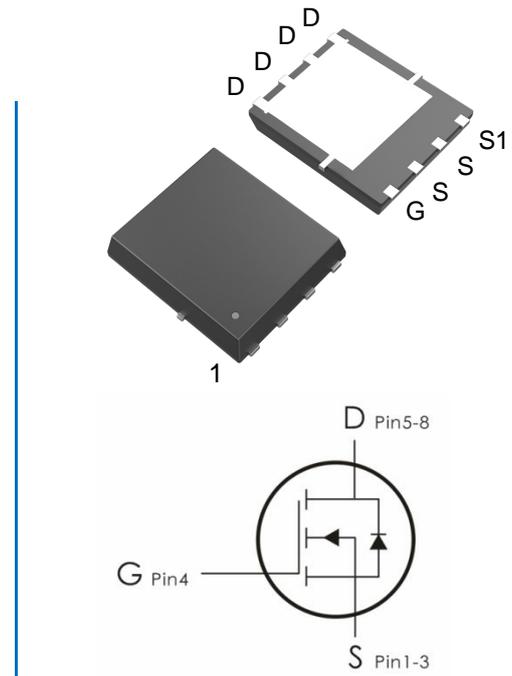


## Description:

This N-Channel MOSFET uses advanced SGT 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)  $V_{DS}=100V, I_D=120A, R_{DS(on)} < 4.5m\ \Omega @ V_{GS}=10V$  (Typ:  $3.6m\ \Omega$ )
- 2) Low gate charge.
- 3) Green device available.
- 4) Advanced high cell density SGT technology for ultra low  $R_{DS(on)}$ .
- 5) Excellent package for good heat dissipation.
- 6) MSL3



## Package Marking and Ordering Information:

| Part NO. | Marking | Package  | Packing       |
|----------|---------|----------|---------------|
| NH4R5T2G | H4R5T2  | DFN5*6-8 | 5000 pcs/Reel |

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

| Symbol         | Parameter  | Ratings  | Units      |
|----------------|--|----------|------------|
| $V_{DS}$       | Drain-Source Voltage                                     | 100      | V          |
| $V_{GS}$       | Gate-Source Voltage                                      | $\pm 20$ | V          |
| $I_D$          | Continuous Drain Current <sup>1</sup>                    | 120      | A          |
|                | Continuous Drain Current- $T_C=100^\circ C$ <sup>1</sup> | 84       |            |
| $I_{DM}$       | Pulsed Drain Current <sup>2</sup>                        | 480      |            |
| $P_D$          | Power Dissipation  | 156      | W          |
| $E_{AS}$       | Single pulse avalanche energy <sup>3</sup>               | 324      | 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 | 0.8 | $^\circ C/W$ |

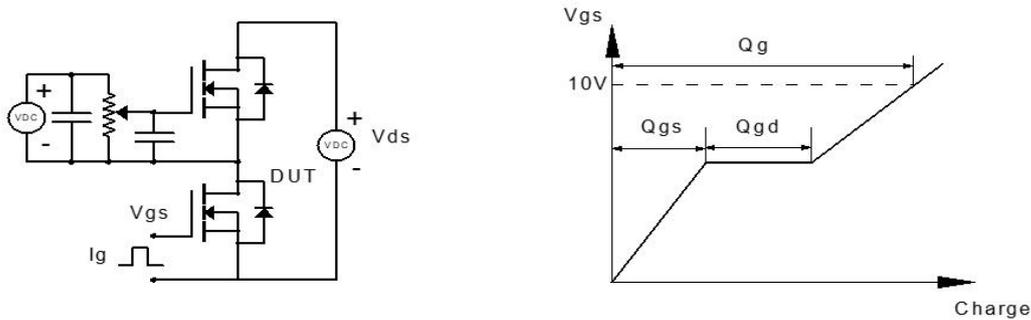
**Electrical Characteristics:** ( $T_C=25^\circ\text{C}$  unless otherwise noted)

