

30V 1.5mohm N-channel SGT MOSFET AKG3N015GL

Description:

This N channel SGT MOSFET has been designed to very low on-state resistance and maintain superior switching performance, especial for high efficiency power management applications.

Features:

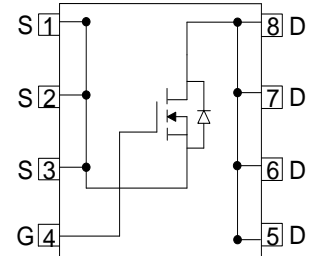
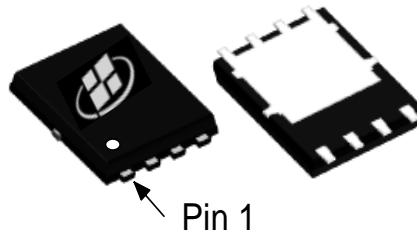
- Low FOM $R_{DS(ON)} \times Q_G$
- Ultra-low on-resistance
- RoHS compliant ^(Note 1)
- Halogen-free ^(Note 1)

Applications:

- Battery Management System
- Motor Drivers
- DC-DC Converter

Key Performance Parameters:

| Parameter | Value | Unit |
|------------------------------------|-------|------|
| V_{DS} | 30 | V |
| $R_{DS(ON), max}$ @ $V_{GS} = 10V$ | 1.5 | mΩ |
| I_D | 165 | A |



Ordering Information:

| Ordering Code | Package Type | Marking Code | Form | Packing |
|---------------|--------------|--------------|-----------|---------|
| AKG3N015GL | DFN5X6 | G3N015GL | Tape Reel | 5000PCS |

Notes:

1. Contact ALKAIDSEMI sales for detail information

Maximum Ratings (T_A = 25°C unless otherwise noted)

| Symbol | Parameter | Value | Units |
|-----------------------------------|--|-------------|-------|
| V _{DS} | Drain-Source Voltage | 30 | V |
| I _D | Drain Current - Continuous (T _C = 25°C) ^(Note 1) | 165 | A |
| | Drain Current - Continuous (T _C = 100°C) | 104 | A |
| I _{DM} | Drain Current - Pulsed ^(Note 2) | 530 | A |
| V _{GS} | Gate-Source Voltage | ± 20 | V |
| E _{AS} | Single Pulsed Avalanche Energy ^(Note 3) | 132 | mJ |
| P _D | Power Dissipation (T _C = 25°C) | 69 | W |
| T _J , T _{STG} | Operating and Storage Temperature Range | -55 to +150 | °C |

Thermal Characteristics

| Symbol | Parameter | Value | Units |
|------------------|---|-------|-------|
| R _{θJC} | Thermal Resistance, Junction-to-Case, Steady-State | 1.8 | °C/W |
| R _{θJA} | Thermal Resistance, Junction-to-Ambient, Steady State ^(Note 4) | 61 | °C/W |

Notes:

1. The max drain current rating is package limited
2. Repetitive Rating: Pulse width limited by maximum junction temperature
3. L = 0.5 mH, V_{DD} = 15 V, I_{AS} = 23 A, R_G = 25 Ω, Starting T_J = 25 °C
4. Mount on minimum PCB layout

