

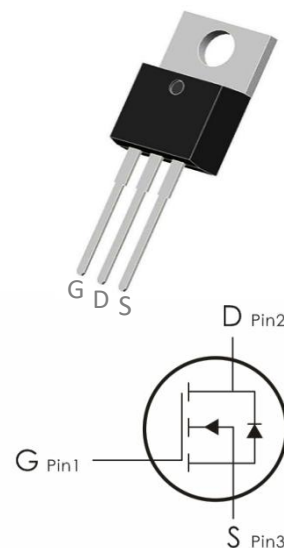
## Description:

This N-Channel MOSFET uses advanced trench technology and design to provide excellent  $R_{DS(on)}$  with low gate charge.

It can be used in a wide variety of applications.

## Features:

- 1)  $V_{DS}=68V, I_D=80A, R_{DS(on)} < 8m\Omega @ V_{GS}=10V$  (Typ:  $6.6m\Omega$ )
- 2) Low gate charge.
- 3) Green device available.
- 4) Advanced high cell density trench technology for ultra low  $R_{DS(on)}$ .
- 5) Excellent package for good heat dissipation.



## Package Marking and Ordering Information:

| Part NO.  | Marking | Package | Packing     |
|-----------|---------|---------|-------------|
| DOP80N068 | 80N068  | TO- 220 | 50 pcs/Tube |

## Absolute Maximum Ratings: ( $T_C=25^\circ C$ unless otherwise noted)

| Symbol         | Parameter                                        | Ratings  | Units      |
|----------------|--------------------------------------------------|----------|------------|
| $V_{DS}$       | Drain-Source Voltage                             | 68       | V          |
| $V_{GS}$       | Gate-Source Voltage                              | $\pm 20$ | V          |
| $I_D$          | Continuous Drain Current                         | 80       | A          |
|                | Continuous Drain Current- $T_C=100^\circ C$      | 56       |            |
| $P_D$          | Power Dissipation                                | 72       | W          |
| $I_{DM}$       | Pulsed Drain Current <sup>1</sup>                | 320      | A          |
| $E_{AS}$       | Single pulse avalanche energy <sup>2</sup>       | 206      | mJ         |
| $T_J, T_{STG}$ | Operating and Storage Junction Temperature Range | -55-+150 | $^\circ C$ |

## Thermal Characteristics:

| Symbol          | Parameter                               | Max | Units        |
|-----------------|-----------------------------------------|-----|--------------|
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case    | 1.7 | $^\circ C/W$ |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient | 68  | $^\circ C/W$ |