| Symbol   | Parameter                               | Conditions  | Min | Typ  | Max       | Units         |
|--|---|---|-----|------|-----------|---------------|
| <b>Off Characteristics</b>                       |   |   |     |      |           |               |
| $BV_{DSS}$                                       | Drain-Source Breakdown Voltage          | $V_{GS}=0V, I_D=250\ \mu\text{A}$                     | 100 | ---  | ---       | V             |
| $I_{DSS}$  | Zero Gate Voltage Drain Current         | $V_{GS}=0V, V_{DS}=100V$                              | --- | ---  | 1         | $\mu\text{A}$ |
| $I_{GSS}$  | Gate-Source Leakage Current             | $V_{GS}=\pm 20V, V_{DS}=0A$                           | --- | ---  | $\pm 100$ | nA            |
| <b>On Characteristics</b> <small>(Note3)</small> |   |   |     |      |           |               |
| $V_{GS(th)}$                                     | Gate-Source Threshold Voltage           | $V_{GS}=V_{DS}, I_D=250\ \mu\text{A}$                 | 1.4 | 1.9  | 2.6       | V             |
| $R_{DS(on)}$                                     | Drain-Source On Resistance <sup>4</sup> | $V_{GS}=10V, I_D=20A$                                 | --- | 3.6  | 4.5       | m $\Omega$    |
|  |   | $V_{GS}=4.5V, I_D=10A$                                | --- | 4.6  | 5.5       |               |
| <b>Dynamic Characteristics</b>                   |   |   |     |      |           |               |
| $C_{iss}$  | Input Capacitance                       | $V_{DS}=25V, V_{GS}=0V, f=1\text{MHz}$                | --- | 4562 | ---       | pF            |
| $C_{oss}$  | Output Capacitance                      |   | --- | 1850 | --        |               |
| $C_{rss}$  | Reverse Transfer Capacitance            |   | --- | 30   | ---       |               |
| <b>Switching Characteristics</b>                 |   |   |     |      |           |               |
| $t_{d(on)}$                                      | Turn-On Delay Time                      | $V_{DS}=50V, I_D=20A,$<br>$R_G=3\ \Omega, V_{GS}=10V$ | --- | 19   | ---       | ns            |
| $t_r$  | Rise Time                               |   | --- | 24   | ---       | ns            |
| $t_{d(off)}$                                     | Turn-Off Delay Time                     |   | --- | 38   | ---       | ns            |
| $t_f$  | Fall Time                               |   | --- | 26   | ---       | ns            |
| $Q_g$  | Total Gate Charge                       | $V_{GS}=10V, V_{DS}=50V,$<br>$I_D=20A$                | --- | 60   | ---       | nC            |
| $Q_{gs}$   | Gate-Source Charge                      |   | --- | 25   | ---       | nC            |
| $Q_{gd}$   | Gate-Drain "Miller" Charge              |   | --- | 15   | ---       | nC            |
| <b>Drain-Source Diode Characteristics</b>        |   |   |     |      |           |               |
| $V_{SD}$   | Diode Forward Voltage                   | $V_{GS}=0V, I_{SD}=30A$                               | --- | ---  | 1.2       | V             |
| $I_S$  | Continuous Drain Current                | $V_D=V_G=0V$  | --- | ---  | 120       | A             |
| $I_{SM}$   | Pulsed Drain Current                    |   | --- | ---  | 480       | A             |
| $T_{rr}$   | Reverse Recovery Time                   | $I_F=20A, T_J=25^\circ\text{C}$                       | --- | 65   | ---       | ns            |
| $Q_{rr}$   | Reverse Recovery Charge                 | $dI/dt=100A/\mu\text{s}$                              | --- | 125  | ---       | nC            |

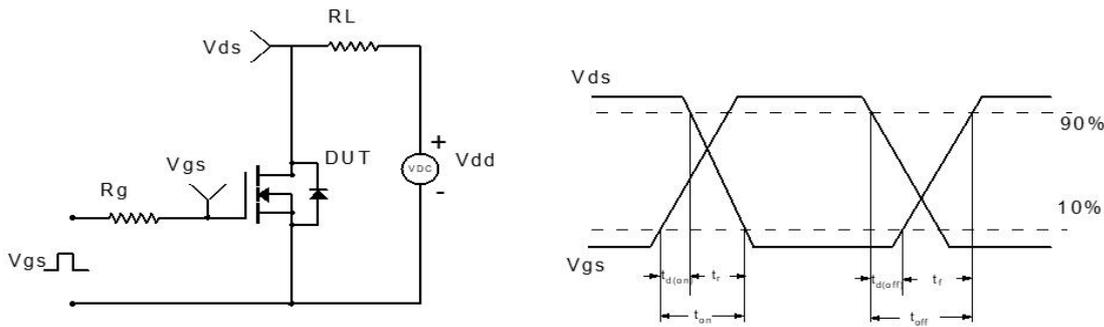
## Notes:

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 :  $T_J=25^{\circ}C, V_{DD}=50V, V_G=10V, L=0.5mH$
4. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 0.5\%$

