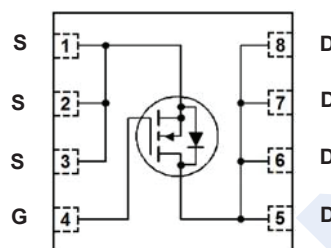


## N-Channel MOSFET

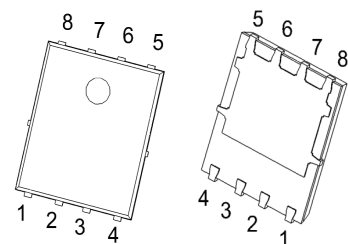
## AON6516 (KON6516)

## ■ Features

- $V_{DS} (V) = 30 V$
- $I_{D_{MAX}} (at V_{GS} = 10 V) = 32 A$
- $R_{DS(ON)} (at V_{GS} = 10 V) < 5 m\Omega$
- $R_{DS(ON)} (at V_{GS} = 4.5 V) < 8 m\Omega$
- Low Gate Charge
- High Current Capability



DFN5x6-8(PDFNWB5x6-8L)

■ Absolute Maximum Ratings ( $T_A = 25^\circ C$  unless otherwise noted)

| Parameter                                              | Symbol     | Rating              | Unit       |
|--------------------------------------------------------|------------|---------------------|------------|
| Drain-Source Voltage                                   | $V_{DS}$   | 30                  | V          |
| Gate-Source Voltage                                    | $V_{GS}$   | $\pm 20$            |            |
| Continuous Drain Current <sup>G</sup>                  | $I_D$      | $T_C = 25^\circ C$  | 32         |
|                                                        |            | $T_C = 100^\circ C$ | 25         |
| Pulsed Drain Current <sup>C</sup>                      | $I_{DM}$   | 127                 | A          |
| Continuous Drain Current                               | $I_{DSM}$  | $T_A = 25^\circ C$  | 27         |
|                                                        |            | $T_A = 70^\circ C$  | 22         |
| Avalanche Current <sup>C</sup>                         | $I_{AS}$   | 34                  |            |
| Avalanche Energy $L = 0.05 mH$ <sup>C</sup>            | $E_{AS}$   | 29                  | mJ         |
| $V_{DS}$ Spike                                         | 100ns      | $V_{SPIKE}$         | 36         |
| Power Dissipation <sup>B</sup>                         | $P_D$      | $T_C = 25^\circ C$  | 25         |
|                                                        |            | $T_C = 100^\circ C$ | 10         |
| Power Dissipation <sup>A</sup>                         | $P_{DSM}$  | $T_A = 25^\circ C$  | 6          |
|                                                        |            | $T_A = 70^\circ C$  | 3.8        |
| Thermal Resistance.Junction- to-Ambient <sup>A</sup>   | $R_{thJA}$ | $t \leq 10s$        | 21         |
| Thermal Resistance.Junction- to-Ambient <sup>A D</sup> |            | Steady-State        | 53         |
| Thermal Resistance.Junction- to-Case                   | $R_{thJC}$ | Steady-State        | 5          |
| Junction Temperature                                   | $T_J$      | 150                 | $^\circ C$ |
| Storage Temperature Range                              | $T_{stg}$  | -55 to 150          |            |

## N-Channel MOSFET

## AON6516 (KON6516)

■ Electrical Characteristics ( $T_J = 25^\circ\text{C}$  unless otherwise specified)