| Electrical Characteristics ($T_J = 25^\circ\text{C}$ unless otherwise noted) | | | | | | |
|--|---|--|-----|------|-----------|------------------|
| Symbol | Parameter | Test Conditions | Min | Typ | Max | Units |
| Static Characteristics | | | | | | |
| BV_{DSS} | Drain-Source Breakdown Voltage | $V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$ | 30 | | | V |
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V},$ | | | 1 | μA |
| I_{GSS} | Gate Leakage Current | $V_{GS} = \pm 20\text{ V}, V_{DS} = 0\text{ V}$ | | | ± 100 | nA |
| $V_{GS(TH)}$ | Gate Threshold voltage | $V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$ | 1 | 1.7 | 2.5 | V |
| $R_{DS(ON)}$ | Drain-Source on-state resistance | $V_{GS} = 10\text{ V}, I_D = 20\text{ A}$ | | 1.3 | 1.5 | $\text{m}\Omega$ |
| | | $V_{GS} = 4.5\text{ V}, I_D = 15\text{ A}$ | | 2.2 | 2.8 | $\text{m}\Omega$ |
| Dynamic Characteristics | | | | | | |
| C_{ISS} | Input Capacitance | $V_{DS} = 15\text{ V}, V_{GS} = 0\text{ V},$ $F = 1\text{ MHz}$ | | 2874 | | pF |
| C_{OSS} | Output Capacitance | | | 1151 | | pF |
| C_{RSS} | Reverse Transfer Capacitance | | | 76 | | pF |
| R_G | Gate Resistance | $F = 1\text{ MHz}$ | | 1.6 | | Ω |
| Switching Characteristics | | | | | | |
| $T_{D(ON)}$ | Turn On Delay Time | $V_{DD} = 15\text{ V}, R_L = 0.75\ \Omega,$ $V_{GS} = 10\text{ V}, R_G = 3\ \Omega$ | | 12 | | nS |
| T_R | Rise Time | | | 48.5 | | nS |
| $T_{D(OFF)}$ | Turn Off Delay Time | | | 39.5 | | nS |
| T_F | Fall Time | | | 14.5 | | nS |
| Q_G | Total Gate Charge | $V_{DD} = 15\text{ V}, I_D = 20\text{ A},$ $V_{GS} = 10\text{ V}$ | | 46.5 | | nC |
| Q_{GS} | Gate-Source Charge | | | 7.7 | | nC |
| Q_{GD} | Gate-Drain Charge | | | 11 | | nC |
| Drain-Source Diode Characteristics and Maximum Ratings | | | | | | |
| I_S | Maximum Continuous Body-Diode Forward Current | | | 165 | | A |
| I_{SM} | Maximum Pulsed Body-Diode Forward Current ^(NOTE 1) | | | 530 | | A |
| V_{SD} | Diode Forward Voltage | $V_{GS} = 0\text{ V}, I_S = 1\text{ A}$ | | 0.65 | 1 | V |
| T_{RR} | Reverse recovery time | $V_{DD} = 20\text{ V}, I_D = 20\text{ A},$ $di/dt = 100\text{ A}/\mu\text{S}$ | | 46.1 | | nS |
| Q_{RR} | Reverse recovery charge | | | 43.7 | | nC |
| I_{RRM} | Peak Reverse Recovery Current | | | 1.6 | | A |

