

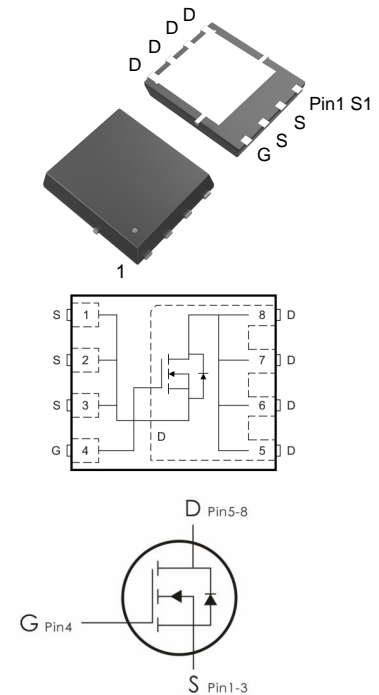
## Description:

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)  $V_{DS}=30V, I_D=40A, R_{DS(ON)} < 10\text{ m}\Omega @ V_{GS}=10V$  (Typ:  $8\text{ m}\Omega$ )
- 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
NC010TDG	C010TD	DFN5*6-8	5000 pcs/Reel

## Absolute Maximum Ratings: ( $T_c=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Ratings	Units
$V_{DS}$	Drain-Source Voltage	30	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Continuous Drain Current <sup>1</sup>	40	A
	Continuous Drain Current- $T_c=100^\circ\text{C}$ <sup>1</sup>	28	
$I_{DM}$	Pulsed Drain Current <sup>2</sup>	160	
$P_D$	Power Dissipation	28	W
$E_{AS}$	Single pulse avalanche energy <sup>3</sup>	8.5	mJ
$T_J, T_{STG}$	Operating and Storage Junction Temperature Range	-55-+150	$^\circ\text{C}$

## Thermal Characteristics:

Symbol	Parameter	Max	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case	4.4	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	65	$^\circ\text{C}/\text{W}$

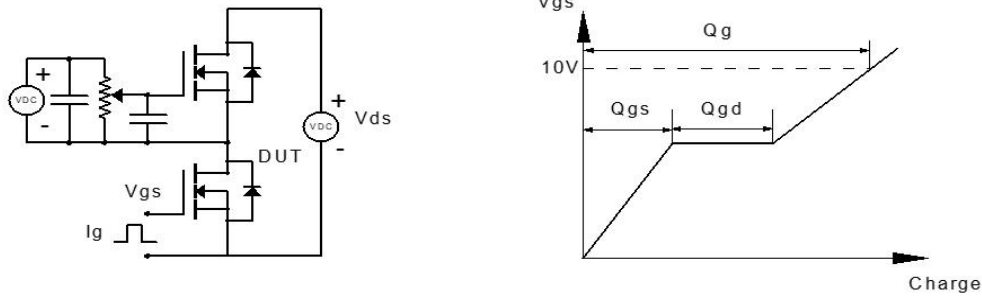
**Electrical Characteristics:** ( $T_c=25^\circ\text{C}$  unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>Off Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\ \mu A$	30	---	---	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{GS}=0V, V_{DS}=30V$	---	---	1	$\mu A$
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0A$	---	---	$\pm 100$	nA
<b>On Characteristics</b>						
$V_{GS(th)}$	Gate-Source Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\ \mu A$	1	1.5	2.5	V
$R_{DS(on)}$	Drain-Source On Resistance <sup>4</sup>	$V_{GS}=10V, I_D=10A$	---	8	10	$m\ \Omega$
		$V_{GS}=4.5V, I_D=5A$	---	10	13	
<b>Dynamic Characteristics</b>						
$C_{iss}$	Input Capacitance	$V_{DS}=15V, V_{GS}=0V, f=1MHz$	---	370	---	pF
$C_{oss}$	Output Capacitance		---	210	--	
$C_{rss}$	Reverse Transfer Capacitance		---	6	---	
<b>Switching Characteristics</b>						
$t_{d(on)}$	Turn-On Delay Time	$V_{DS}=15V, I_D=15A,$ $R_G=6\ \Omega, V_{GS}=10V$	---	2.7	---	ns
$t_r$	Rise Time		---	3.5	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	13.1	---	ns
$t_f$	Fall Time		---	5.8	---	ns
$Q_g$	Total Gate Charge	$V_{GS}=10V, V_{DS}=15V,$ $I_D=15A$	---	8	---	nC
$Q_{gs}$	Gate-Source Charge		---	1	---	nC
$Q_{gd}$	Gate-Drain "Miller" Charge		---	2	---	nC
<b>Drain-Source Diode Characteristics</b>						
$V_{SD}$	Diode Forward Voltage	$V_{GS}=0V, I_{SD}=1A$	---	---	1.0	V
$I_S$	Continuous Drain Current	$V_D=V_G=0V$	---	---	40	A
$I_{SM}$	Pulsed Drain Current		---	---	160	A
$T_{rr}$	Reverse Recovery Time	$I_F=15A, T_J=25^\circ\text{C}$	---	16.6	---	ns
$Q_{rr}$	Reverse Recovery Charge	$dI/dt=100A/\mu s$	---	5.5	---	nC