| Parameter                             | Symbol       | Test Conditions                                                                              | Min | Typ  | Max       | Unit          |
|---------------------------------------|--------------|----------------------------------------------------------------------------------------------|-----|------|-----------|---------------|
| Drain-Source Breakdown Voltage        | $BV_{DS}$    | $I_D = 250\ \mu\text{A}$ , $V_{GS} = 0\text{V}$                                              | 30  |      |           | V             |
| Zero Gate Voltage Drain Current       | $I_{DSS}$    | $V_{DS} = 30\text{V}$ , $V_{GS} = 0\text{V}$                                                 |     |      | 1         | $\mu\text{A}$ |
|                                       |              | $V_{DS} = 30\text{V}$ , $V_{GS} = 0\text{V}$ , $T_J = 55^\circ\text{C}$                      |     |      | 5         |               |
| Gate to Source Leakage Current        | $I_{GSS}$    | $V_{DS} = 0\text{V}$ , $V_{GS} = \pm 20\text{V}$                                             |     |      | $\pm 100$ | nA            |
| Gate to Source Threshold Voltage      | $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 250\ \mu\text{A}$                                                 | 1.2 |      | 2.2       | V             |
| Static Drain-Source On-Resistance     | $R_{DS(on)}$ | $V_{GS} = 10\text{V}$ , $I_D = 20\text{A}$                                                   |     |      | 5         | m $\Omega$    |
|                                       |              | $V_{GS} = 10\text{V}$ , $I_D = 20\text{A}$ , $T_J = 125^\circ\text{C}$                       |     |      | 8         |               |
|                                       |              | $V_{GS} = 4.5\text{V}$ , $I_D = 20\text{A}$                                                  |     |      | 8         |               |
| Forward Transconductance              | $g_{FS}$     | $V_{DS} = 5\text{V}$ , $I_D = 20\text{A}$                                                    |     | 83   |           | S             |
| Input Capacitance                     | $C_{iss}$    | $V_{GS} = 0\text{V}$ , $V_{DS} = 15\text{V}$ , $f = 1\text{MHz}$                             |     | 1229 |           | pF            |
| Output Capacitance                    | $C_{oss}$    |                                                                                              |     | 526  |           |               |
| Reverse Transfer Capacitance          | $C_{rss}$    |                                                                                              |     | 83   |           |               |
| Gate Resistance                       | $R_g$        | $V_{GS} = 0\text{V}$ , $V_{DS} = 0\text{V}$ , $f = 1\text{MHz}$                              | 0.8 |      | 2.6       | $\Omega$      |
| Total Gate Charge                     | $Q_g(10V)$   | $V_{GS} = 10\text{V}$ , $V_{DS} = 15\text{V}$ , $I_D = 20\text{A}$                           |     | 24   | 33        | nC            |
| Total Gate Charge                     | $Q_g(4.5V)$  |                                                                                              |     | 12   | 17        |               |
| Gate Source Charge                    | $Q_{gs}$     |                                                                                              |     | 4    |           |               |
| Gate Drain Charge                     | $Q_{gd}$     |                                                                                              |     | 5.5  |           |               |
| Turn-On DelayTime                     | $t_{d(on)}$  | $V_{GS} = 10\text{V}$ , $V_{DS} = 15\text{V}$ , $R_L = 0.75\ \Omega$ , $R_{GEN} = 3\ \Omega$ |     | 7.0  |           | ns            |
| Turn-On Rise Time                     | $t_r$        |                                                                                              |     | 4.8  |           |               |
| Turn-Off DelayTime                    | $t_{d(off)}$ |                                                                                              |     | 24.0 |           |               |
| Turn-Off Fall Time                    | $t_f$        |                                                                                              |     | 5.8  |           |               |
| Body Diode Reverse Recovery Time      | $t_{rr}$     | $I_F = 20\text{A}$ , $di/dt = 500\text{A}/\mu\text{s}$                                       |     | 12.6 |           | nC            |
| Body Diode Reverse Recovery Charge    | $Q_{rr}$     |                                                                                              |     | 15.2 |           |               |
| Maximum Body-Diode Continuous Current | $I_S$        |                                                                                              |     |      | 30        | A             |
| Diode Forward Voltage                 | $V_{SD}$     | $V_{GS} = 0\text{V}$ , $I_S = 1\text{A}$                                                     |     |      | 1         | V             |

Notes:

- A. The value of  $R_{\theta JA}$  is measured with the device mounted on 1 in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with  $T_A = 25^\circ\text{C}$ . The Power dissipation  $P_{DSM}$  is based on  $R_{\theta JA}$  and the maximum allowed junction temperature of  $150^\circ\text{C}$ . The value in any given application depends on the user's specific board design.
- B. The power dissipation  $P_D$  is based on  $T_{J(MAX)} = 150^\circ\text{C}$ , using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.
- C. Single pulse width limited by junction temperature  $T_{J(MAX)} = 150^\circ\text{C}$ .
- D. The  $R_{\theta JA}$  is the sum of the thermal impedance from junction to case  $R_{\theta JC}$  and case to ambient.
- E. The static characteristics in Figures 1 to 6 are obtained using  $<300\ \mu\text{s}$  pulses, duty cycle 0.5% max.
- F. These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of  $T_{J(MAX)} = 150^\circ\text{C}$ . The SOA curve provides a single pulse rating.
- G. The maximum current rating is package limited.
- H. These tests are performed with the device mounted on 1 in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with  $T_A = 25^\circ\text{C}$ .