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

| Symbol                             | Parameter                               | Conditions                                                                                | Min | Typ  | Max   | Units |
|------------------------------------|-----------------------------------------|-------------------------------------------------------------------------------------------|-----|------|-------|-------|
| Off Characteristics                |                                         |                                                                                           |     |      |       |       |
| BV <sub>DSS</sub>                  | Drain-Source Breakdown Voltage          | V <sub>GS</sub> =0V, I <sub>D</sub> =250 μ A                                              | 68  | ---  | ---   | V     |
| I <sub>DSS</sub>                   | Zero Gate Voltage Drain Current         | V <sub>GS</sub> =0V, V <sub>DS</sub> =68V                                                 | --- | ---  | 1     | μ A   |
| I <sub>GSS</sub>                   | Gate-Source Leakage Current             | V <sub>GS</sub> =± 20V, V <sub>DS</sub> =0A                                               | --- | ---  | ± 100 | nA    |
| On Characteristics                 |                                         |                                                                                           |     |      |       |       |
| V <sub>GS(th)</sub>                | Gate-Source Threshold Voltage           | V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250 μ A                                | 2   | 3.09 | 4     | V     |
| R <sub>DS(ON)</sub>                | Drain-Source On Resistance <sup>3</sup> | V <sub>GS</sub> =10V, I <sub>D</sub> =30A                                                 | --- | 6.6  | 8     | m Ω   |
| Dynamic Characteristics            |                                         |                                                                                           |     |      |       |       |
| C <sub>iss</sub>                   | Input Capacitance                       | V <sub>DS</sub> =35V, V <sub>GS</sub> =0V, f=1MHz                                         | --- | 5389 | ---   | pF    |
| C <sub>oss</sub>                   | Output Capacitance                      |                                                                                           | --- | 262  | --    |       |
| C <sub>rss</sub>                   | Reverse Transfer Capacitance            |                                                                                           | --- | 208  | ---   |       |
| Switching Characteristics          |                                         |                                                                                           |     |      |       |       |
| t <sub>d(on)</sub>                 | Turn-On Delay Time                      | V <sub>DS</sub> =35V, I <sub>D</sub> =30A,<br>R <sub>ENG</sub> =3 Ω ,V <sub>GS</sub> =10V | --- | 21   | ---   | ns    |
| t <sub>r</sub>                     | Rise Time                               |                                                                                           | --- | 31.5 | ---   | ns    |
| t <sub>d(off)</sub>                | Turn-Off Delay Time                     |                                                                                           | --- | 47   | ---   | ns    |
| t <sub>f</sub>                     | Fall Time                               |                                                                                           | --- | 14.7 | ---   | ns    |
| Q <sub>g</sub>                     | Total Gate Charge                       | V <sub>GS</sub> =10V, V <sub>DS</sub> =35V,<br>I <sub>D</sub> =30A                        | --- | 98   | ---   | nC    |
| Q <sub>gs</sub>                    | Gate-Source Charge                      |                                                                                           | --- | 31   | ---   | nC    |
| Q <sub>gd</sub>                    | Gate-Drain “Miller” Charge              |                                                                                           | --- | 25   | ---   | nC    |
| Drain-Source Diode Characteristics |                                         |                                                                                           |     |      |       |       |
| V <sub>SD</sub>                    | Diode Forward Voltage                   | V <sub>GS</sub> =0V, I <sub>SD</sub> =30A                                                 | --- | ---  | 1.2   | V     |
| I <sub>S</sub>                     | Continuous Drain Curren                 | V <sub>D</sub> =V <sub>G</sub> =0V                                                        | --- | ---  | 80    | A     |
| I <sub>SM</sub>                    | Pulsed Drain Current                    |                                                                                           | --- | ---  | 320   | A     |
| T <sub>rr</sub>                    | Reverse Recovery Time                   | I <sub>F</sub> =28A, T <sub>J</sub> =25 °C                                                | --- | 30   | ---   | ns    |
| Q <sub>rr</sub>                    | Reverse Recovery Charge                 | dI/dt=300A/us                                                                             | --- | 41.8 | ---   | nC    |

## Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. EAS condition :  $T_J=25^{\circ}\text{C}$ ,  $V_{DD}=35\text{V}$ ,  $V_G=10\text{V}$ ,  $L=0.5\text{mH}$
3. Pulse Test: Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 0.5\%$

