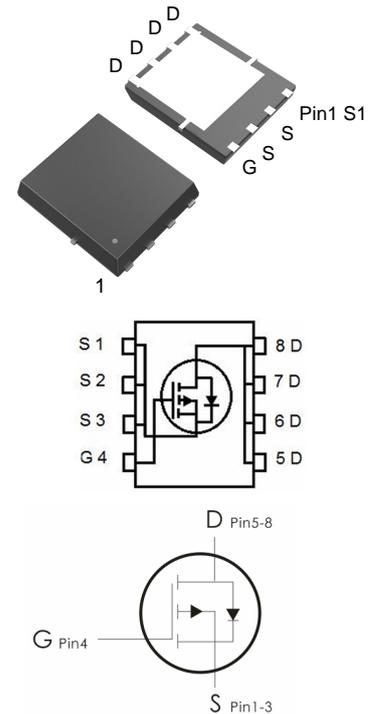


## Description:

This P-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)  $V_{DS}=-100V, I_D=-55A, R_{DS(ON)}<22m\Omega @V_{GS}=-10V$  (Typ:  $16m\Omega$ )
- 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.



## Package Marking and Ordering Information:

Part NO.	Marking	Package	Packing
NH020TPG	H020TP	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>	-55	A
$I_{DM}$	Pulsed Drain Current <sup>2</sup>	-220	
$P_D$	Power Dissipation	140	W
$E_{AS}$	Single pulse avalanche energy <sup>3</sup>	465	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	0.89	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	50	$^\circ C/W$

**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>						
$V_{GS(th)}$	Gate-Source Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\ \mu\text{A}$	-2	-3	-4	V
$R_{DS(on)}$	Drain-Source On Resistance <sup>4</sup>	$V_{GS}=-10V, I_D=-10A$	---	16	22	$\text{m}\Omega$
<b>Dynamic Characteristics</b>						
$C_{iss}$	Input Capacitance	$V_{DS}=-50V, V_{GS}=0V, f=1\text{MHz}$	---	4200	---	pF
$C_{oss}$	Output Capacitance		---	352	--	
$C_{rss}$	Reverse Transfer Capacitance		---	26	---	
<b>Switching Characteristics</b>						
$t_{d(on)}$	Turn-On Delay Time	$V_{DS}=-50V, I_D=-20A,$ $R_G=5\ \Omega, V_{GS}=-10V$	---	15.7	---	ns
$t_r$	Rise Time		---	18.9	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	52	---	ns
$t_f$	Fall Time		---	19.9	---	ns
$Q_g$	Total Gate Charge	$V_{GS}=-10V, V_{DS}=-50V,$ $I_D=-20A$	---	50	---	nC
$Q_{gs}$	Gate-Source Charge		---	17.5	---	nC
$Q_{gd}$	Gate-Drain "Miller" Charge		---	7.4	---	nC
<b>Drain-Source Diode Characteristics</b>						
$V_{SD}$	Diode Forward Voltage <sup>1</sup>	$V_{GS}=0V, I_{SD}=-20A$	---	---	-1.2	V
$I_S$	Continuous Drain Current <sup>3</sup>	$V_D=V_G=0V$	---	---	-45.8	A
$I_{SM}$	Pulsed Drain Current		---	---	-183	A
$T_{rr}$	Reverse Recovery Time	$I_S=-20A, V_{DD}=50V$	---	55	---	ns
$Q_{rr}$	Reverse Recovery Charge	$dI/dt=100A/\mu\text{s}$	---	102	---	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  $\leq 0.5\%$

