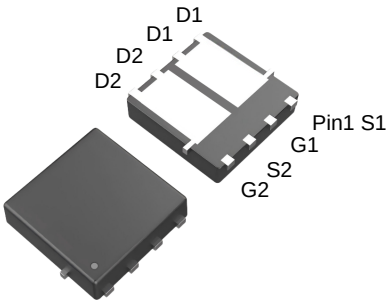
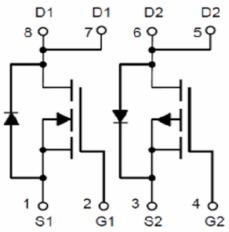
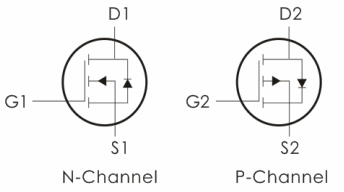
## Description：

This N+P 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：

N-Channel:$V_{DS}$=30V,$I_D$=20A,$R_{DS(ON)}$<13mΩ @$V_{GS}$=10V（Typ：9mΩ）

P-Channel: $V_{DS}$=-30V,$I_D$=-20A,$R_{DS(ON)}$<25mΩ @$V_{GS}$=-10V（Typ：18mΩ）

1) Low gate charge.
2) Green device available.
3) Advanced high cell denity trench technology for ultra low $R_{DS(ON)}$.
4) Excellent package for good heat dissipation.
5) MSL3

## Package Marking and Ordering Information：

| Part NO. | Marking | Package | Packing |
|---|---|---|---|
| DOZ4616A | Z4616A | DFN3*3-8D | 5000 pcs/Reel |

## Absolute Maximum Ratings：($T_C$=25℃ unless otherwise noted)

| Symbol | Parameter | N-Channel | P-Channel | Units |
|---|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | 30 | -30 | V |
| $V_{GS}$ | Gate-Source Voltage | ±20 | ±20 | V |
| $I_D$ | Continuous Drain Current- $T_C$=25℃ [1] | 20 | -20 | A |
| | Continuous Drain Current-$T_C$=100℃ [1] | 14 | -14 | |
| $I_{DM}$ | Pulsed Drain Current [2] | 80 | -80 | A |
| $E_{AS}$ | Single pulse avalanche energy[3] | 24 | 31 | mJ |
| $P_D$ | Power Dissipation - $T_C$=25℃ | 26 | 34 | W |
| $T_J$, $T_{STG}$ | Operating and Storage Junction Temperature Range | -55 to +150 | | ℃ |

## Thermal Characteristics：

| Symbol | Parameter | N-CH | P-CH | Units |
|---|---|---|---|---|
| $R_{\theta JC}$ | Thermal Resistance,Junction to Case | 4.8 | 3.7 | ℃/W |

## N-Channel Electrical Characteristics: ($T_C$=25℃ unless otherwise noted)

| Symbol | Parameter | Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| **Off Characteristics** | | | | | | |
| $BV_{DSS}$ | Drain-Sourtce Breakdown Voltage | $V_{GS}$=0V,$I_D$=250μA | 30 | --- | --- | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{GS}$=0V, $V_{DS}$=30V | --- | --- | 1 | μA |
| $I_{GSS}$ | Gate-Source Leakage Current | $V_{GS}$=±20V, $V_{DS}$=0A | --- | --- | ±100 | nA |
| **On Characteristics** | | | | | | |
| $V_{GS(th)}$ | Gate-Source Threshold Voltage | $V_{GS}$=$V_{DS}$, $I_D$=250μA | 1 | 1.5 | 2 | V |
| $R_{DS(ON)}$ | Drain-Source On Resistance[4] | $V_{GS}$=10V,$I_D$=10A | --- | 9 | 13 | mΩ |
| | | $V_{GS}$=4.5V,$I_D$=5A | --- | 15 | 21 | |
| **Dynamic Characteristics** | | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=15V, $V_{GS}$=0V, f=1MHz | --- | 550 | --- | pF |
| $C_{oss}$ | Output Capacitance | | --- | 110 | --- | |
| $C_{rss}$ | Reverse Transfer Capacitance | | --- | 92 | --- | |
| **Switching Characteristics** | | | | | | |
| $t_{d(on)}$ | Turn-On Delay Time | $V_{DS}$=15V, $I_D$=10A, $R_{REN}$ =3Ω ,$V_{GS}$=10V | --- | 3 | --- | ns |
| $t_r$ | Rise Time | | --- | 6 | --- | ns |
| $t_{d(off)}$ | Turn-Off Delay Time | | --- | 19 | --- | ns |
| $t_f$ | Fall Time | | --- | 5 | --- | ns |
| $Q_g$ | Total Gate Charge | $V_{GS}$=4.5V, $V_{DS}$=15V, $I_D$=10A | --- | 8 | --- | nC |
| $Q_{gs}$ | Gate-Source Charge | | --- | 4.5 | --- | nC |
| $Q_{gd}$ | Gate-Drain “Miller” Charge | | --- | 3.3 | --- | nC |
| **Drain-Source Diode Characteristics** | | | | | | |
| $I_S$ | Continuous Drain to Source Diode | $V_D$=$V_G$=0V | --- | ---- | 20 | A |
| $I_{SM}$ | Pulsed Drain to Source Diode | | --- | --- | 80 | A |
| $V_{SD}$ | Source-Drain Diode Forward Voltage | $V_{GS}$=0V,$I_S$=11A | --- | 0.8 | 1.2 | V |
| Trr | Reverse Recovery Time | $I_F$=11A,$T_J$=25℃ dI/dt=100A/us | --- | 7 | --- | ns |
| Qrr | Reverse Recovery Charge | | --- | 5.9 | --- | nC |