## Typical Characteristics: ( $T_c=25^{\circ}\text{C}$ unless otherwise noted)

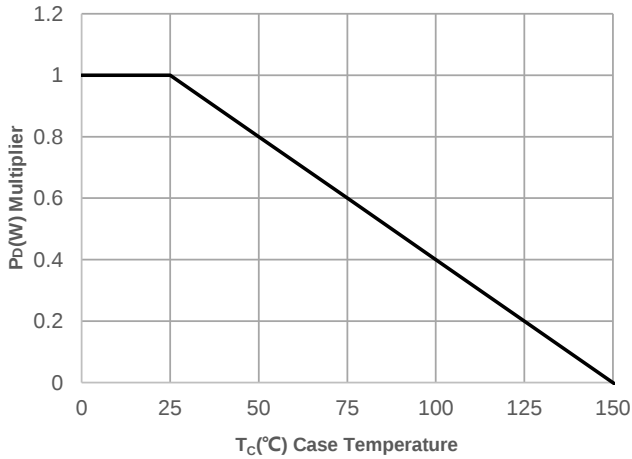


Figure 1: Power De-rating

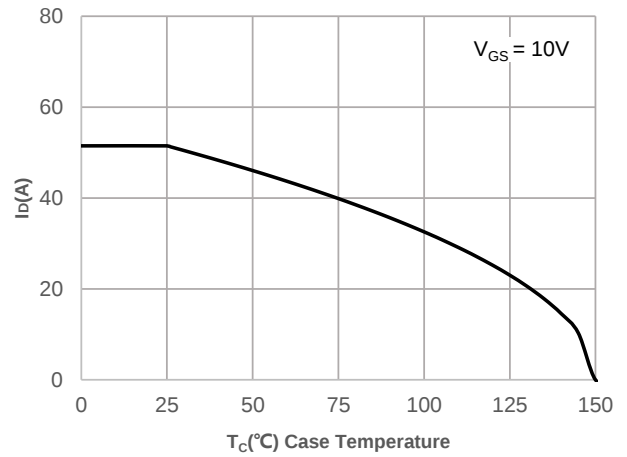


Figure 2: Current De-rating

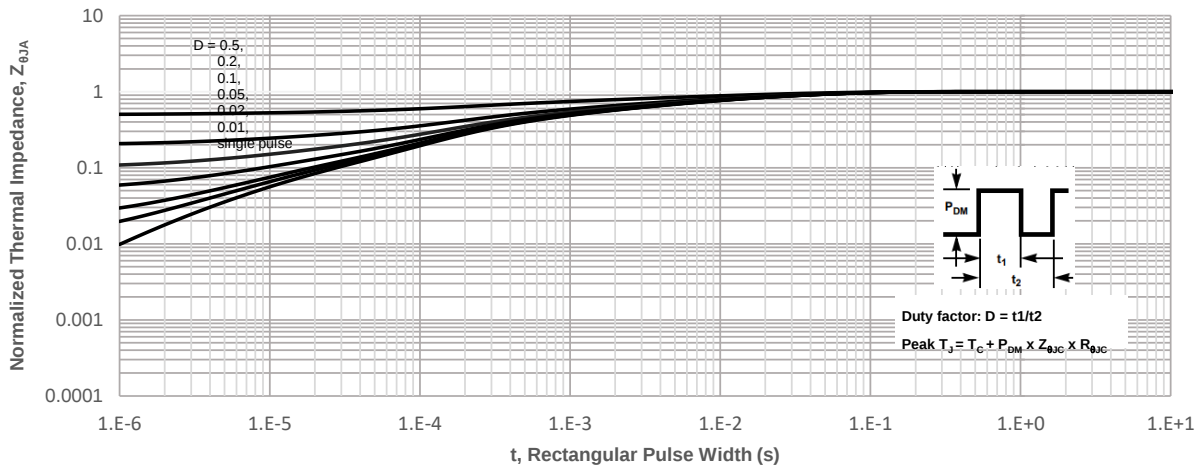


Figure 3: Normalized Maximum Transient Thermal Impedance