## N-Channel MOSFET

## AON6516 (KON6516)

## ■ Typical Electrical and Thermal Characteristics

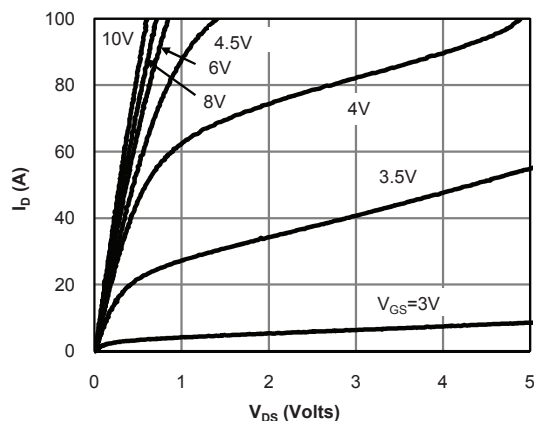


Fig 1: On-Region Characteristics (Note E)

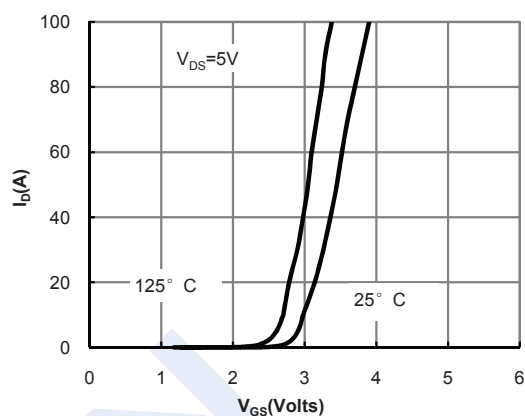


Figure 2: Transfer Characteristics (Note E)

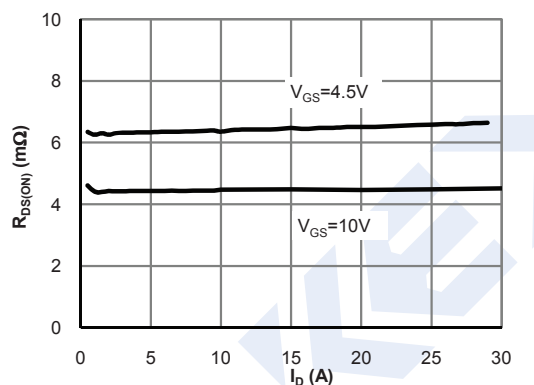


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

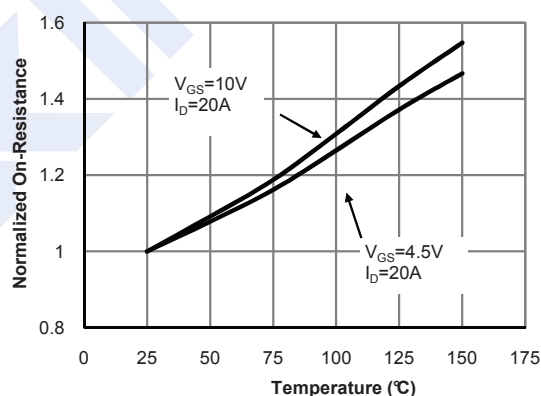


Figure 4: On-Resistance vs. Junction Temperature (Note E)