Electrical Characteristics Diagrams

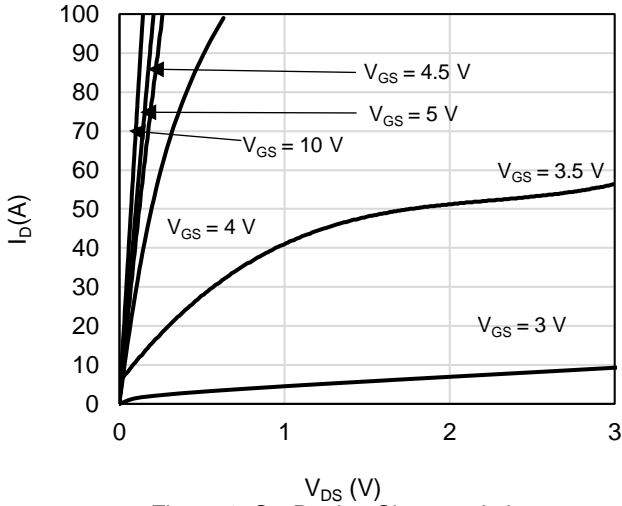


Figure 1: On-Region Characteristics

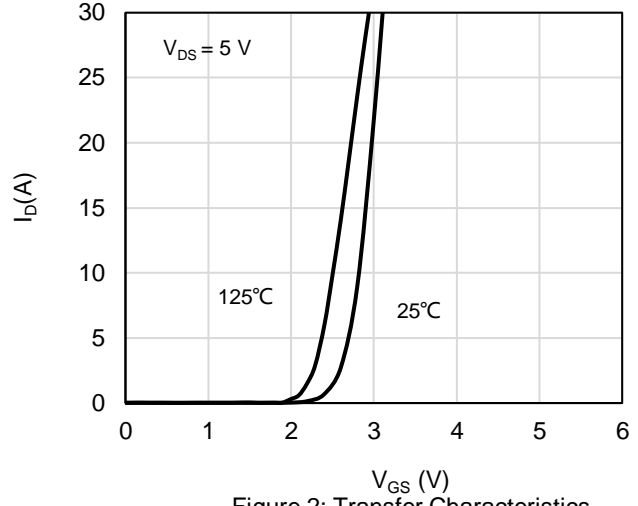


Figure 2: Transfer Characteristics

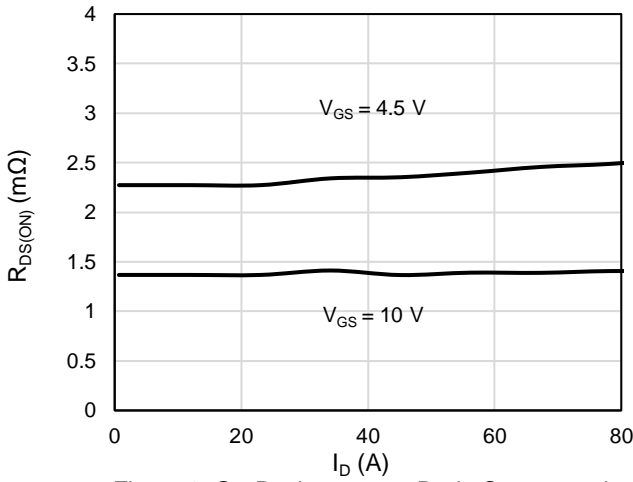


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

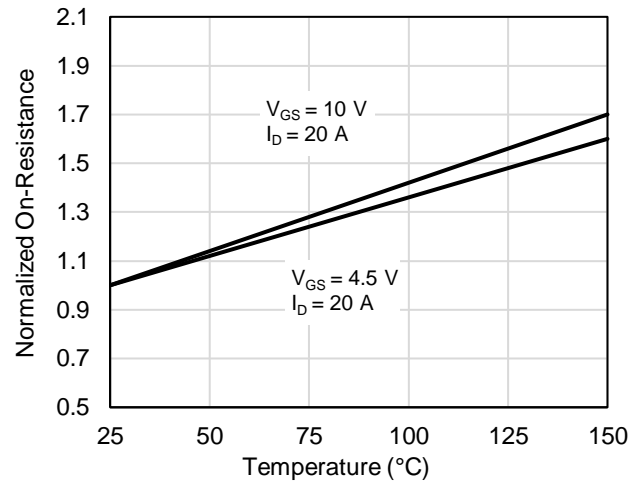


Figure 4: On-Resistance vs. Junction Temperature

