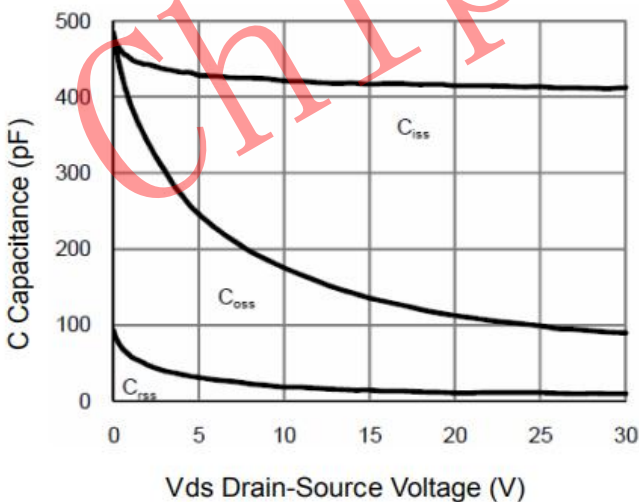
Tj Junction Temperature (°C)  
**Figure 8 Power Dissipation**



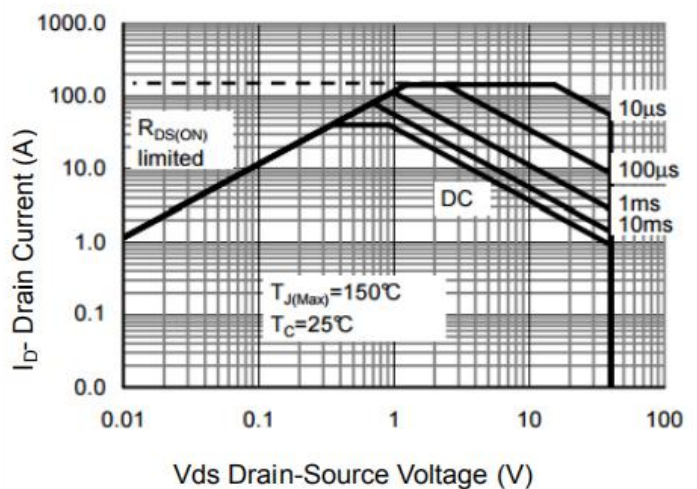
**Figure 9 Gate Charge**



**Figure 10 Source- Drain Diode Forward**



Vds Drain-Source Voltage (V)  
**Figure 11 Capacitance vs Vds**



**Figure 12 Safe Operation Area**

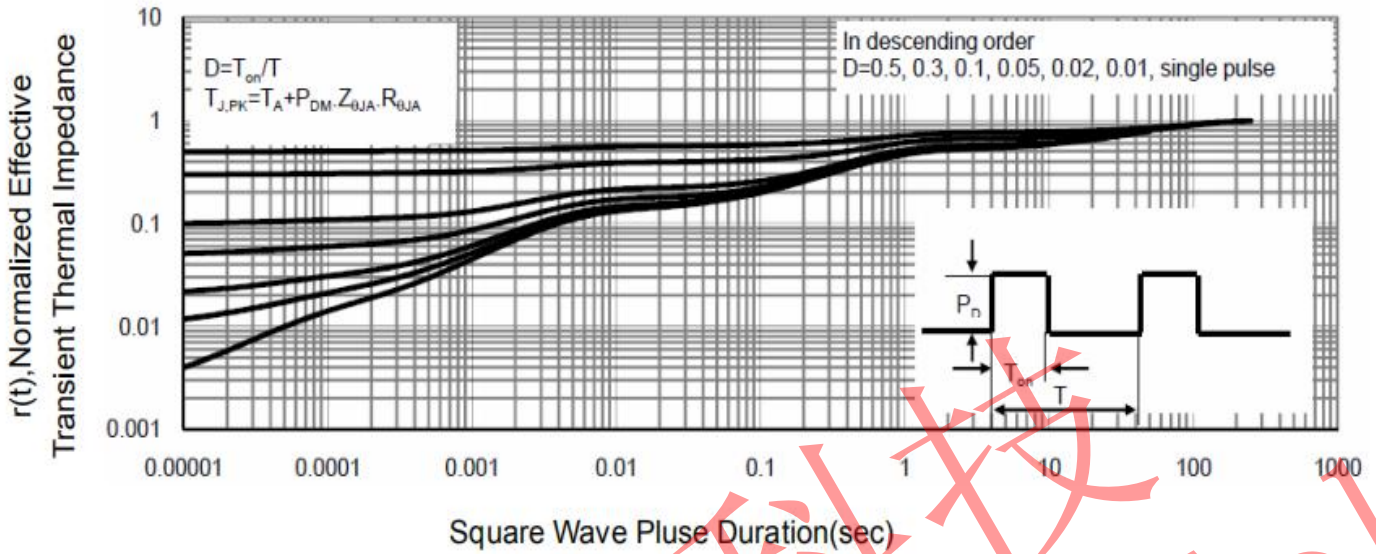
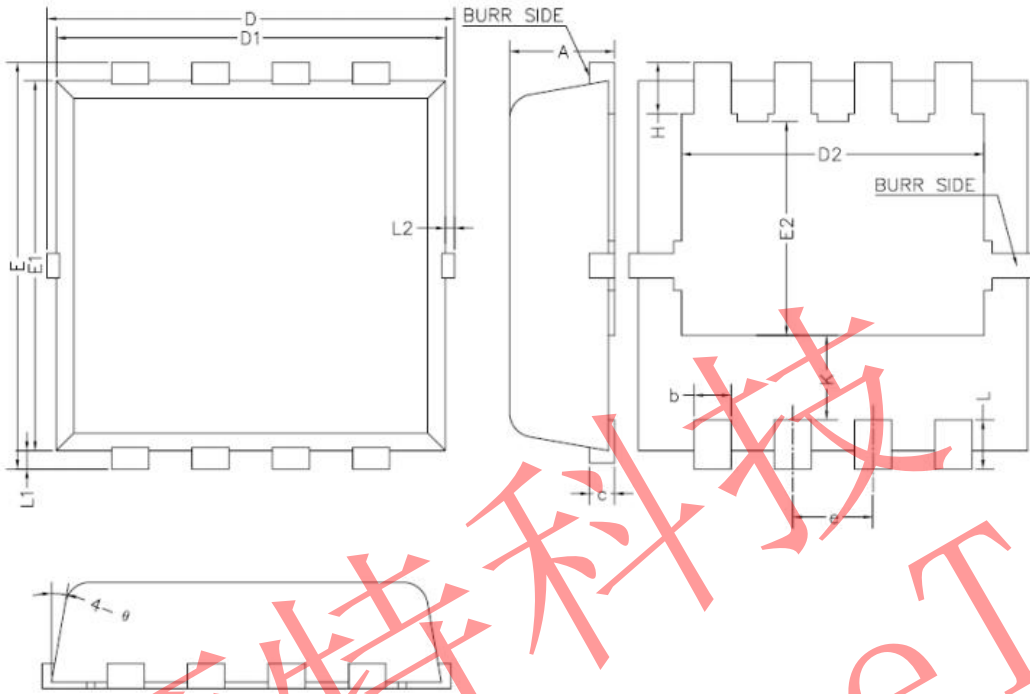


Figure 13 Normalized Maximum Transient Thermal Impedance



PDFN3x3-8L PACKAGE



COMMON DIMENSIONS  
(UNITS OF MEASURE=MILLIMETER)

| SYMBOL   | MIN  | NOM  | MAX  |
|----------|------|------|------|
| A        | 0.70 | 0.80 | 0.90 |
| b        | 0.25 | 0.30 | 0.35 |
| c        | 0.14 | 0.15 | 0.20 |
| D        | 3.10 | 3.30 | 3.50 |
| D1       | 3.05 | 3.15 | 3.25 |
| D2       | 2.35 | 2.45 | 2.55 |
| e        | 0.55 | 0.65 | 0.75 |
| E        | 3.10 | 3.30 | 3.50 |
| E1       | 2.90 | 3.00 | 3.10 |
| E2       | 1.64 | 1.74 | 1.84 |
| H        | 0.32 | 0.42 | 0.52 |
| K        | 0.59 | 0.69 | 0.79 |
| L        | 0.25 | 0.40 | 0.55 |
| L1       | 0.10 | 0.15 | 0.20 |
| L2       | —    | —    | 0.15 |
| $\theta$ | 8°   | 10°  | 12°  |