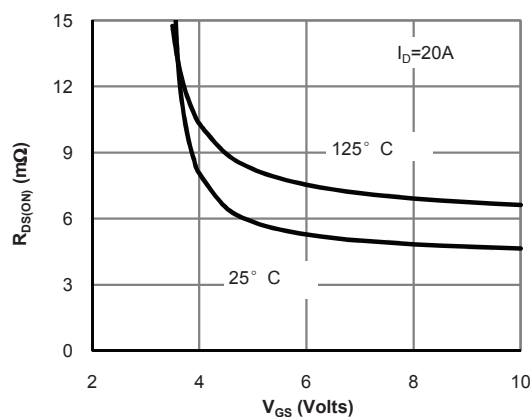


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

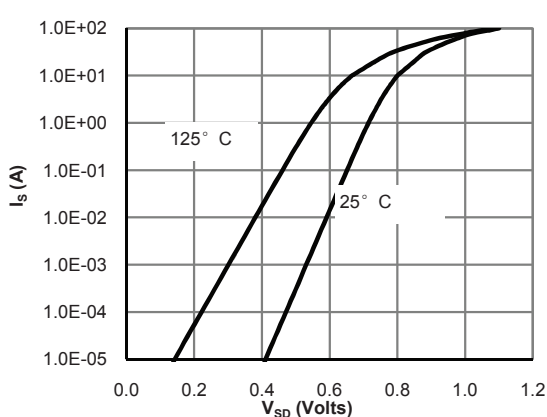
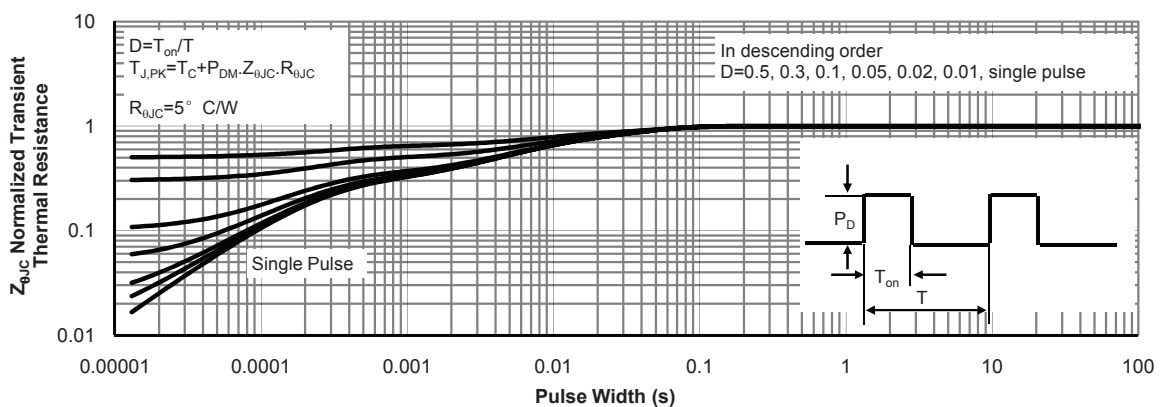
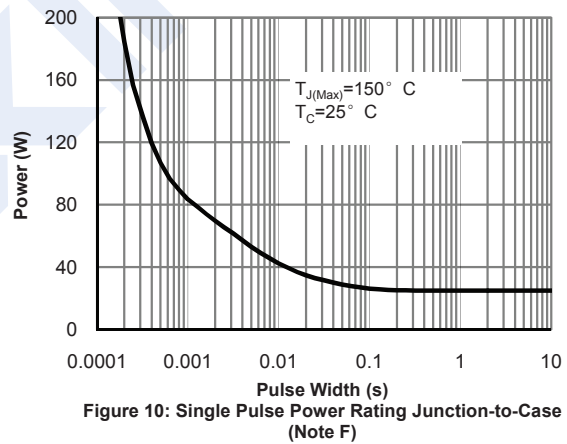
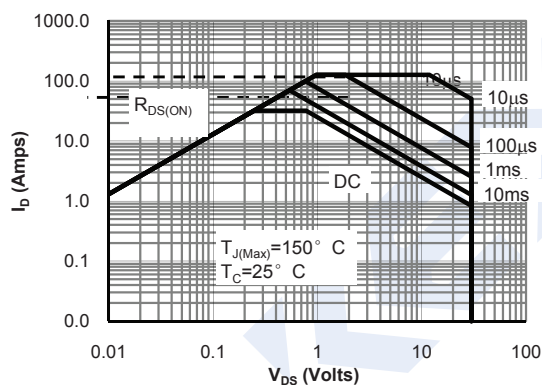
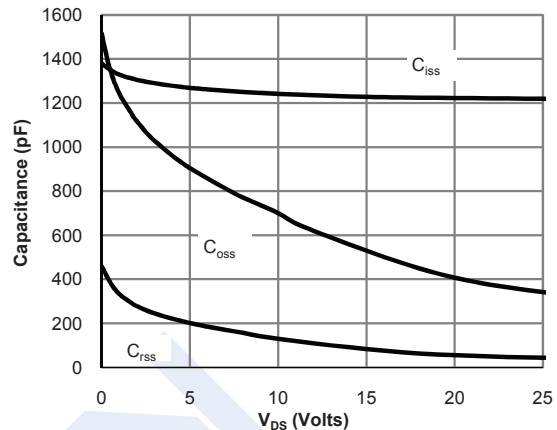
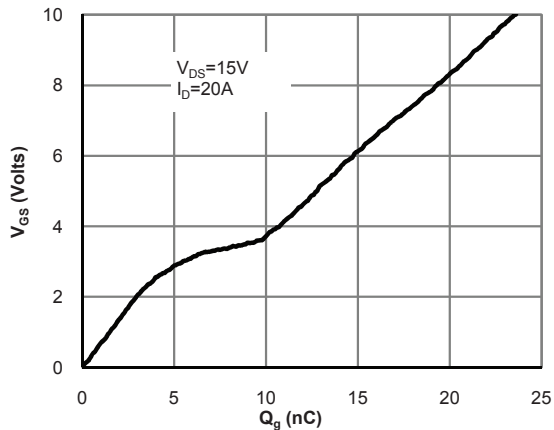