Figure 4: Peak Current Capacity

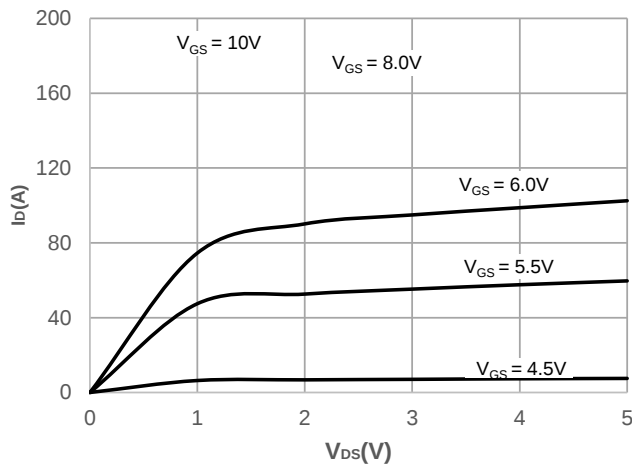


Figure 5: Output Characteristics

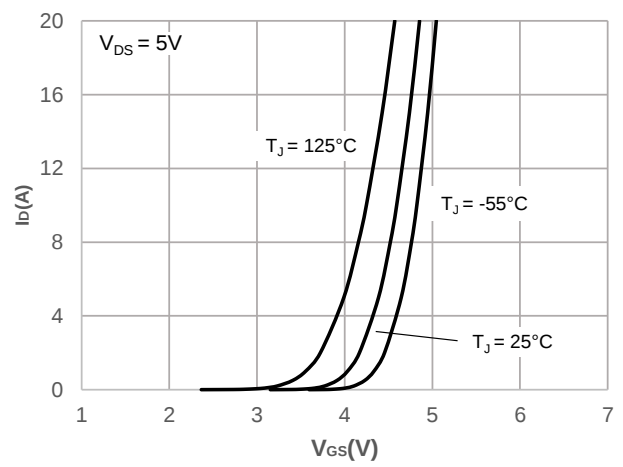


Figure 6: Typical Transfer Characteristics

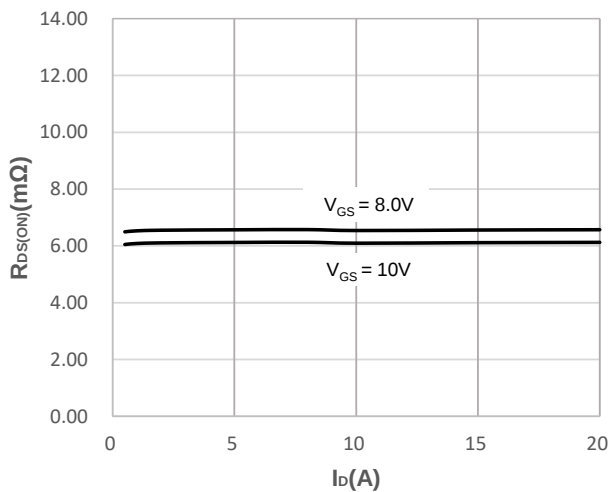


Figure 7: On-resistance vs. Drain Current

