

preliminary

CMY27904PL-33

## 40V P-Channel MOSFET

### Features

- Trench Power LV MOSFET technology
- Low  $R_{DS(on)}$
- High Speed switching
- 100% EAS Guaranteed
- Green product

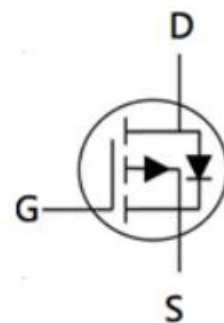
### Product Summary

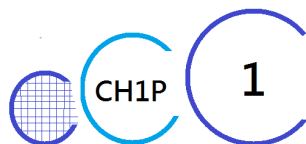
| Item                                 | Typical Value | Unit       |
|--------------------------------------|---------------|------------|
| $V_{DS}$                             | -40           | V          |
| $R_{DS(on)}$ @ $V_{GS} = -10V$ (Max) | 13            | m $\Omega$ |
| $I_D$                                | -40           | A          |

### Applications

- Hard Switching and High Speed Circuit
- DC/DC in Telecoms and Industrial

### PDFN3x3 Pin Description





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

| Parameter                                                               | Symbol        | Value      | Units              |
|-------------------------------------------------------------------------|---------------|------------|--------------------|
| Drain-Source Voltage                                                    | $V_{DS}$      | -40        | V                  |
| Gate-Source Voltage                                                     | $V_{GS}$      | $\pm 20$   | V                  |
| Continuous Drain Current, $T_C = 25^{\circ}\text{C}/70^{\circ}\text{C}$ | $I_D$         | -40/-25    | A                  |
| Pulsed Drain Current                                                    | $I_{DM}$      | -100       | A                  |
| Single Pulse UIS Capability, 0.1mH                                      | $E_{AS}$      | 146        | mJ                 |
| Total Power Dissipation                                                 | $P_D$         | 31.3       | W                  |
| Junction Temperature Maximum                                            | $T_{JMAX}$    | 150        | $^{\circ}\text{C}$ |
| Storage Temperature                                                     | $T_{Storage}$ | -55 to 150 | $^{\circ}\text{C}$ |

### Thermal Characteristics

| Parameter                           | Symbol          | Value | Units                       |
|-------------------------------------|-----------------|-------|-----------------------------|
| Thermal Resistance Junction-Ambient | $R_{\theta JA}$ | 62    | $^{\circ}\text{C}/\text{W}$ |

## Electrical Characteristics

| Static ( $T_J=25^{\circ}\text{C}$ unless otherwise specified)  |              |                                                             |      |      |           |       |
|----------------------------------------------------------------|--------------|-------------------------------------------------------------|------|------|-----------|-------|
| Parameter                                                      | Symbol       | Test Conditions                                             | Min. | Typ. | Max.      | Units |
| Drain-Source Breakdown Voltage                                 | $BV_{DS}$    | $V_{GS} = 0V, I_D = -250\mu A$                              | -40  | ---  | ---       | V     |
| Gate-Source Leakage                                            | $I_{GSS}$    | $V_{GS} = \pm 20V, V_{DS} = 0V$                             | ---  | ---  | $\pm 100$ | nA    |
| Zero Gate Voltage Drain Current                                | $I_{DSS}$    | $V_{DS} = -32V, V_{GS} = 0V, T_J=25^{\circ}\text{C}$        | ---  | ---  | -1        | uA    |
|                                                                |              | $V_{DS} = -32V, V_{GS} = 0V, T_J=55^{\circ}\text{C}$        | ---  | ---  | -5        |       |
| Drain-Source On-State Resistance                               | $R_{DS(on)}$ | $V_{GS} = -10V, I_D = -10A$                                 | ---  | ---  | 13        | mΩ    |
|                                                                |              | $V_{GS} = -4.5V, I_D = -8A$                                 | ---  | ---  | 20        |       |
| Gate-Source Threshold Voltage                                  | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = -250\mu A$                          | -1.0 | ---  | -2.5      | V     |
| Gate Resistance                                                | $R_G$        | $V_{GS} = 0V, V_{DS} \text{Open}, f=1\text{MHz}$            | ---  | 7    | ---       | Ω     |
| Dynamic ( $T_J=25^{\circ}\text{C}$ unless otherwise specified) |              |                                                             |      |      |           |       |
| Parameter                                                      | Symbol       | Test Conditions                                             | Min. | Typ. | Max.      | Units |
| Input Capacitance                                              | $C_{iss}$    | $V_{GS} = 0V, V_{DS} = -15V, f = 1\text{MHz}$               | ---  | 3500 | ---       | pF    |
| Output Capacitance                                             | $C_{oss}$    |                                                             | ---  | 323  | ---       |       |
| Reverse Transfer Capacitance                                   | $C_{rss}$    |                                                             | ---  | 222  | ---       |       |
| Total Gate Charge                                              | $Q_g$        | $V_{DS} = -20V, I_D = -12A, V_{GS} = -4.5V$                 | ---  | 27.9 | ---       | nC    |
| Gate-Source Charge                                             | $Q_{gs}$     |                                                             | ---  | 7.7  | ---       |       |
| Gate-Drain Charge                                              | $Q_{gd}$     |                                                             | ---  | 7.5  | ---       |       |
| Turn-on delay time                                             | $T_{d(on)}$  | $V_{DS} = -15V, I_D = -1A, V_{GS} = -10V, R_G = 3.3\Omega,$ | ---  | 40   | ---       | ns    |
| Rise time                                                      | $T_r$        |                                                             | ---  | 35.2 | ---       |       |
| Turn-off delay time                                            | $T_{d(off)}$ |                                                             | ---  | 100  | ---       |       |
| Fall time                                                      | $T_f$        |                                                             | ---  | 9.6  | ---       |       |
| Transconductance                                               | $g_{fs}$     | $V_{DS} = -5V, I_D = -10A$                                  | ---  | 23   | ---       | S     |
| Reverse Diode Characteristics                                  |              |                                                             |      |      |           |       |
| Diode Forward Voltage                                          | $V_{SD}$     | $V_{GS} = 0V, I_F = -1A$                                    | ---  | ---  | -1        | V     |