Figure 6: Body-Diode Characteristics (Note E)

## N-Channel MOSFET

## AON6516 (KON6516)



## N-Channel MOSFET

## AON6516 (KON6516)

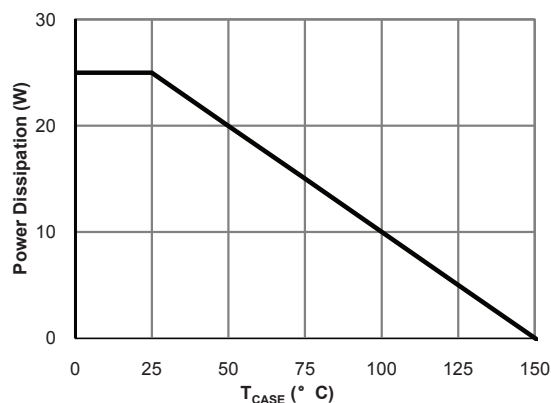


Figure 12: Power De-rating (Note F)

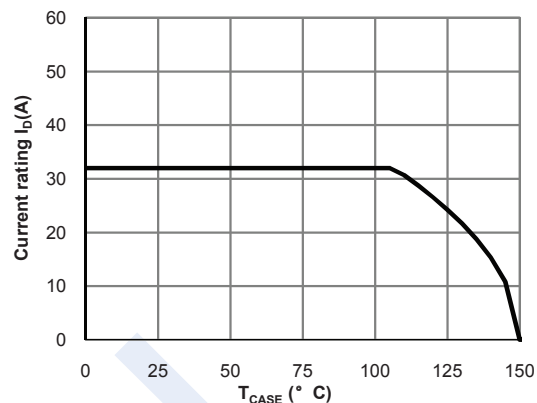


Figure 13: Current De-rating (Note F)

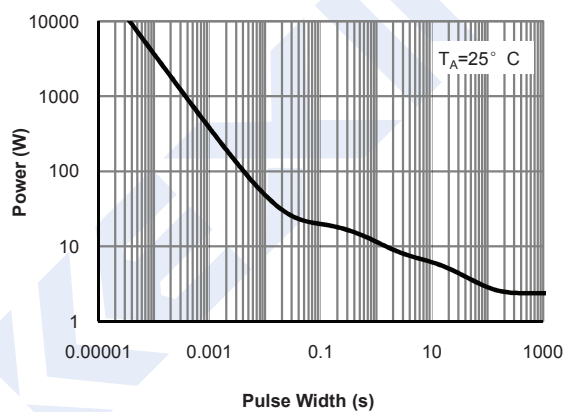


Figure 14: Single Pulse Power Rating Junction-to-Ambient (Note H)