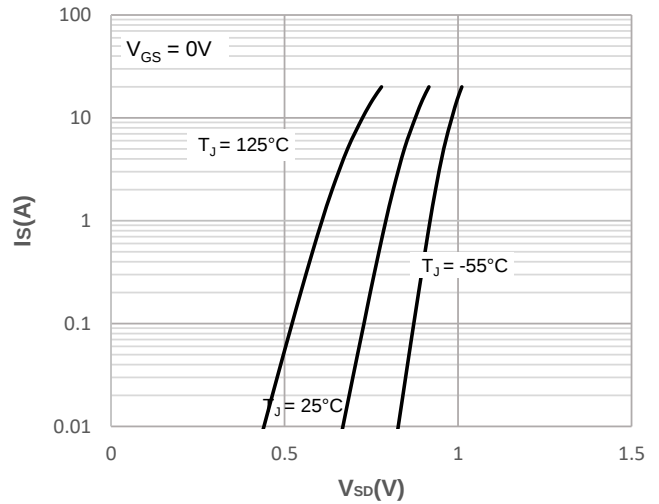


Figure 8: Body Diode Characteristics

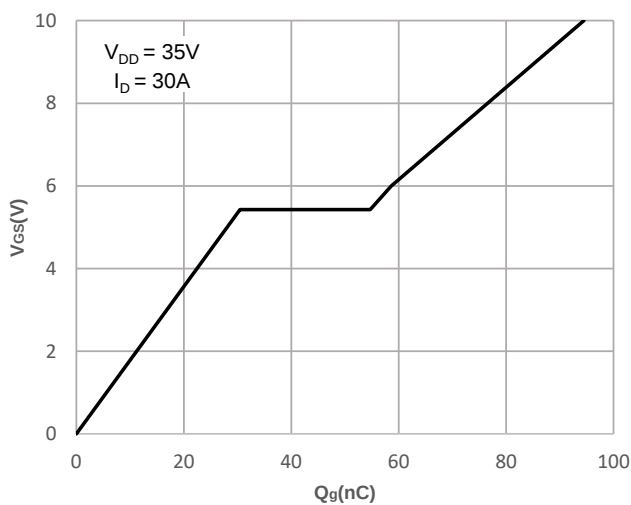


Figure 9: Gate Charge Characteristics

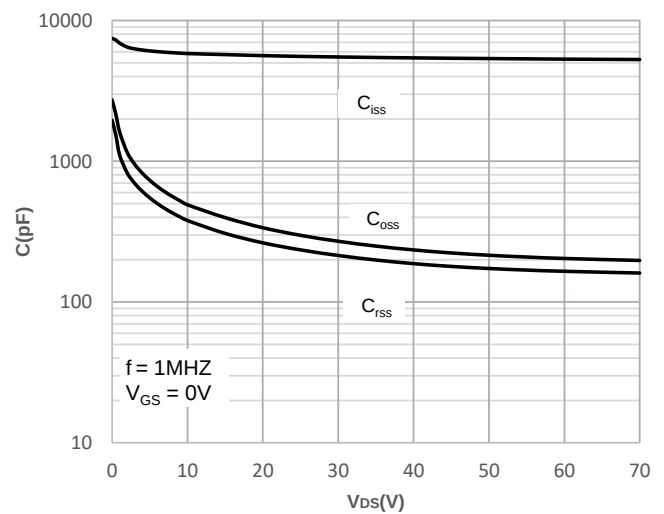
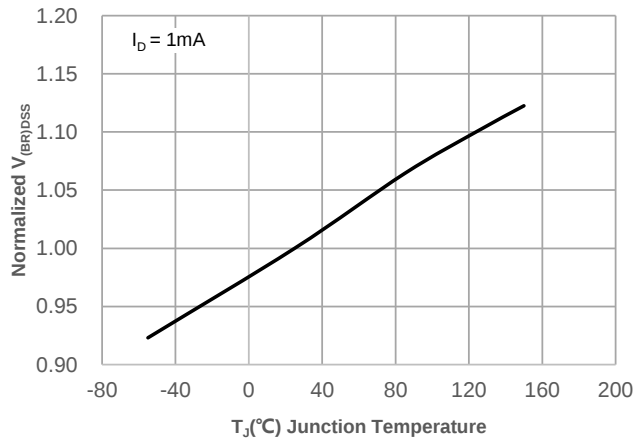
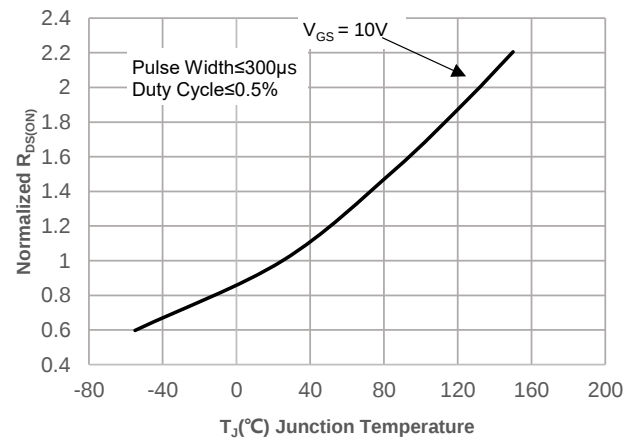