## Notes:

1. Computed continuous current assumes the condition of $T_{j,Max}$ while the actual continuous current depends on the thermal & electro-mechanical application board design
2. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
3. EAS condition : TJ=25℃,VDD=15V,$V_G$=10V,L=0.5mH
4. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

## N-Typical Characteristics: ($T_C$=25℃ unless otherwise noted)

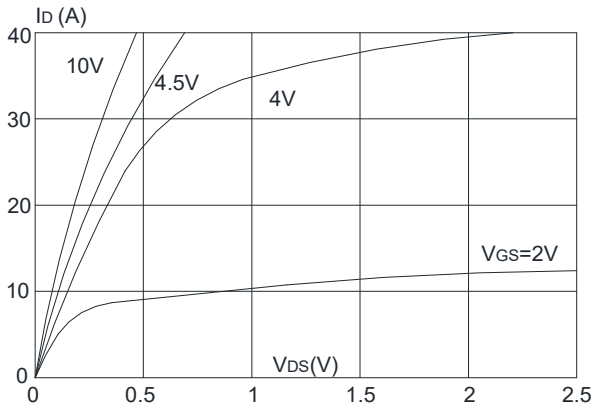



**Figure1:** Output Characteristics

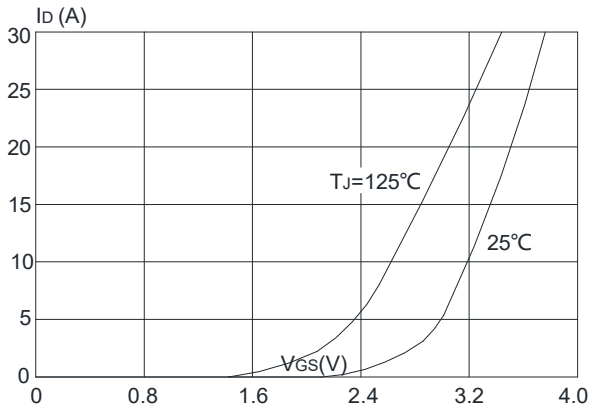



**Figure 2:** Typical Transfer Characteristics

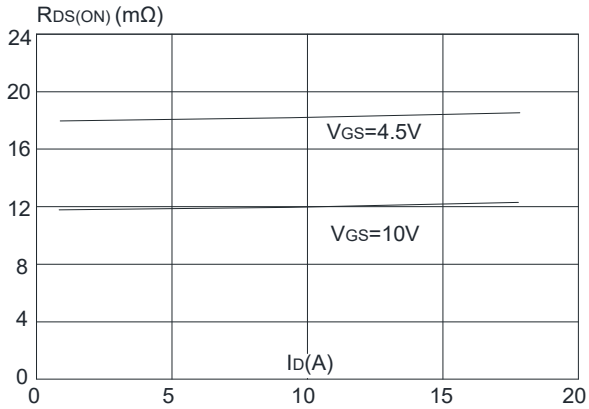



**Figure3:** On-resistance vs. Drain Current

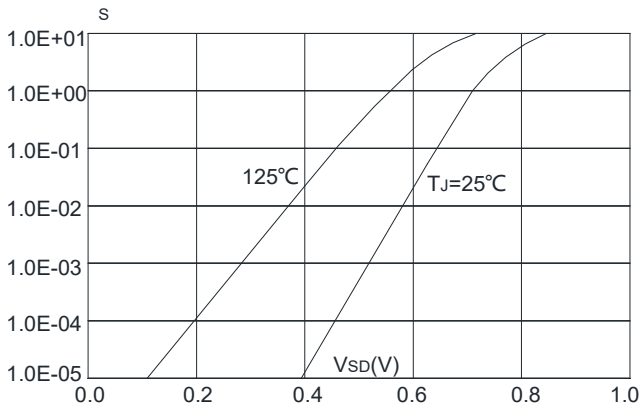



**Figure 4**: Body Diode Characteristics

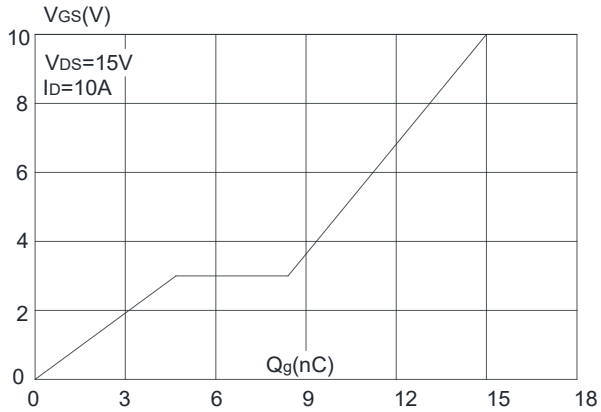



**Figure 5:** Gate Charge Characteristics

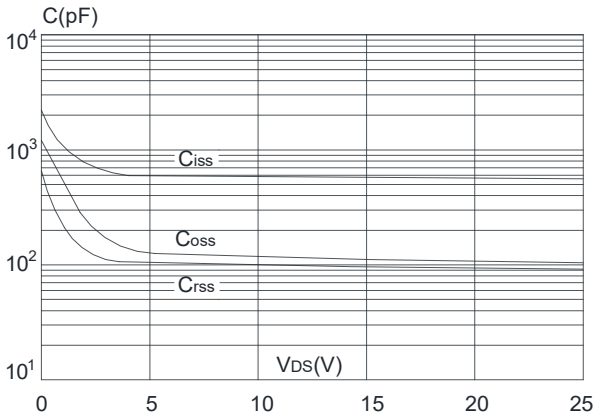



**Figure 6:** Capacitance Characteristics

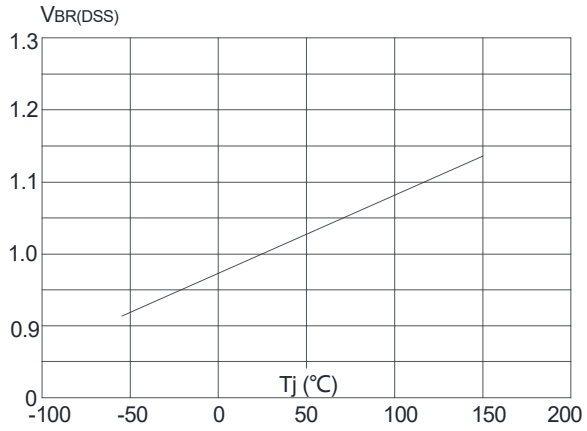



**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature

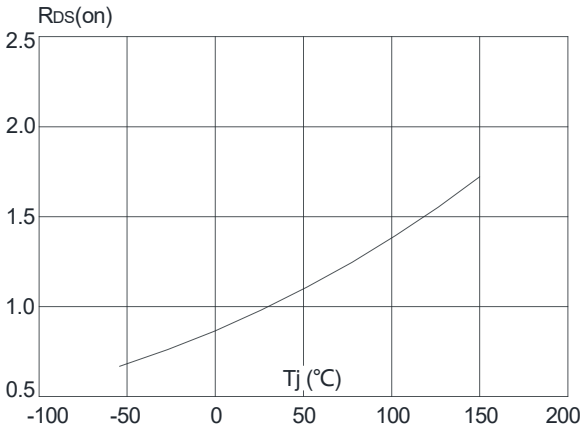



**Figure 8:** Normalized on Resistance vs. Junction Temperature

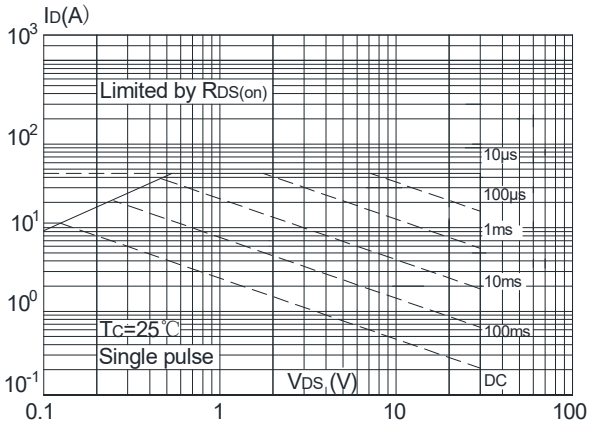