### Typical Characteristics: ( $T_C=25^{\circ}C$ unless otherwise noted)

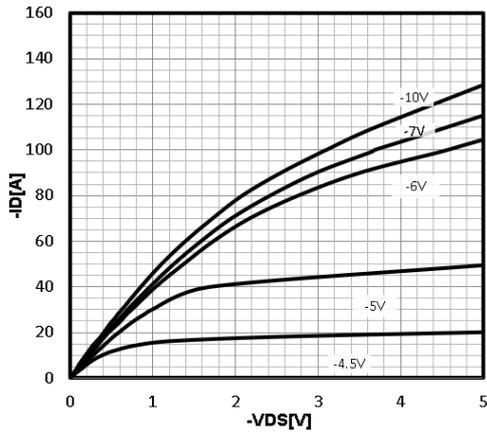


Figure 1: Typ. output characteristics

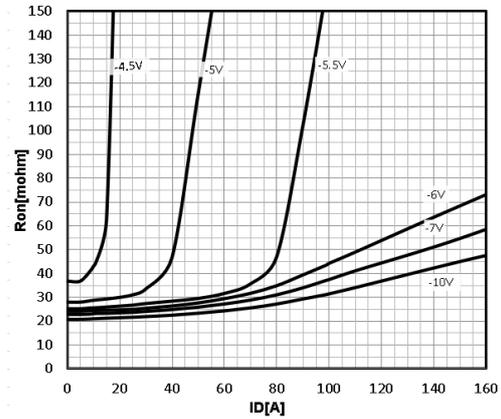


Figure 2: Typ. drain-source on resistance

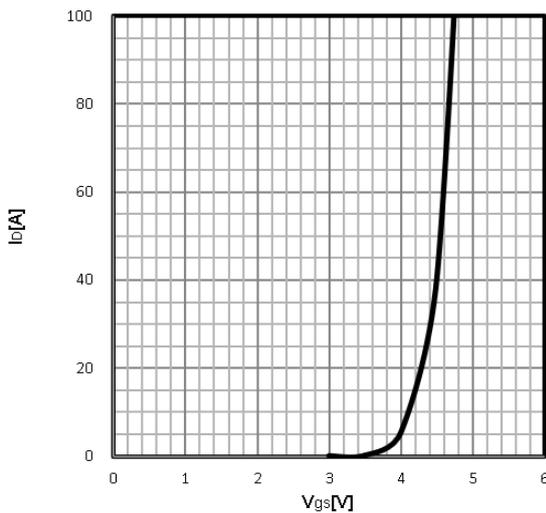


Figure 3: Typ. transfer characteristics

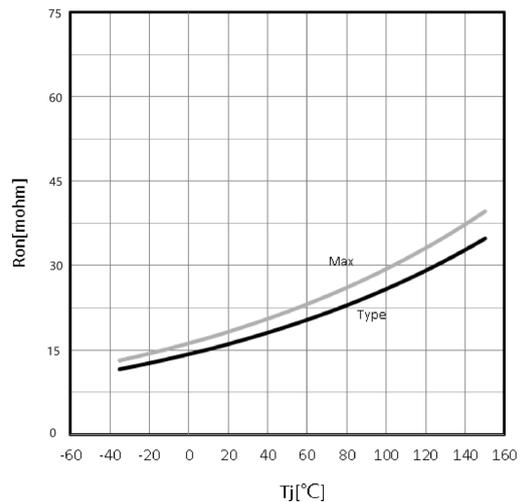


Figure 4: Drain-source on-state resistance

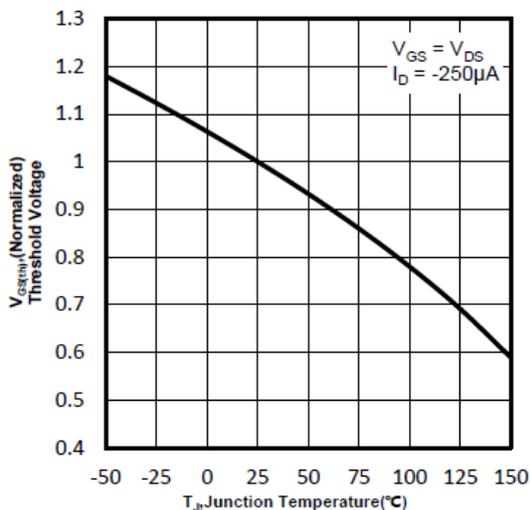


Figure 5: Gate Threshold Voltage

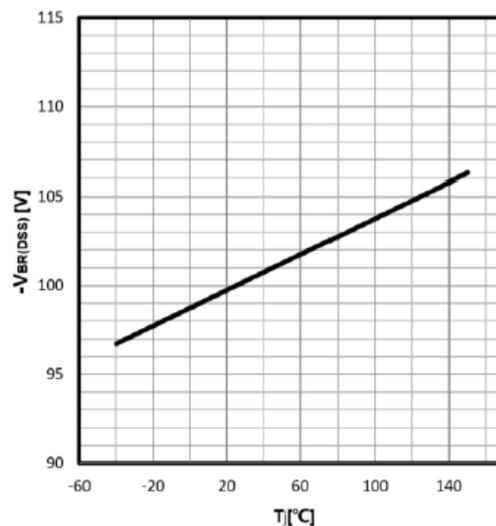