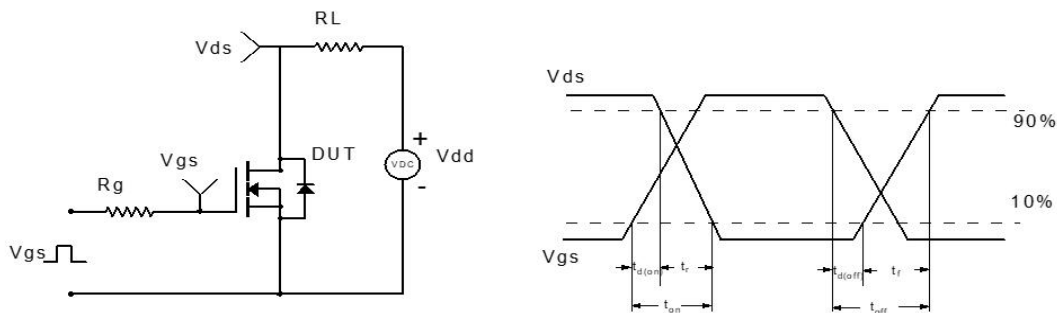
## Notes:

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 :  $T_J=25^{\circ}C, V_{DD}=15V, V_G=10V, L=0.1mH$
4. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 0.5\%$

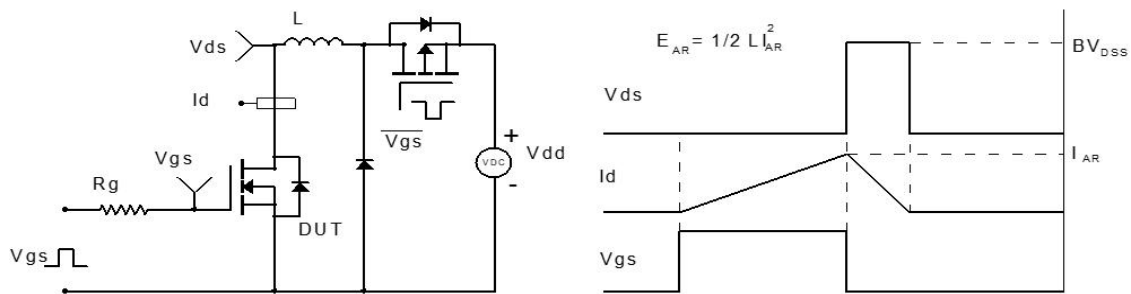
## Test Circuit



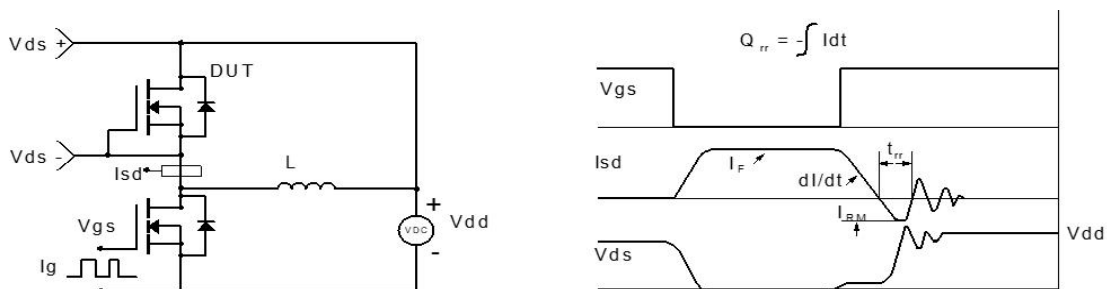
**Figure 1: Gate Charge Test Circuit & Waveform**