**Figure 9:** Maximum Safe Operating Area

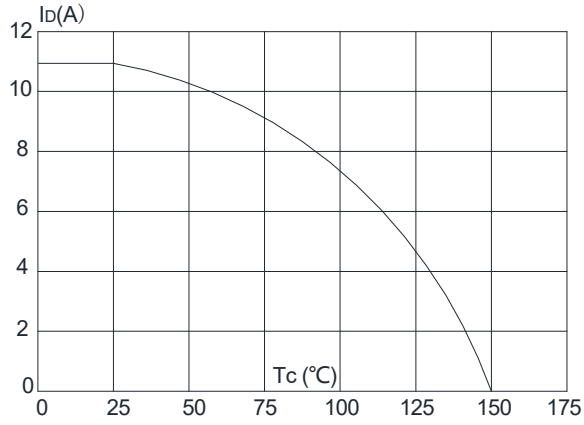



**Figure 10:** Maximum Continuous Drain Current vs. Case Tem erature

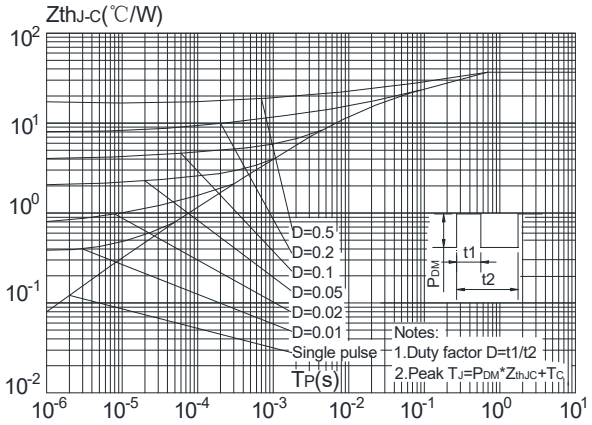



**Figure.11:** Maximum Effective Transient Thermal Impedance, Junction-to-Case

## P-Channel Electrical Characteristics: ($T_A$=25℃ unless otherwise noted)

| Symbol | Parameter | Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| **Off Characteristics** | | | | | | |
| $BV_{DSS}$ | Drain-Sourtce Breakdown Voltage | $V_{GS}$=0V,$I_D$=250μA | -30 | --- | --- | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{GS}$=0V, $V_{DS}$=-30V | --- | --- | -1 | μA |
| $I_{GSS}$ | Gate-Source Leakage Current | $V_{GS}$=±20V, $V_{DS}$=0A | --- | --- | ±100 | nA |
| **On Characteristics** | | | | | | |
| $V_{GS(th)}$ | Gate-Source Threshold Voltage | $V_{GS}$=$V_{DS}$, $I_D$=250μA | -1 | -1.5 | -2 | V |
| $R_{DS(ON)}$ | Drain-Source On Resistance[4] | $V_{GS}$=-10V,$I_D$=-10A | --- | 18 | 25 | mΩ |
| | | $V_{GS}$=-4.5V,$I_D$=-5A | --- | 25 | 40 | |
| **Dynamic Characteristics** | | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=-15V, $V_{GS}$=0V, f=1MHz | --- | 1000 | --- | pF |