## Typical Characteristics

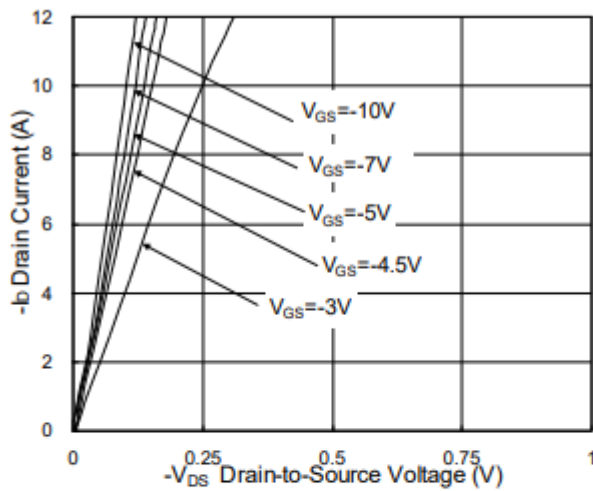


Fig.1 Typical Output Characteristics

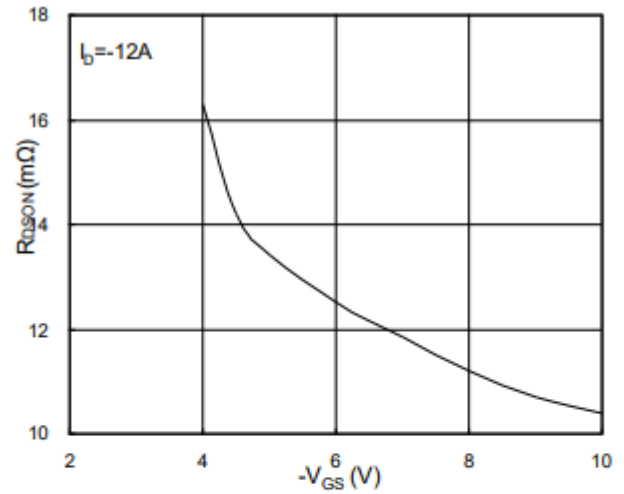


Fig.2 On-Resistance vs G-S Voltage

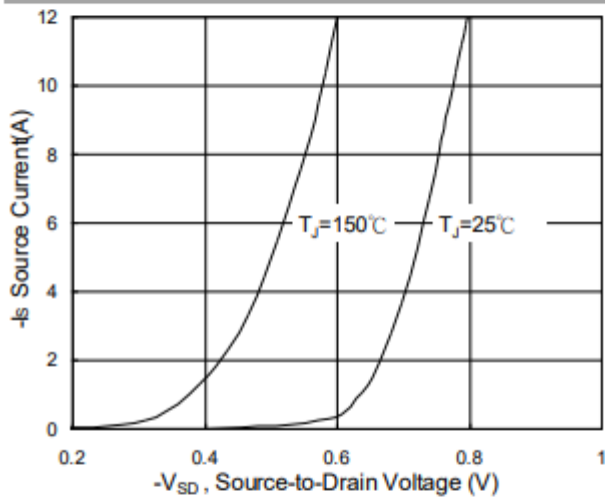


Fig.3 Source Drain Forward Characteristics

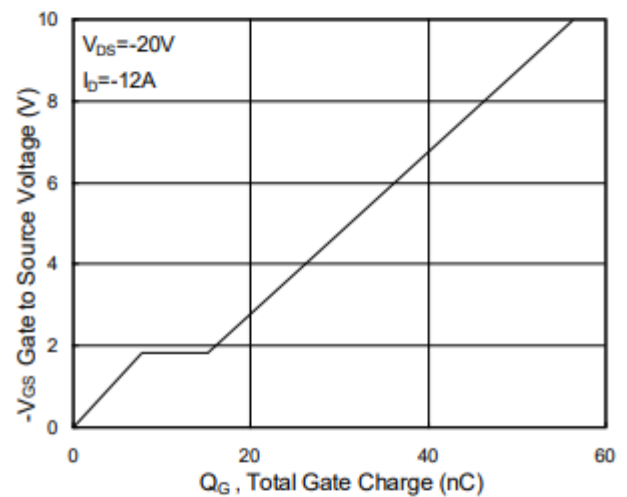


Fig.4 Gate-Charge Characteristics

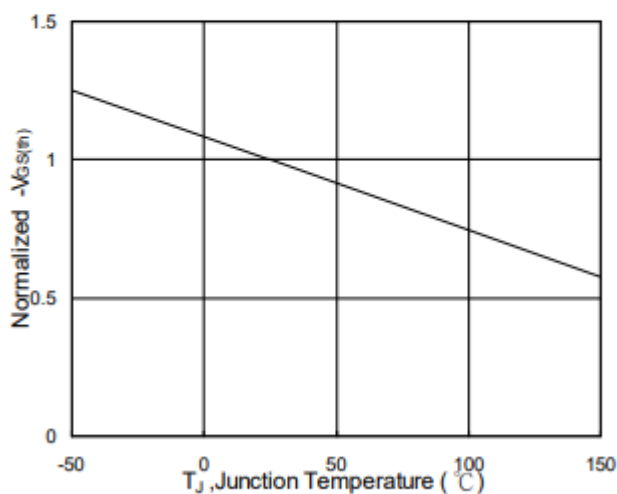


Fig.5 Normalized  $V_{GS(th)}$  vs  $T_J$

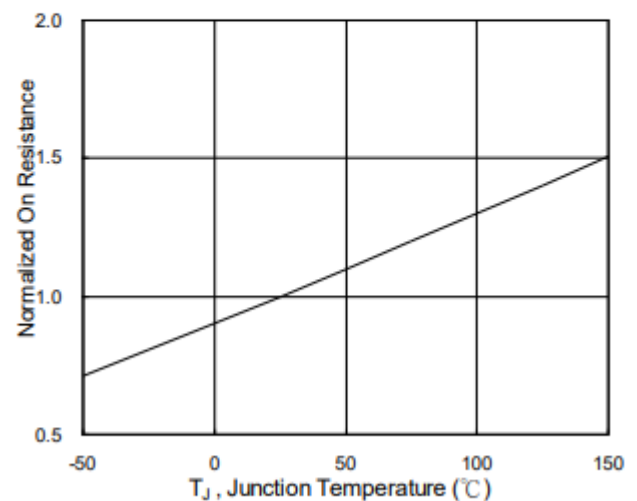


Fig.6 Normalized  $R_{DS(on)}$  vs  $T_J$