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

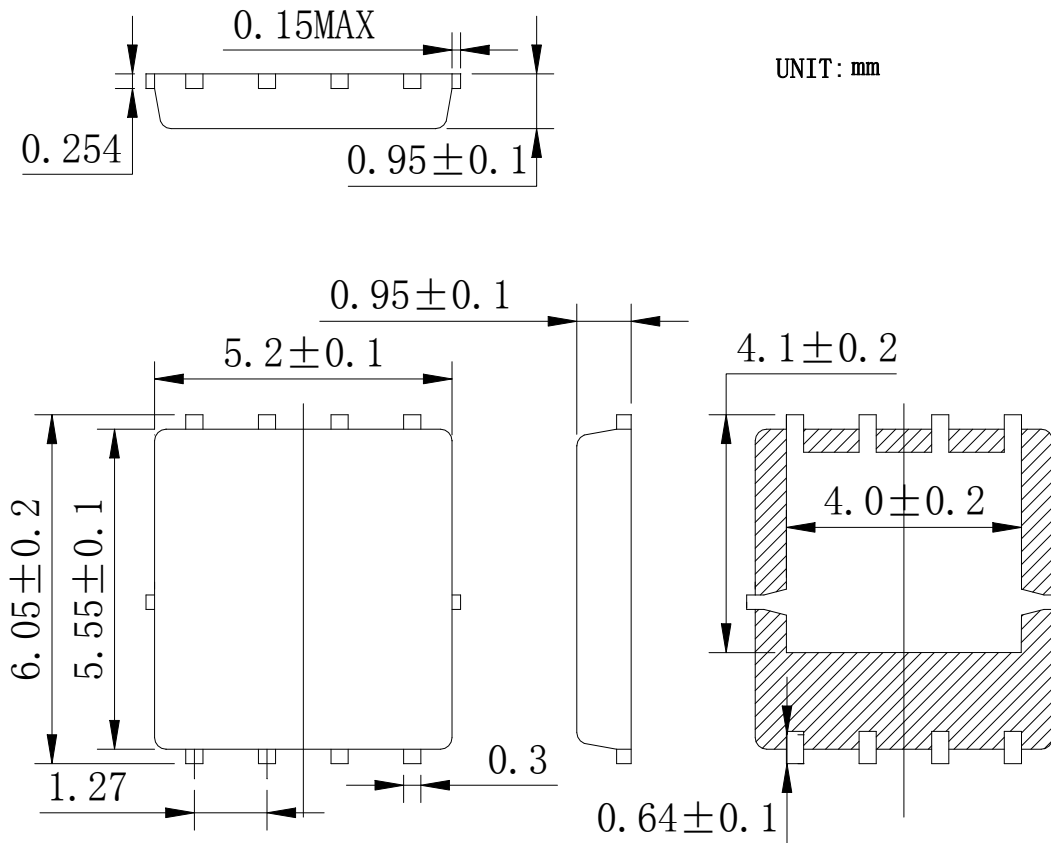


**Figure 3: Unclamped Inductive Switching Test Circuit & Waveform**



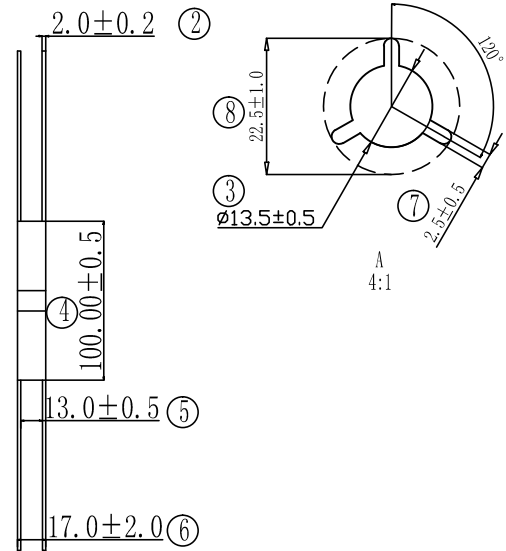
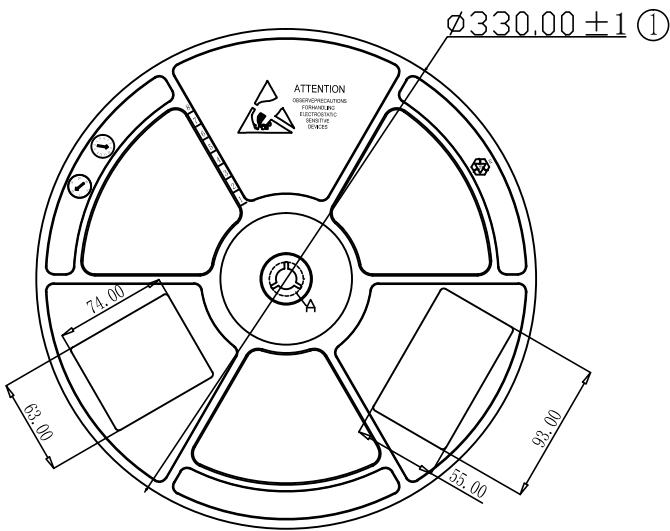
**Figure 4: Diode Recovery Test Circuit & Waveform**

## DFN5x6-8 Package Information:

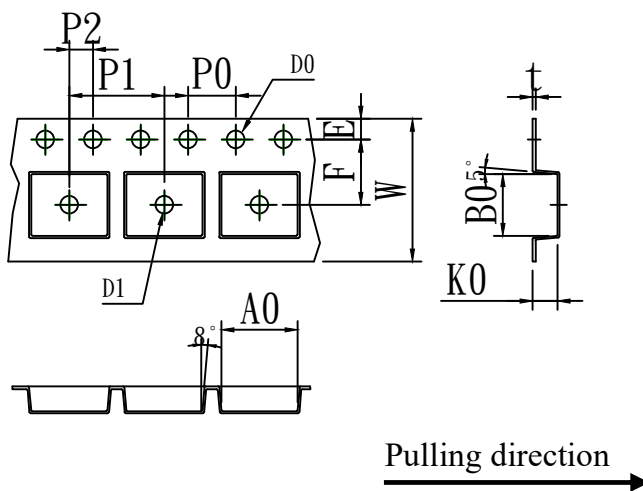