| $C_{oss}$ | Output Capacitance | | --- | 150 | --- | |
| $C_{rss}$ | Reverse Transfer Capacitance | | --- | 135 | --- | |
| **Switching Characteristics** | | | | | | |
| $t_{d(on)}$ | Turn-On Delay Time | $V_{DD}$= -15V， $I_D$=-1A $V_{GS}$= -10V, $R_{GEN}$=6Ω | --- | 12 | --- | ns |
| $t_r$ | Rise Time | | --- | 13 | --- | ns |
| $t_{d(off)}$ | Turn-Off Delay Time | | --- | 195 | --- | ns |
| $t_f$ | Fall Time | | --- | 95 | --- | ns |
| $Q_g$ | Total Gate Charge | $V_{GS}$=-10V,$V_{DS}$=-15V, $I_D$=-8A | --- | 50 | --- | nC |
| $Q_{gs}$ | Gate-Source Charge | | --- | 9.5 | --- | nC |
| $Q_{gd}$ | Gate-Drain “Miller” Charge | | --- | 8.3 | --- | nC |
| **Drain-Source Diode Characteristics** | | | | | | |
| $I_S$ | Continuous Drain to Source Diode | $V_D$=$V_G$=0V | --- | --- | -20 | A |
| $I_{SM}$ | Pulsed Drain to Source Diode | | --- | --- | -80 | A |
| Trr | Reverse Recovery Time | $I_F$=-2A,$T_J$=25℃ dI/dt=100A/us | --- | 37 | --- | ns |
| Qrr | Reverse Recovery Charge | | --- | 36 | --- | nC |
| $V_{SD}$ | Source-Drain Diode Forward Voltage | $V_{GS}$=0V,$I_S$=-11A | --- | -0.8 | -1.2 | V |