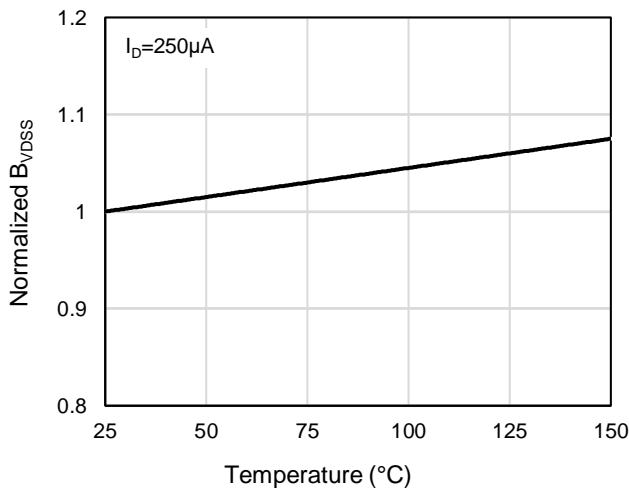


Figure 5: Breakdown Voltage vs. Junction Temperature

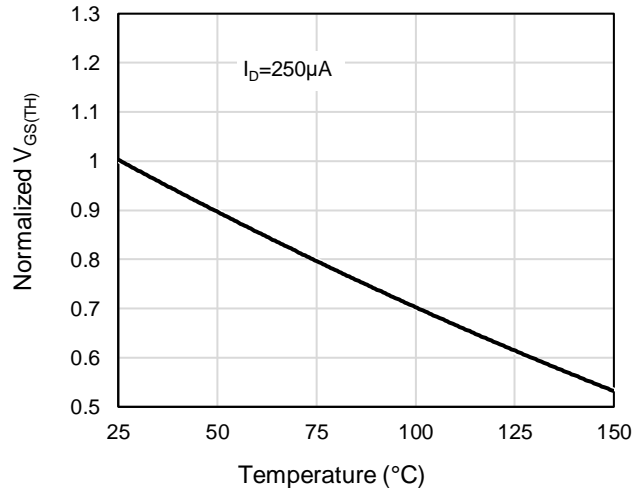


Figure 6: Threshold Voltage vs. Junction Temperature

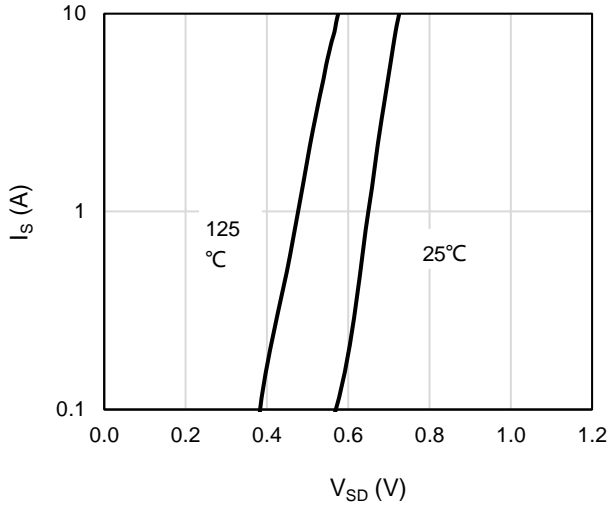


Figure 7: Body-Diode Characteristics

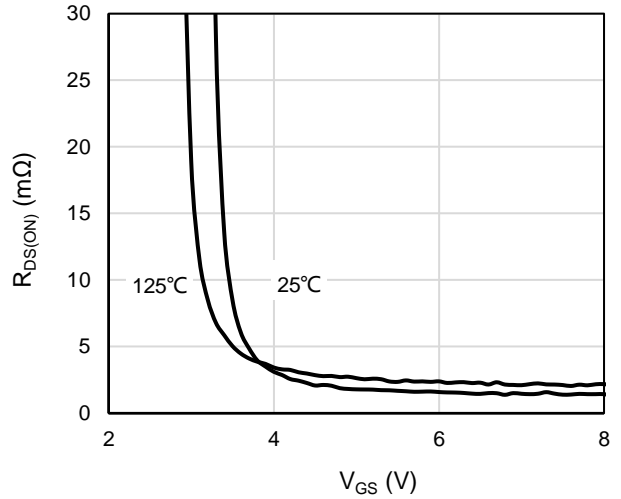


Figure 8: On-Resistance vs. Gate-Source Voltage

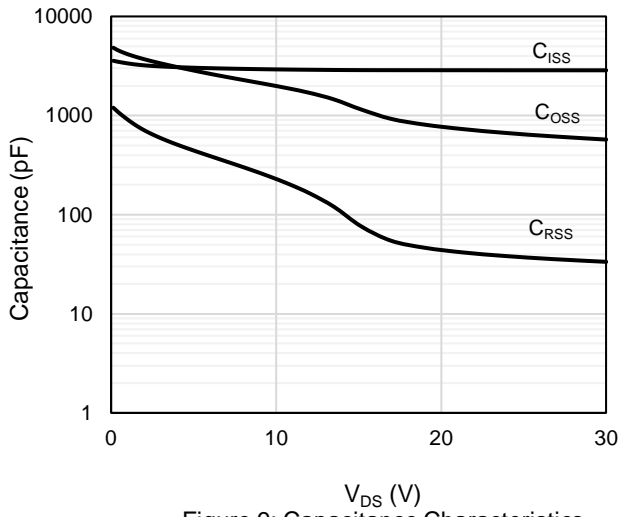