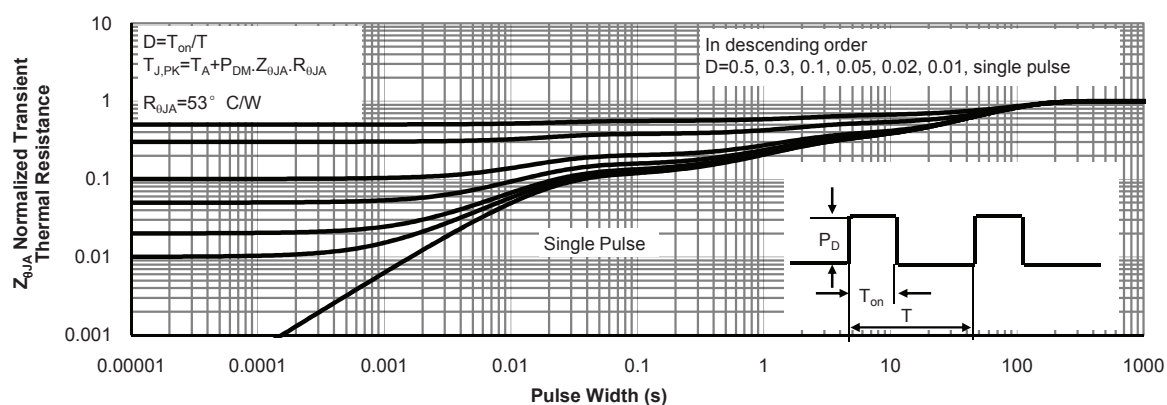
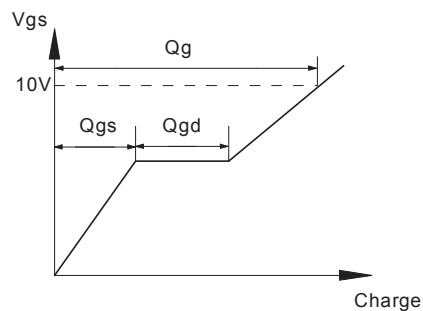
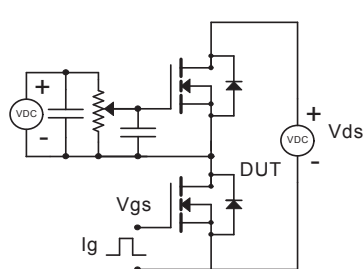


Figure 15: Normalized Maximum Transient Thermal Impedance (Note H)

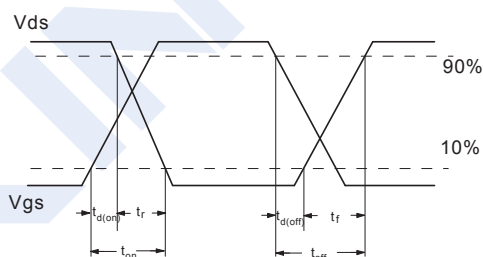
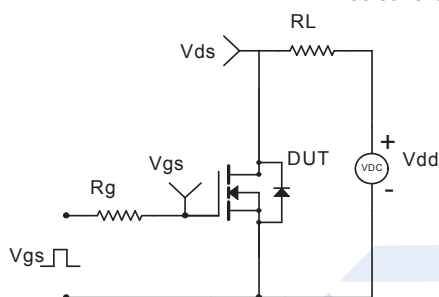
## N-Channel MOSFET

## AON6516 (KON6516)

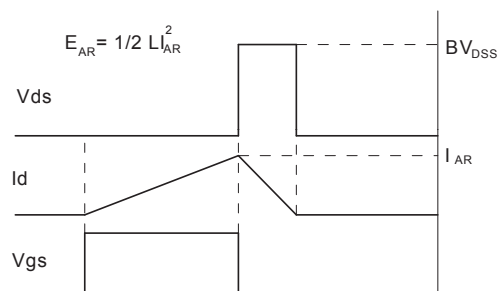
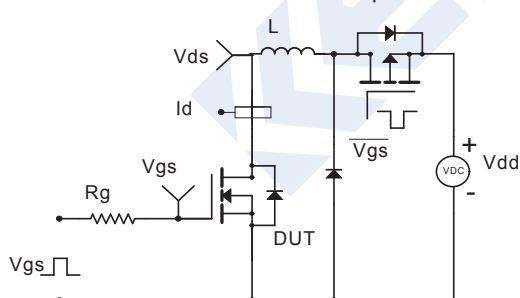
Gate Charge Test Circuit &amp; Waveform