## Notes:

1. Computed continuous current assumes the condition of $T_{j,Max}$ while the actual continuous current depends on the thermal & electro-mechanical application board design
2. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
3. EAS condition : TJ=25℃,VDD=-15V,$V_G$=-10V,L=0.5mH
4. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

## P-Typical Characteristics: ($T_C$=25℃ unless otherwise noted)

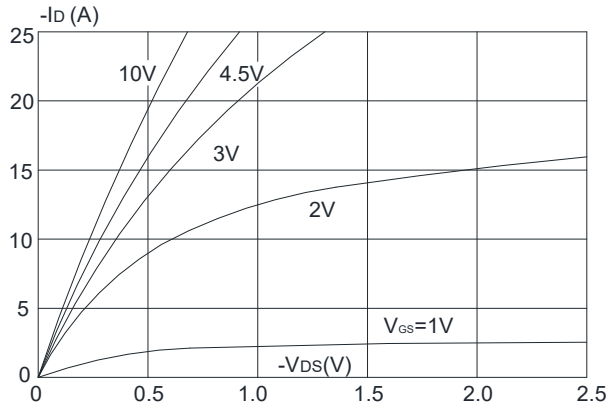



**Figure1:** Output Characteristics

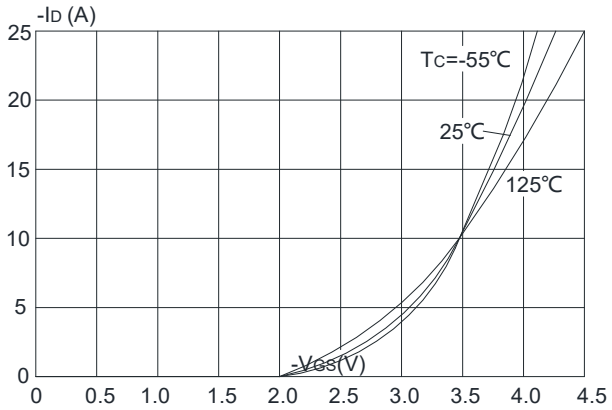



**Figure 2:** Typical Transfer Characteristics

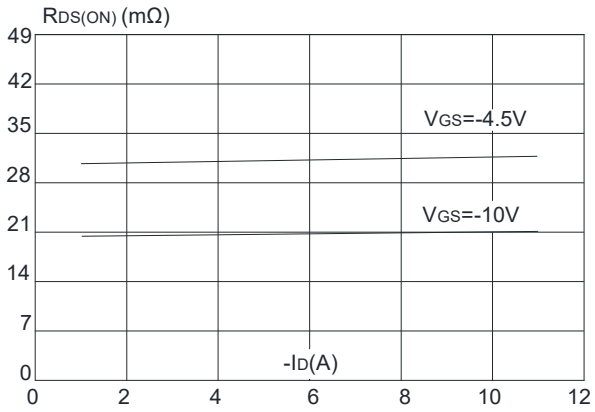



**Figure 3:**On-resistance vs. Drain Current

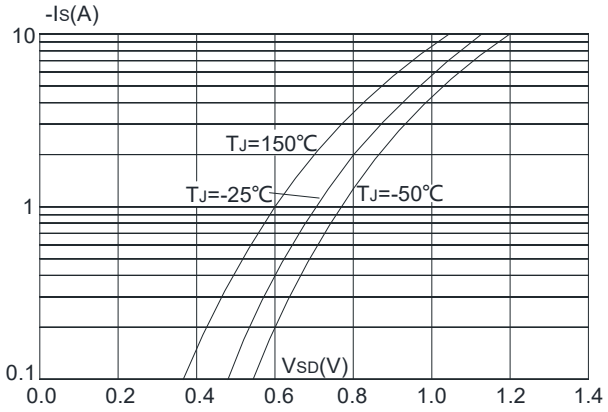



**Figure 4**: Body Diode Characteristics

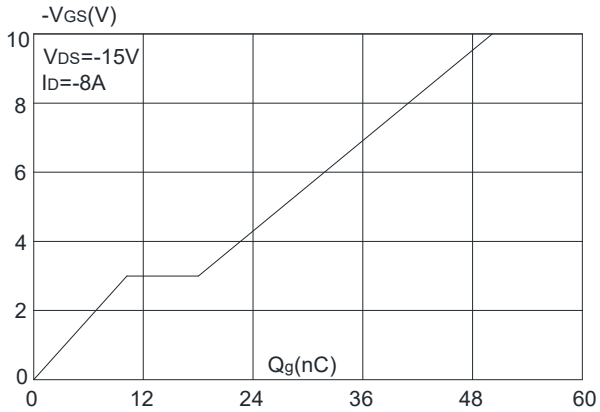



**Figure 5:** Gate Charge Characteristics

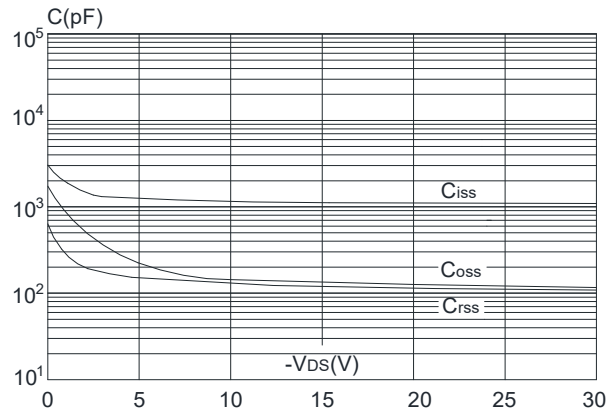



**Figure 6:** Capacitance Characteristics

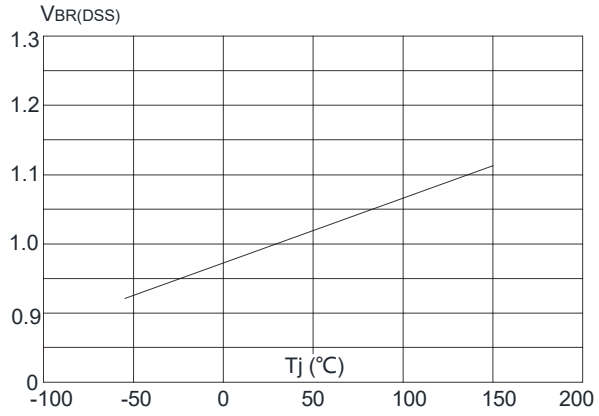