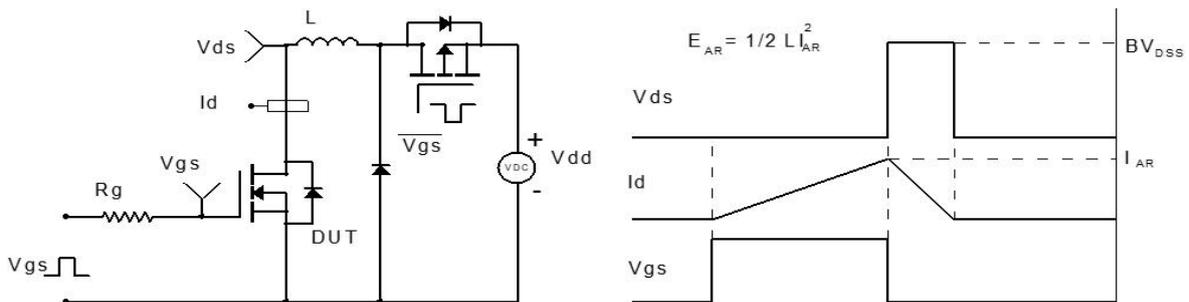
## Test Circuit



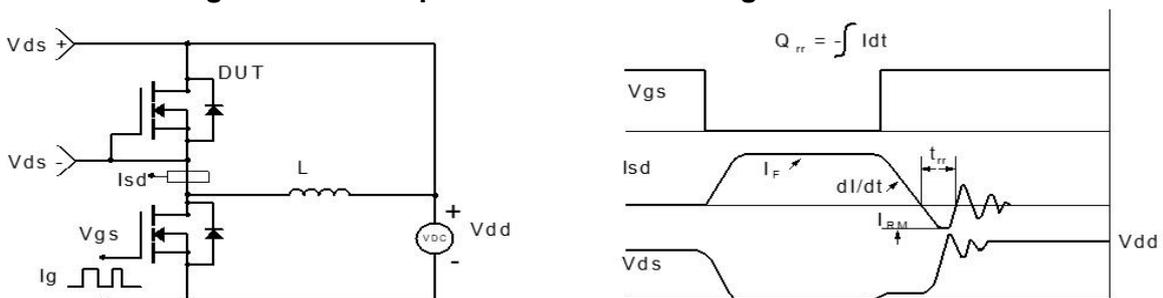
**Figure 1: Gate Charge Test Circuit & Waveform**