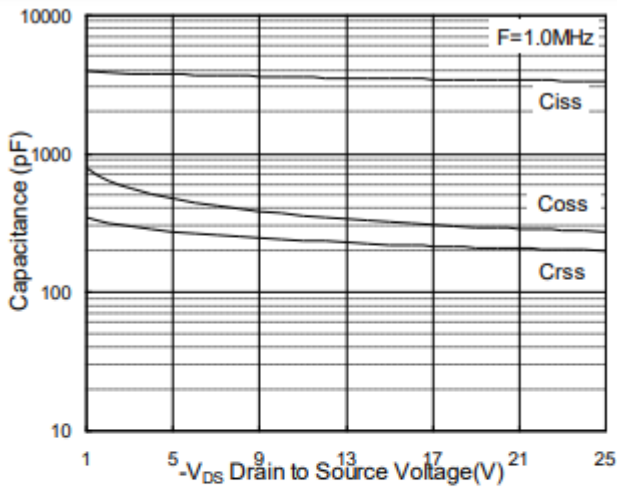


Fig.7 Capacitance

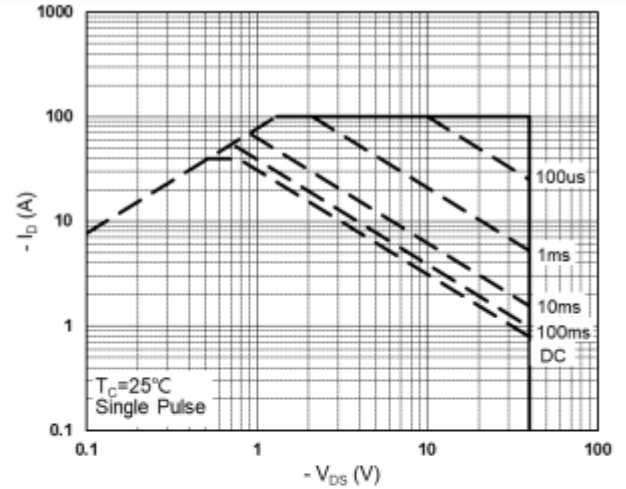


Fig.8 Safe Operating Area

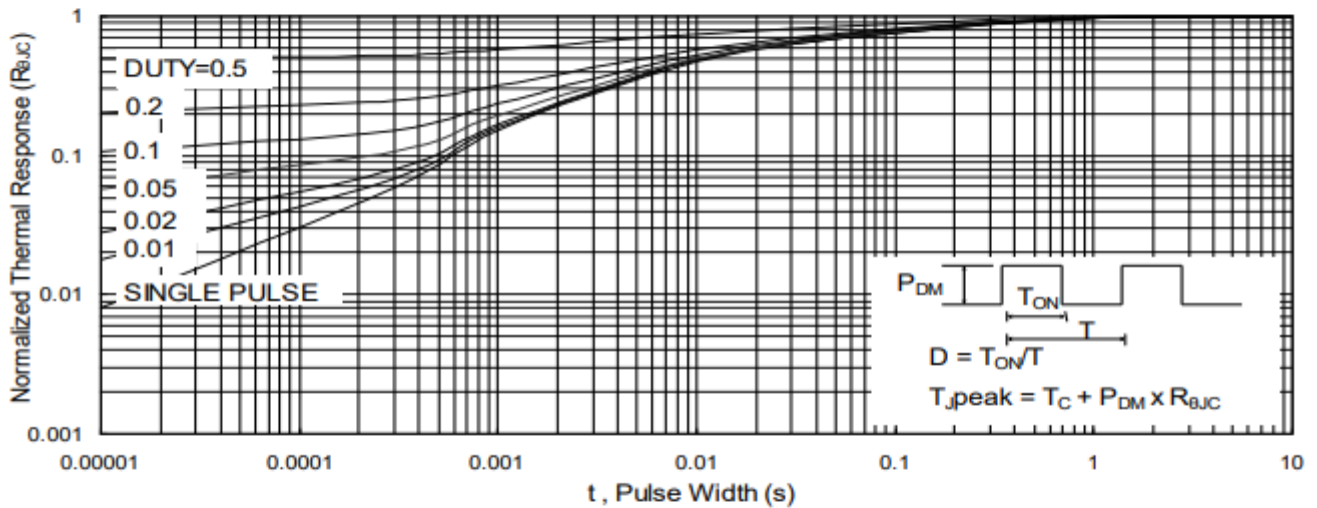


Fig.9 Normalized Maximum Transient Thermal Impedance

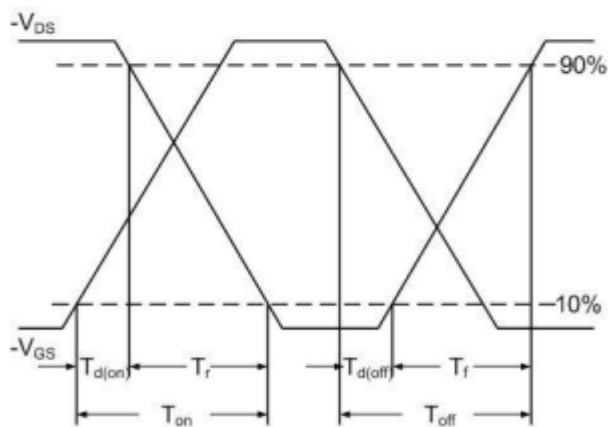


Fig.10 Switching Time Waveform

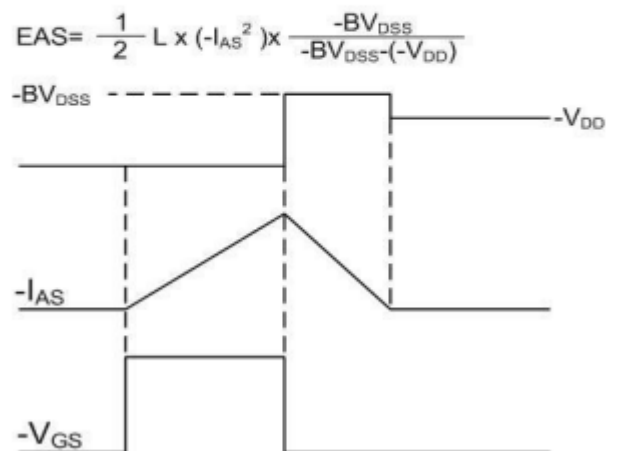
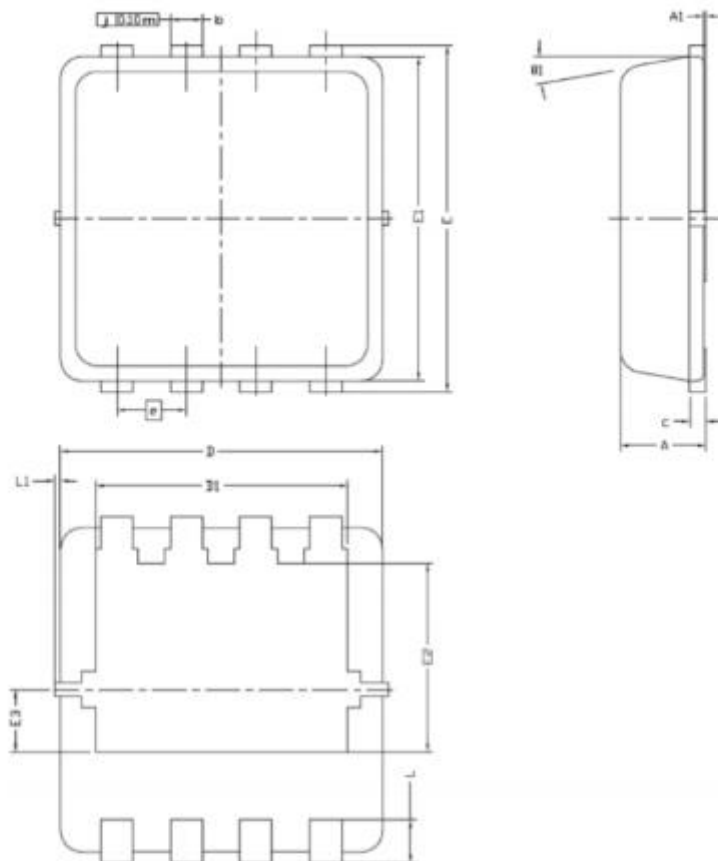


Fig.11 Unclamped Inductive Waveform

## PDFN3x3 PACKAGE INFORMATION



| DIM. | MILLIMETERS |       |       | INCHES    |        |        |