**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature

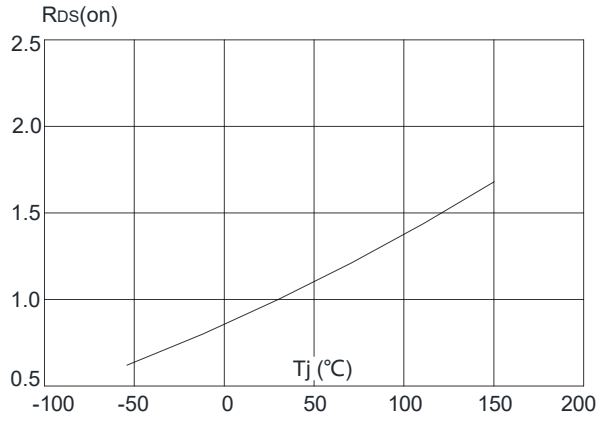



**Figure 8:** Normalized on Resistance vs. Junction Temperature

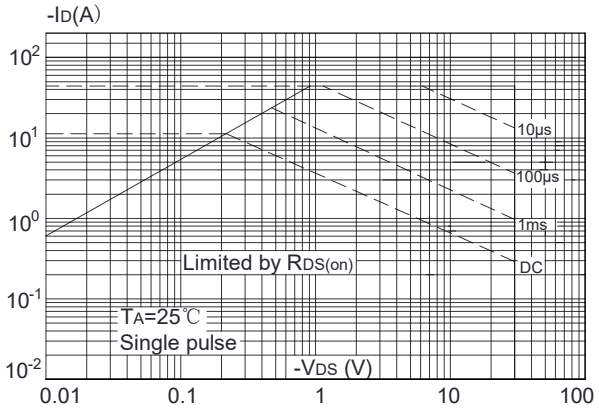



**Figure 9:** Maximum Safe Operating Area

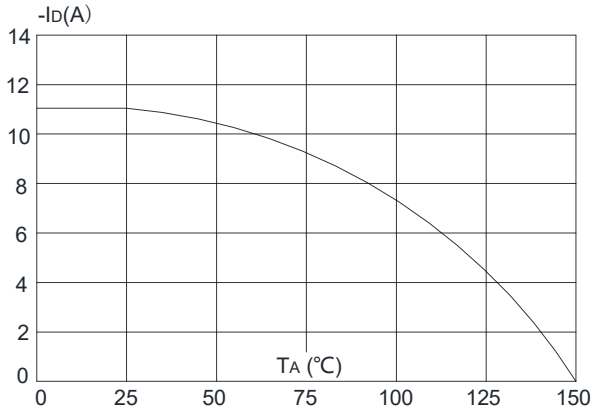



**Figure 10:** Maximum Continuous Drain Current vs. Ambient Temperature

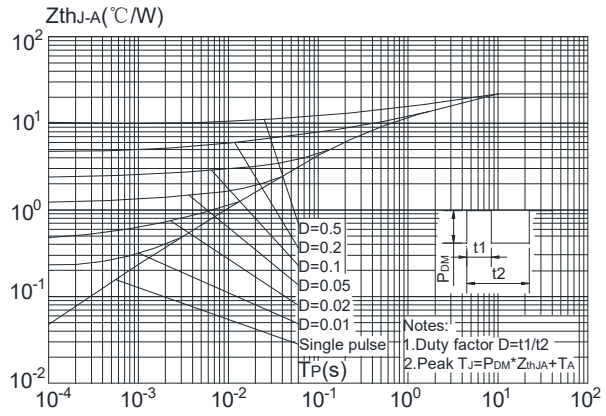
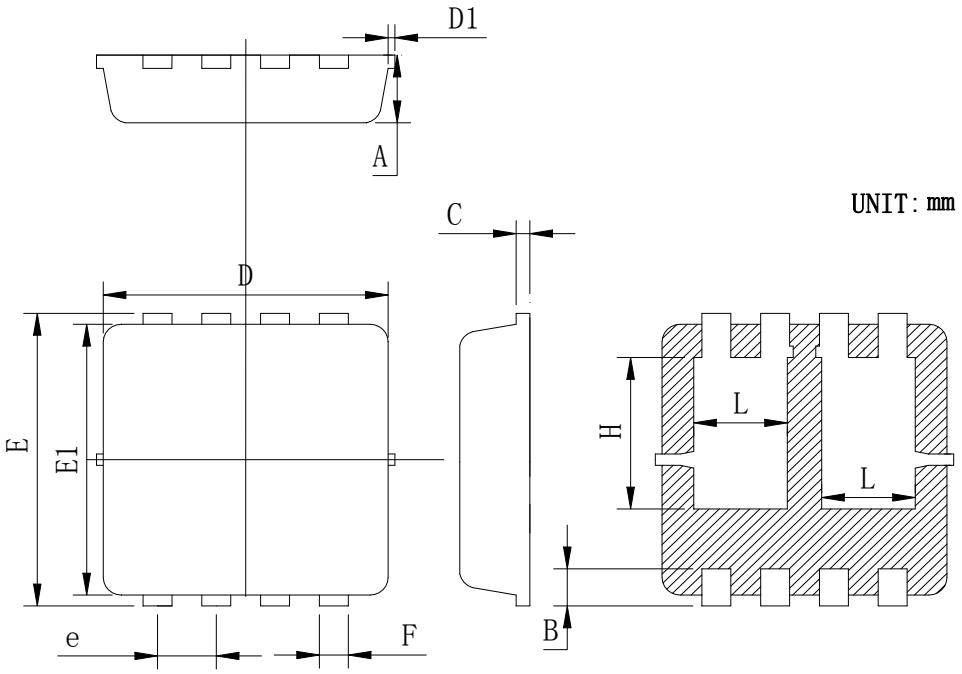