## Tape & Reel Information

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	$12.00 \pm 0.10$	$1.75 \pm 0.10$	$5.50 \pm 0.10$	$2.00 \pm 0.10$	$0.20 \pm 0.05$			



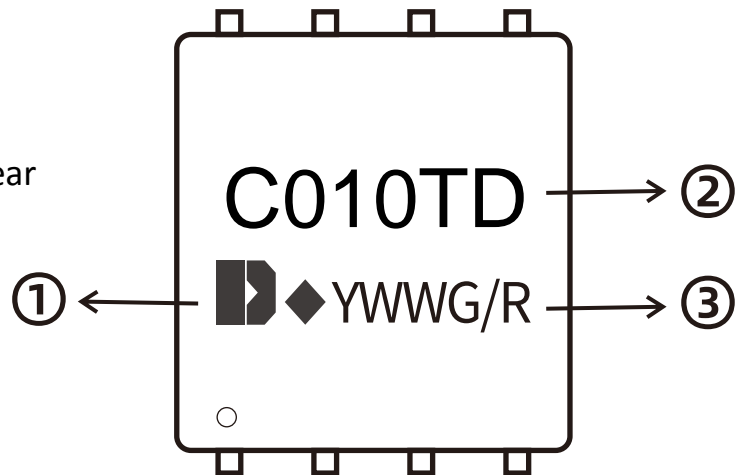
## Marking Information:

- 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	2025-06-12	Release of final version

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