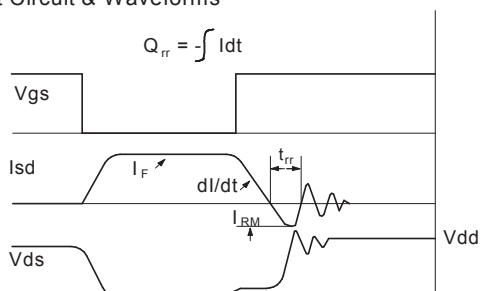
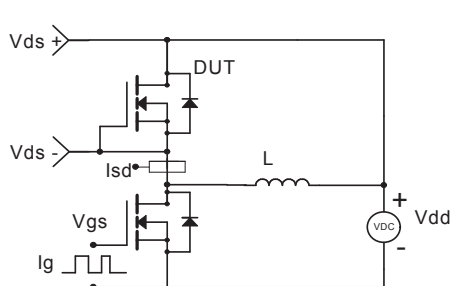
Resistive Switching Test Circuit &amp; Waveforms



Unclamped Inductive Switching (UIS) Test Circuit &amp; Waveforms



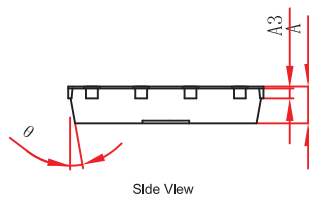
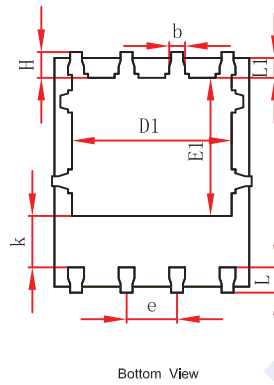
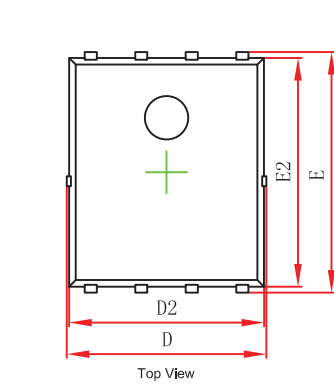
Diode Recovery Test Circuit &amp; Waveforms



## N-Channel MOSFET

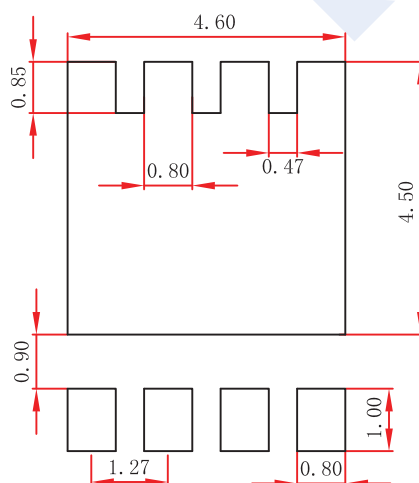
## AON6516 (KON6516)

## ■ DFN5x6-8(PDFNWB5x6-8L) Package Outline Dimensions



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min.                      | Max.  | Min.                 | Max.  |
| A      | 0.900                     | 1.000 | 0.035                | 0.039 |
| A3     | 0.254REF.                 |       | 0.010REF.            |       |
| D      | 4.944                     | 5.096 | 0.195                | 0.201 |
| E      | 5.974                     | 6.126 | 0.235                | 0.241 |
| D1     | 3.910                     | 4.110 | 0.154                | 0.162 |
| E1     | 3.375                     | 3.575 | 0.133                | 0.141 |
| D2     | 4.824                     | 4.976 | 0.190                | 0.196 |
| E2     | 5.674                     | 5.826 | 0.223                | 0.229 |
| k      | 1.190                     | 1.390 | 0.047                | 0.055 |
| b      | 0.350                     | 0.450 | 0.014                | 0.018 |
| e      | 1.270TYP.                 |       | 0.050TYP.            |       |
| L      | 0.559                     | 0.711 | 0.022                | 0.028 |
| L1     | 0.424                     | 0.576 | 0.017                | 0.023 |
| H      | 0.574                     | 0.726 | 0.023                | 0.029 |
| θ      | 10°                       | 12°   | 10°                  | 12°   |

## ■ DFN5x6-8(PDFNWB5x6-8L) Suggested Pad Layout



Note:

1. Controlling dimension: in millimeters.
2. General tolerance:  $\pm 0.05\text{mm}$ .
3. The pad layout is for reference purposes only.