Figure 9: Capacitance Characteristics

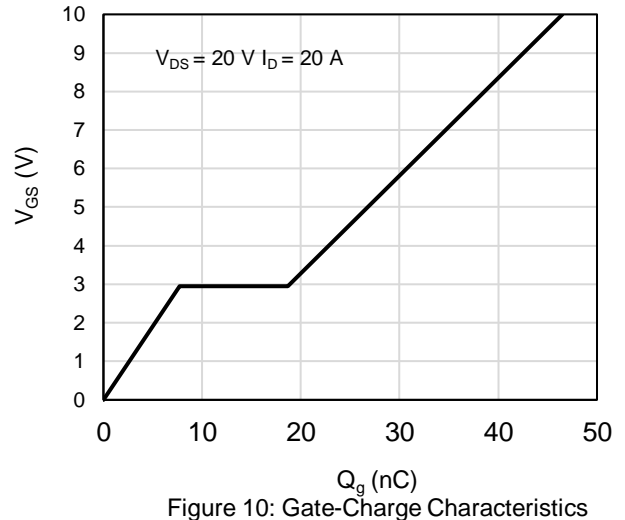


Figure 10: Gate-Charge Characteristics

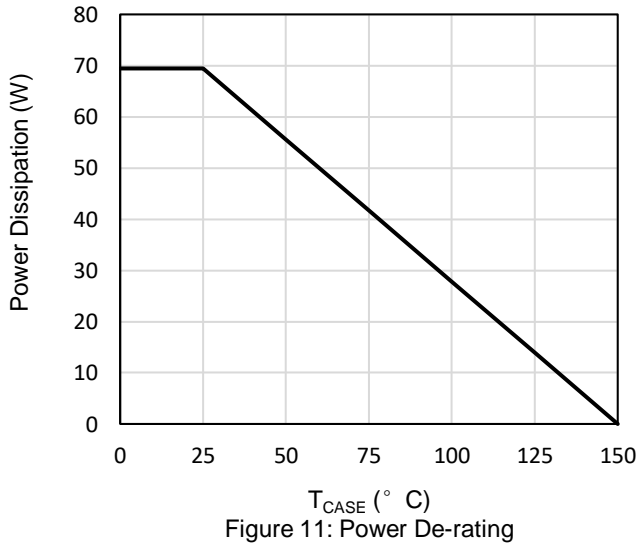


Figure 11: Power De-rating

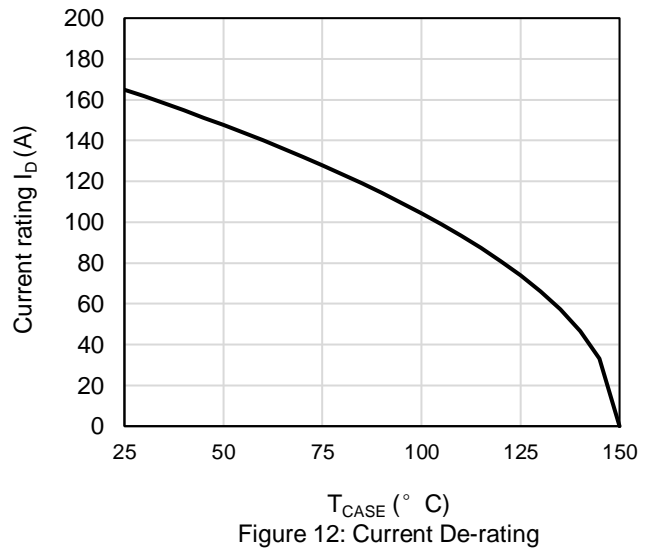
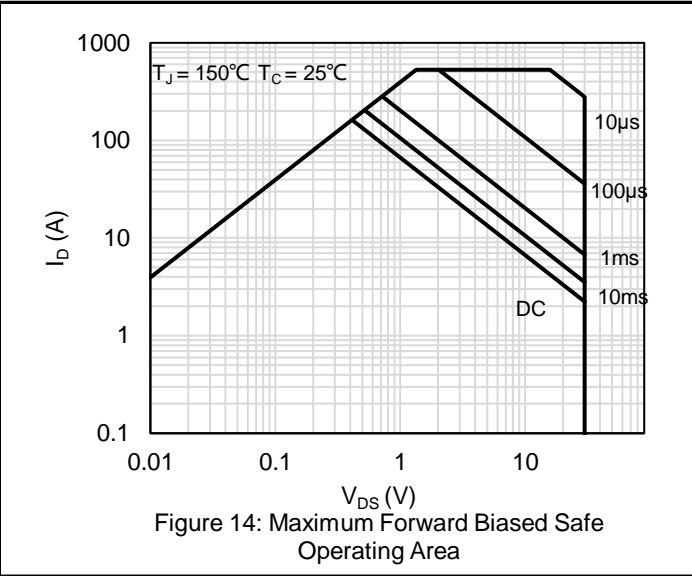
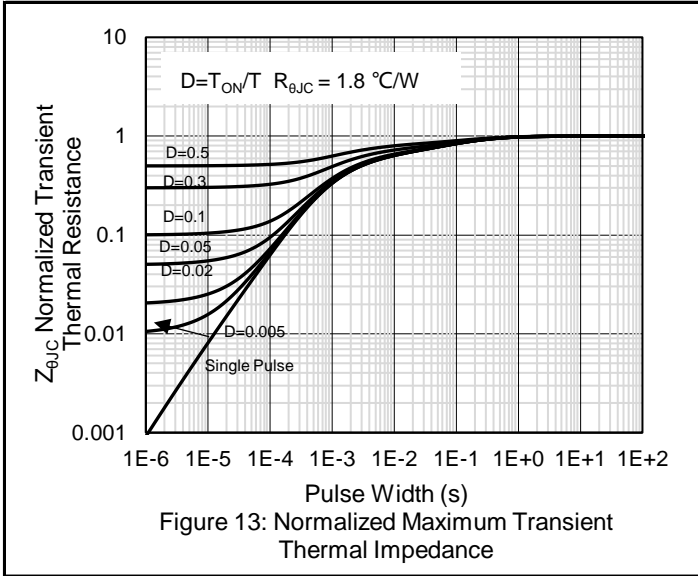
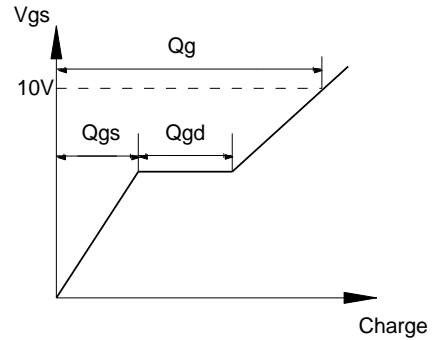
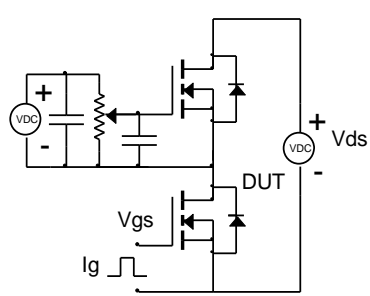