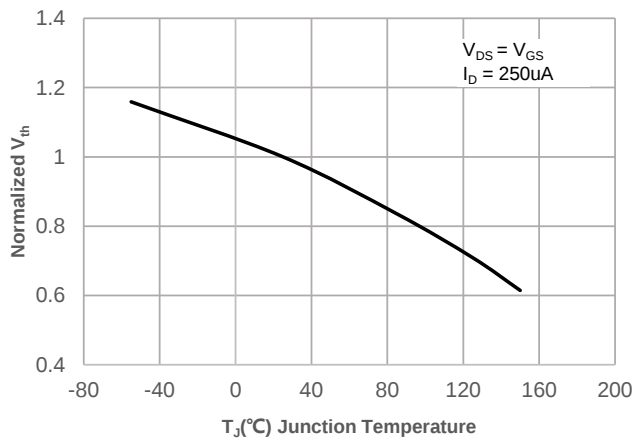
Figure 10: Capacitance Characteristics



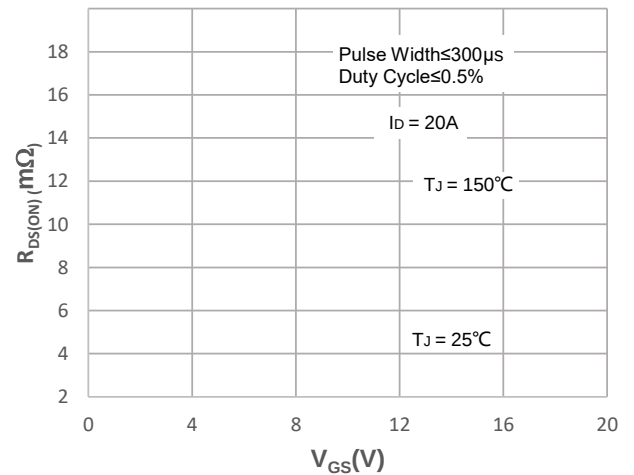
**Figure 11: Normalized Breakdown voltage vs. Junction Temperature**



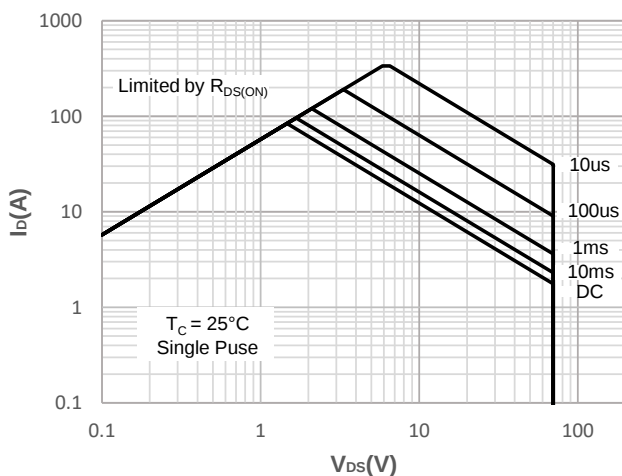
**Figure 12: Normalized on Resistance vs. Junction Temperature**