**Figure 2: Resistive Switching Test Circuit & Waveform**

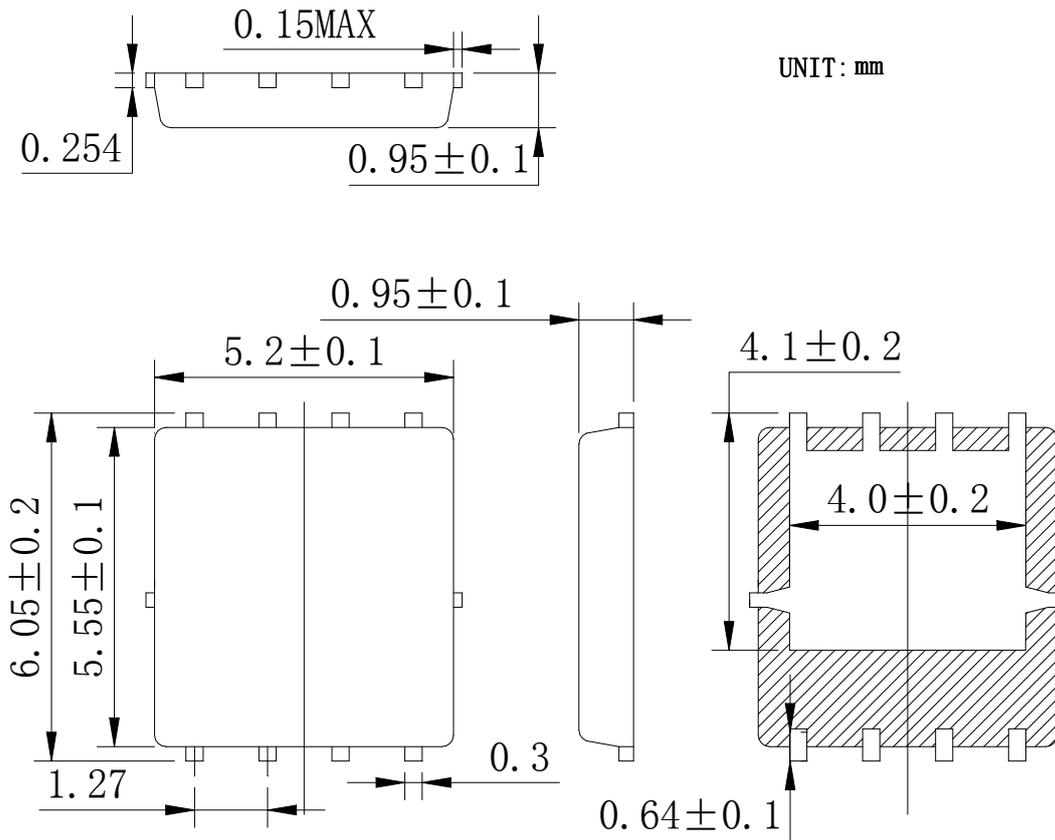


**Figure 3: Unclamped Inductive Switching Test Circuit & Waveform**



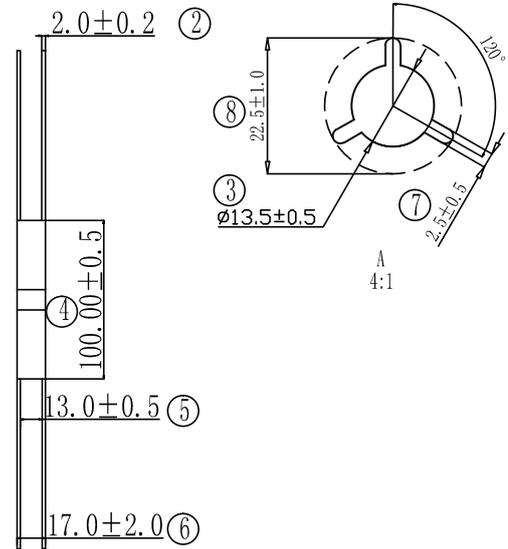
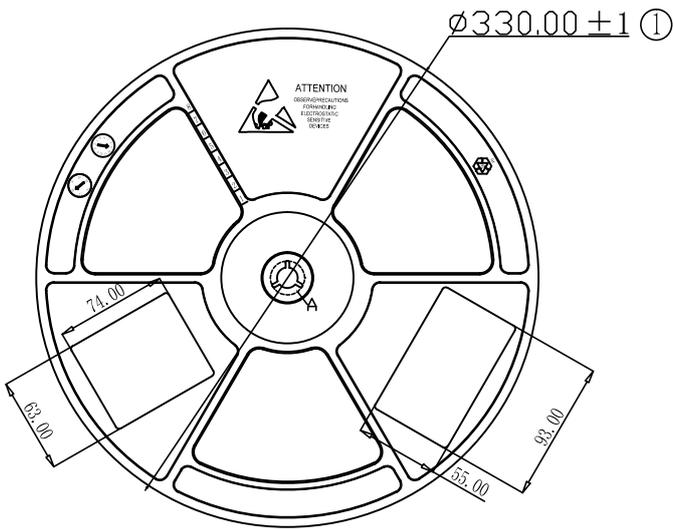
**Figure 4: Diode Recovery Test Circuit & Waveform**

## DFN5x6-8 Package Information:

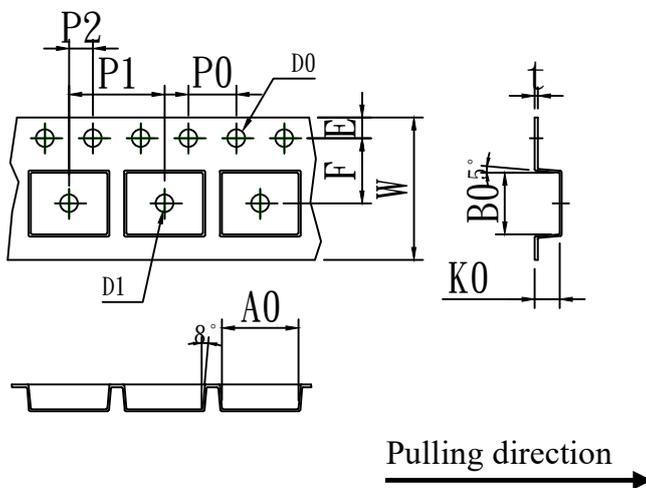


## Tape & Reel Information

Dimensions in mm



|        |                  |                 |                 |                 |                 |                 |                 |                  |
|--------|------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|
| Symbol | A0               | B0              | K0              | D0              | D1              | P0              | P1              | 10*P0            |
| Spec   | $6.15 \pm 0.10$  | $5.40 \pm 0.10$ | $1.30 \pm 0.10$ | $1.55 \pm 0.10$ | $1.55 \pm 0.10$ | $4.00 \pm 0.10$ | $8.00 \pm 0.10$ | $40.00 \pm 0.10$ |
| Symbol | W                | E               | F               | P2              | t               |                 |                 |                  |
| Spec   | $12.00 \pm 0.10$ | $1.75 \pm 0.10$ | $5.50 \pm 0.10$ | $2.00 \pm 0.10$ | $0.20 \pm 0.05$ |                 |                 |                  |



## Marking Information:

- ①. Doingter LOGO
- ②. Part NO.
- ③. 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) |
|---------|------------|--|
| 1.0     | 2025-02-07 | Release of final version                     |

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