|------|-------------|-------|-------|-----------|--------|--------|
|      | MIN         | NOM   | MAX   | MIN       | NOM    | MAX    |
| A    | 0,700       | 0,80  | 0,900 | 0,0276    | 0,0315 | 0,0354 |
| A1   | 0,00        | ---   | 0,05  | 0,000     | ---    | 0,002  |
| b    | 0,24        | 0,30  | 0,35  | 0,009     | 0,012  | 0,014  |
| c    | 0,10        | 0,152 | 0,25  | 0,004     | 0,006  | 0,010  |
| D    | 3,00 BSC    |       |       | 0,118 BSC |        |        |
| D1   | 2,35 BSC    |       |       | 0,093 BSC |        |        |
| E    | 3,20 BSC    |       |       | 0,126 BSC |        |        |
| E1   | 3,00 BSC    |       |       | 0,118 BSC |        |        |
| E2   | 1,75 BSC    |       |       | 0,069 BSC |        |        |
| E3   | 0,575 BSC   |       |       | 0,023 BSC |        |        |
| e    | 0,65 BSC    |       |       | 0,026 BSC |        |        |
| L    | 0,30        | 0,40  | 0,50  | 0,0118    | 0,0157 | 0,0197 |
| L1   | 0           | ---   | 0,100 | 0         | ---    | 0,004  |
| θ1   | 0°          | 10°   | 12°   | 0°        | 10°    | 12°    |