**Figure.11:** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

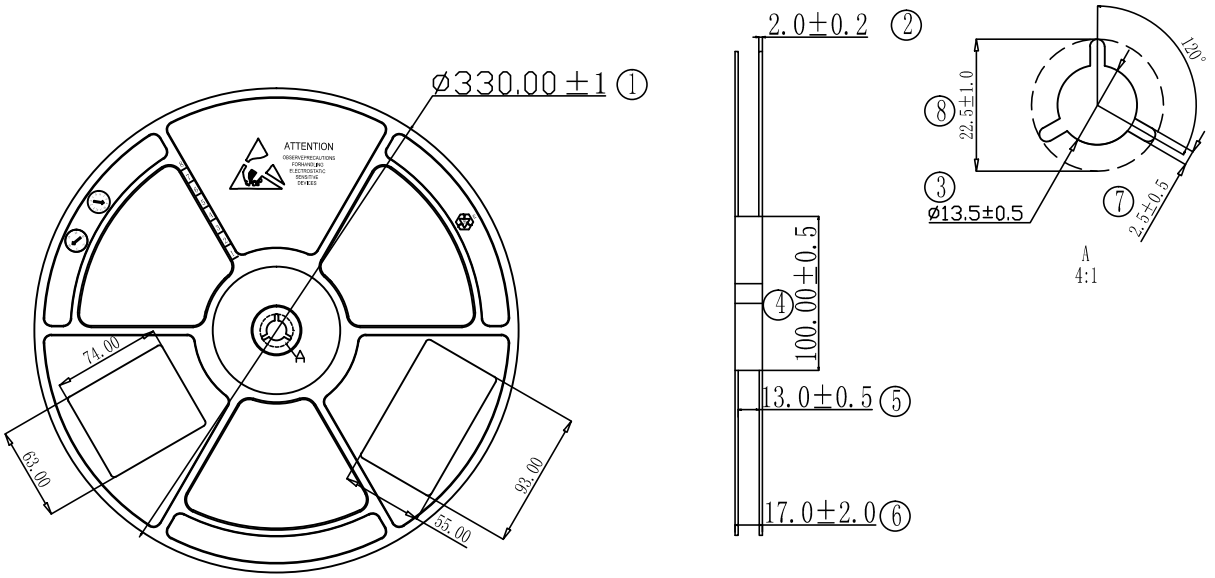
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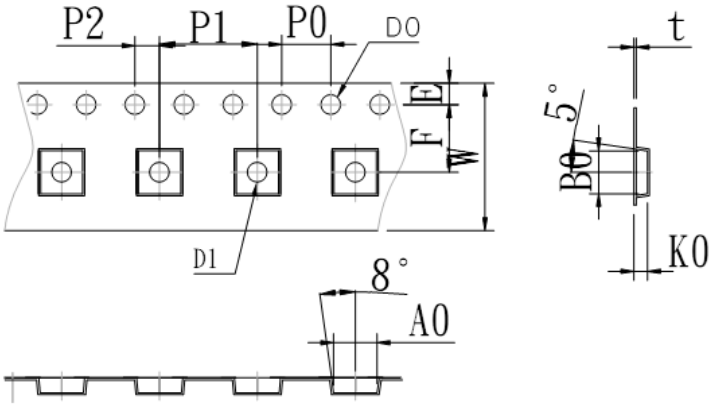

| Symbol | Min | Typ | Max |
|---|---|---|---|
| A | 0.725 | 0.775 | 0.825 |
| B | 0.28 | 0.38 | 0.48 |
| C | 0.13 | 0.15 | 0.20 |
| D | 3.05 | 3.15 | 3.25 |
| D1 | | | 0.10 |
| E | 3.25 | 3.35 | 3.45 |
| E1 | 3.0 | 3.1 | 3.2 |
| e | 0.60 | 0.65 | 0.70 |
| F | 0.27 | 0.32 | 0.37 |
| H | 1.63 | 1.73 | 1.83 |
| L | 0.93 | 1.03 | 1.13 |

## Tape & Reel Information

Dimensions in mm




| Symbol | A0 | B0 | K0 | D0 | D1 | P0 | P1 | 10*P0 |
|---|---|---|---|---|---|---|---|---|
| Spec | 3.55±0.10 | 3.45±0.10 | 1.13±0.10 | 1.55±0.10 | 1.55±0.10 | 4.00±0.10 | 8.00±0.10 | 40.0±0.10 |
| Symbol | W | E | F | P2 | t | | | |
| Spec | 12.00±0.10 | 1.75±0.10 | 5.50±0.10 | 2.00±0.10 | 0.20±0.05 | | | |




Pulling direction

## Marking Information：

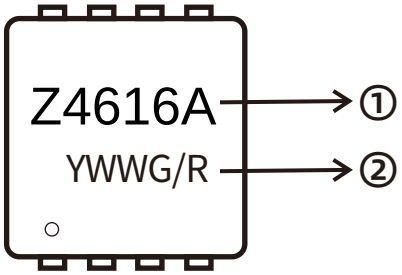
①:Part NO.

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)




## Previous Version

| Version | Date | Subjects (major changes since last revision) |
|---|---|---|
| 2.2 | 2025-05-21 | Release of final version |

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