Figure 12: Current De-rating

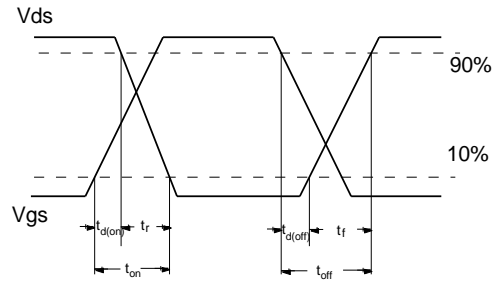
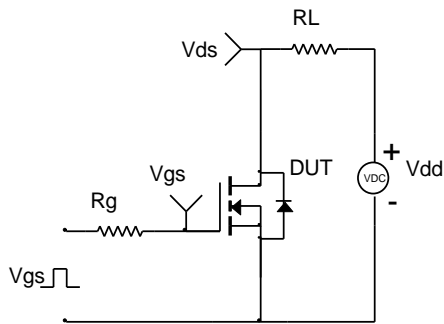


Test Circuit and Waveform

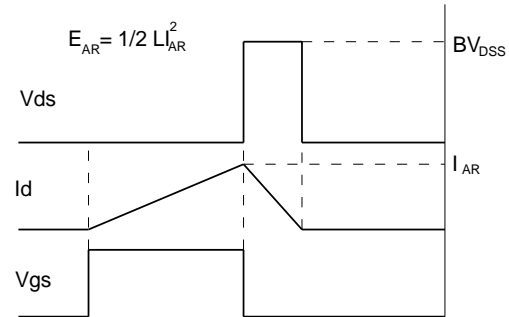
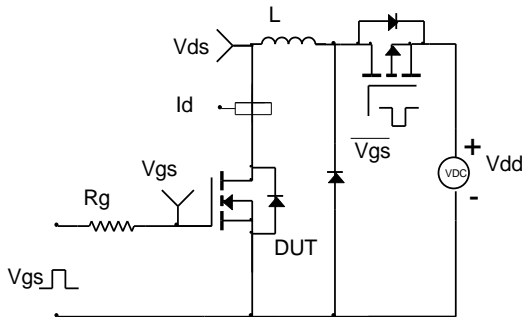
Gate Charge Test Circuit & Waveform