**Figure 13: Normalized Threshold Voltage vs. Junction Temperature**

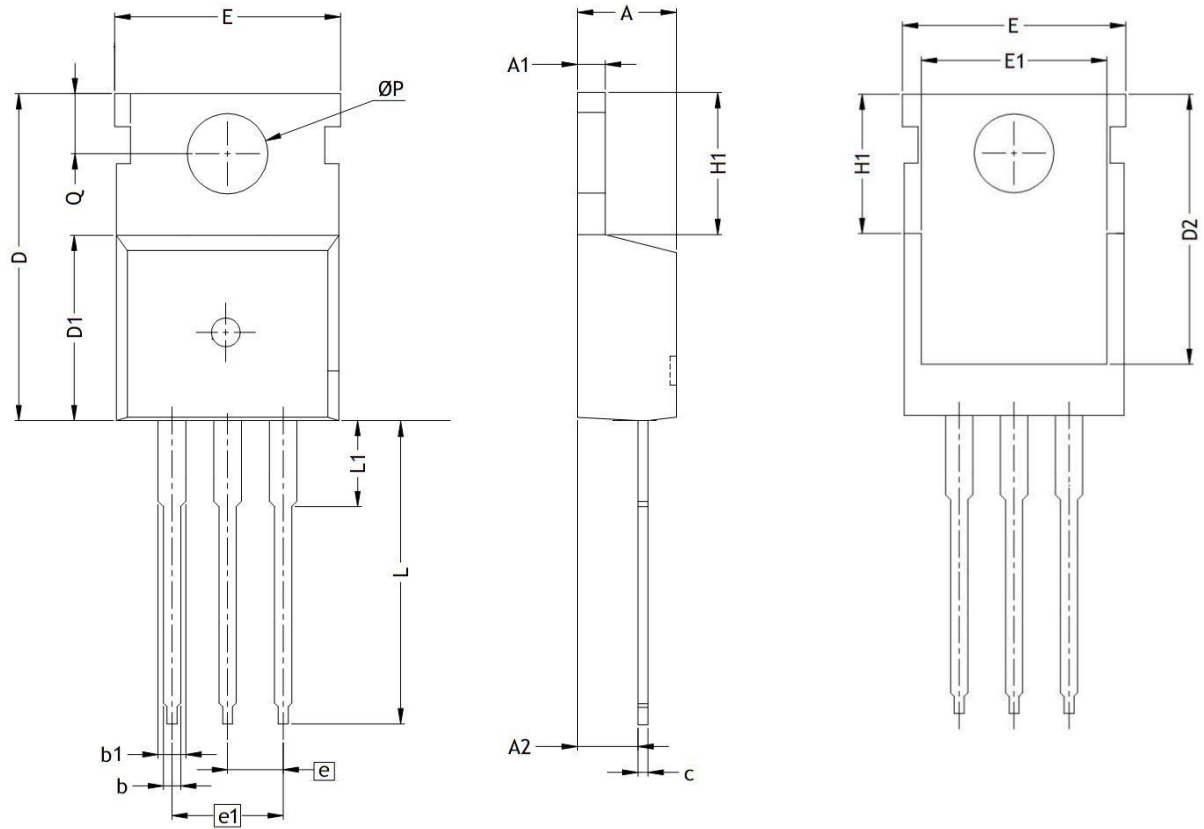


**Figure 14:  $R_{DS(ON)}$  vs.  $V_{GS}$**



**Figure 15: Maximum Safe Operating Area**

## TO-220 Package Information:



UNIT: mm

| SYMBOLS | A     | A1   | A2    | b    | b1   | c    | D     | D1   | D2    | E     | E1   | e     |
|---------|-------|------|-------|------|------|------|-------|------|-------|-------|------|-------|
| MIN     | 4.25  | 1.25 | 2.35  | 0.7  | 1.15 | 0.45 | 14.35 | 8.80 | 13.05 | 9.90  | 7.85 | 2.540 |
| MAX     | 4.65  | 1.35 | 2.55  | 0.9  | 1.75 | 0.60 | 15.95 | 9.50 | 13.65 | 10.35 | 8.85 | BSC   |
| SYMBOLS | e1    | H1   | L     | L1   | Q    | φP   |       |      |       |       |      |       |
| MIN     | 5.080 | 6.30 | 12.85 | 2.85 | 2.70 | 3.50 |       |      |       |       |      |       |
| MAX     | BSC   | 6.65 | 13.50 | 3.25 | 2.90 | 3.70 |       |      |       |       |      |       |

## Marking Information:

①. Doingter LOGO

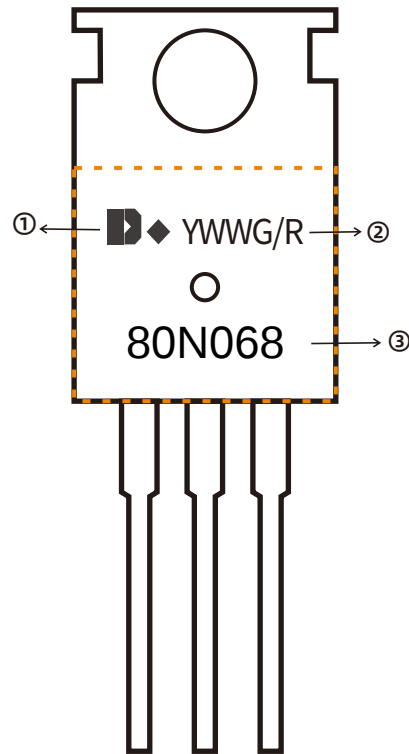
②. Date Code(YWWG / R)

Y : Year Code , last digit of the year

WW : Week Code(01-53)

G/R : G(Green) /R(Lead Free)

③. Part NO.



## Previous Version

| Version | Date       | Subjects (major changes since last revision) |
|---------|------------|----------------------------------------------|
| 1.0     | 2024-10-16 | Release of final version                     |

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