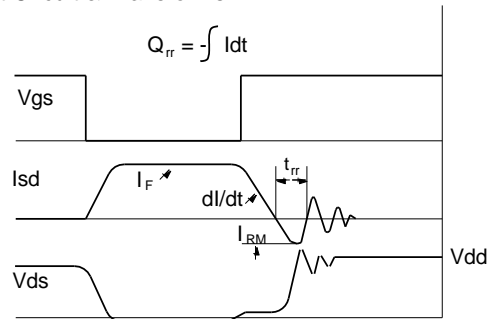
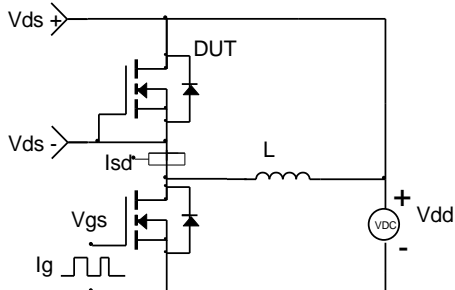
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



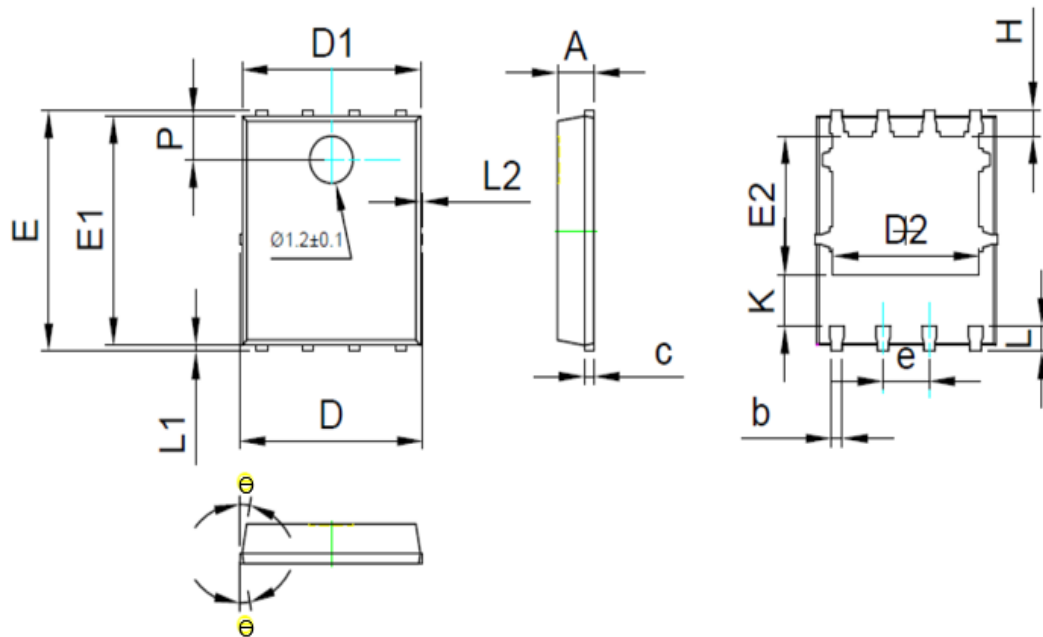
Diode Recovery Test Circuit & Waveforms



Package Outlines

Package Dimensions : PDFN 5*6 PACKAG

E



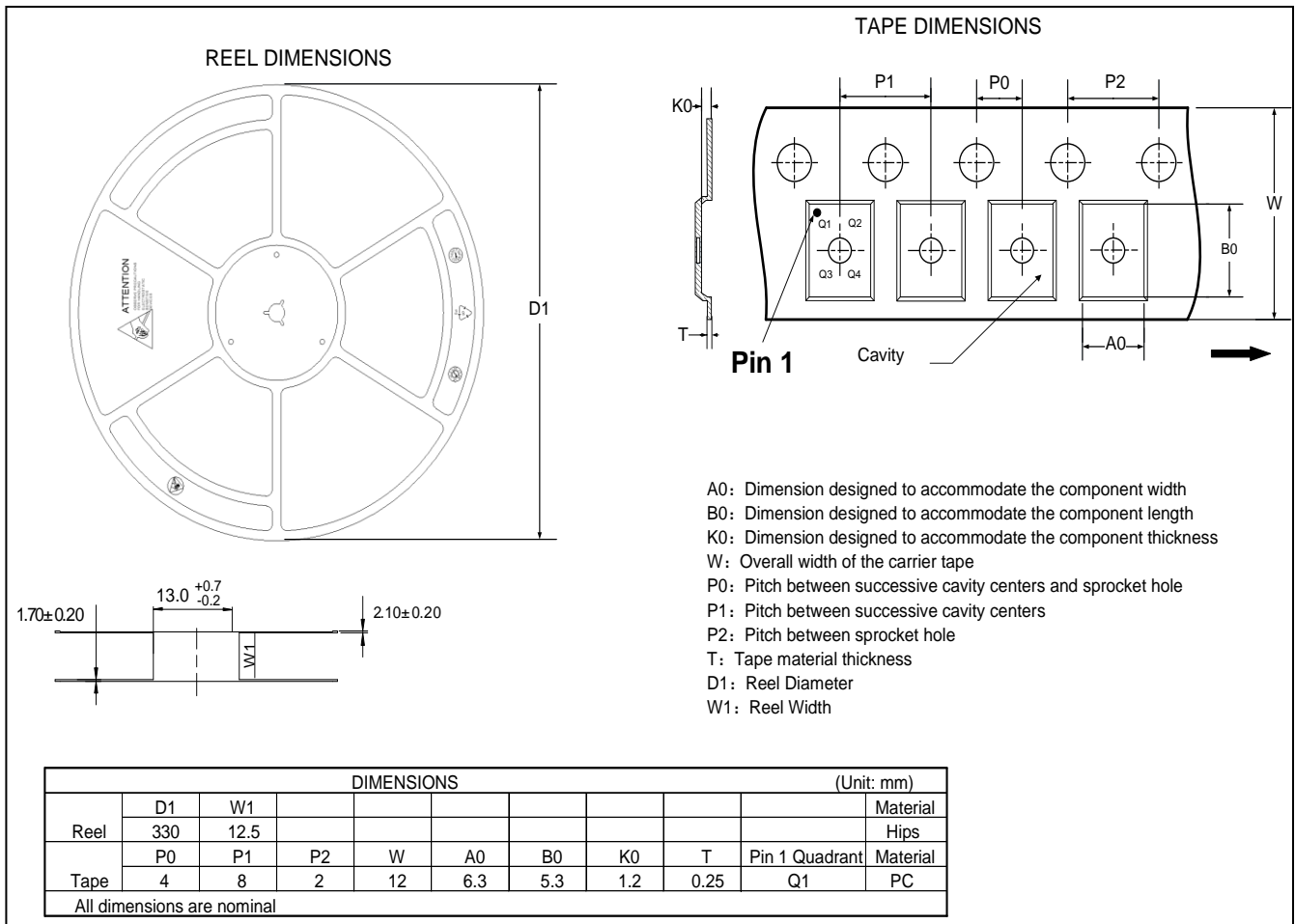
COMMON DIMENSIONS
(UNITS OF MEASURE = MILLIMETER)

| SYMBOL | MIN | NOM | MAX |
|----------|----------|-------|-------|
| A | 0.90 | 1.00 | 1.10 |
| b | 0.35 | 0.40 | 0.45 |
| c | 0.21 | 0.25 | 0.34 |
| D | - | - | 5.1 |
| D1 | 4.85 | 4.90 | 4.95 |
| D2 | 3.96 | 4.01 | 4.06 |
| e | 1.27 BSC | | |
| E | 5.95 | 6.00 | 6.05 |
| E1 | 5.70 | 5.75 | 5.80 |
| E2 | 3.425 | 3.475 | 3.525 |
| H | 0.60 | 0.65 | 0.70 |
| K | 1.29 | - | - |
| L | 0.60 | 0.65 | 0.70 |
| L1 | 0.05 | 0.15 | 0.25 |
| L2 | - | - | 0.12 |
| θ | 8° | 10° | 12° |
| P | 1.05 | 1.10 | 1.15 |

Marking Information



Note:
 G3N015GL = Product Name Code
 XXXXXXXX = Date code
 Contact ALKAIDSEMI sales for detail information



Revision History

| Revision | Release Date | Remark |
|----------|--------------|-----------------|
| Rev.1.0 | 2022/7/13 | Initial Release |

Disclaimer

The information given in this document describes the independent performance of the product, but similar performance is not guaranteed under other working conditions, and cannot be guaranteed when installed with other products or equipment. To achieve the required performance of the product in actual scenarios, the customer should conduct a complete application test to assess the functionality of the product.

Alkaidsemi assumes no responsibility for equipment failures result from using products at values that exceed the ratings, operating conditions, or other parameters listed in the product specifications.

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