Figure 6: Drain-source breakdown voltage

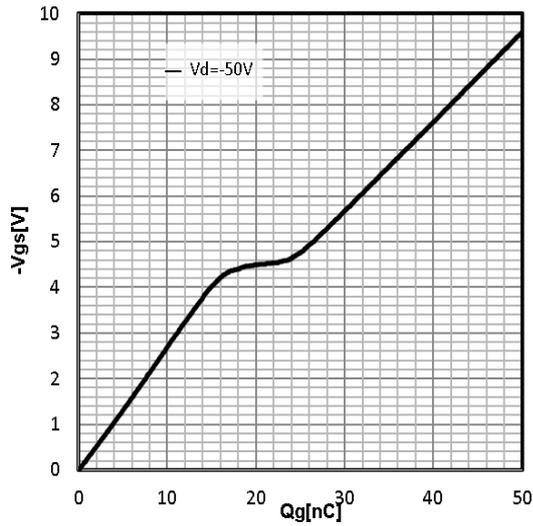


Figure 7: Typ. gate charge

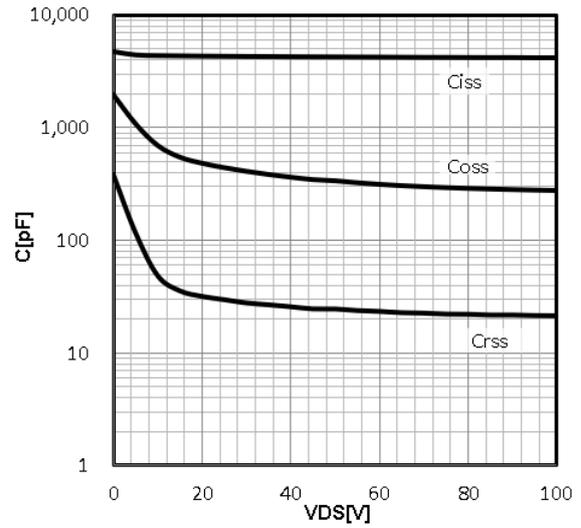


Figure 8: Typ. capacitances

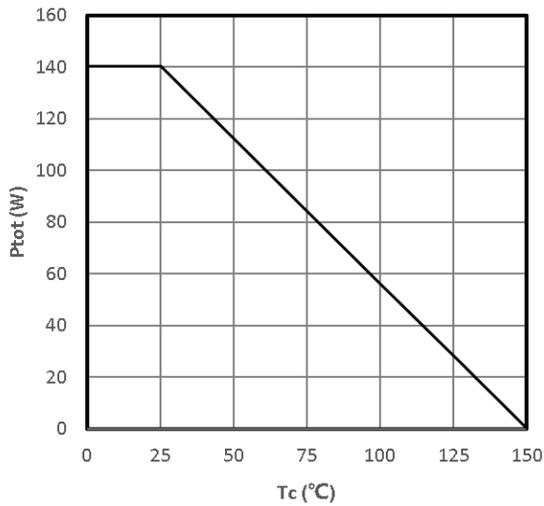


Figure 9: Power Dissipation

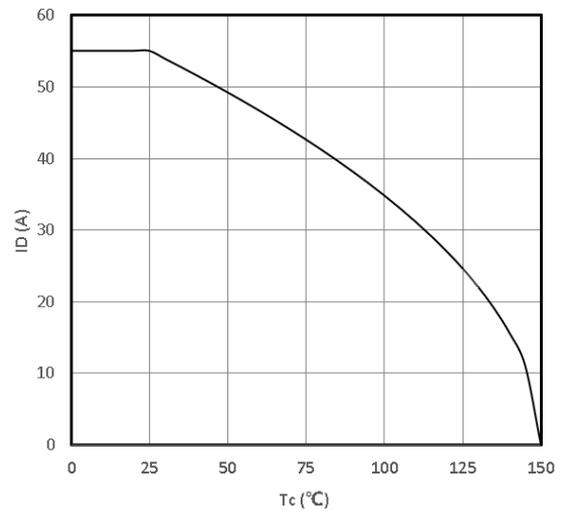


Figure 10: Maximum Drain Current

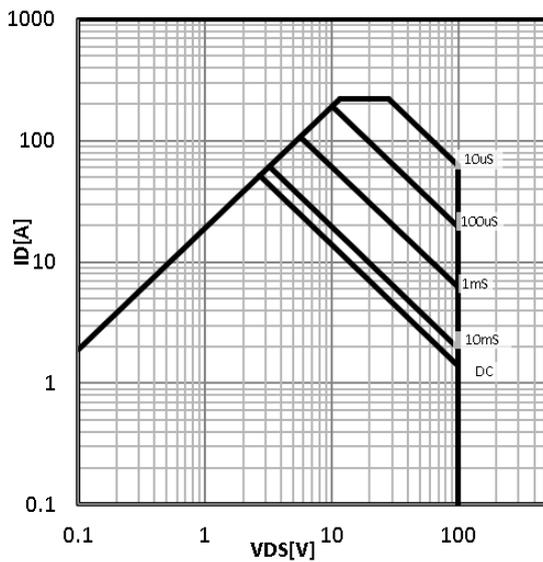


Figure.11: Safe operating area

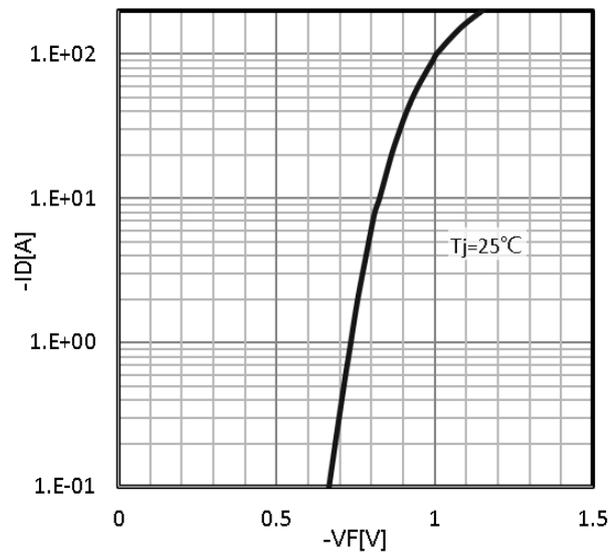


Figure.12 : Body Diode Forward Voltage Variation

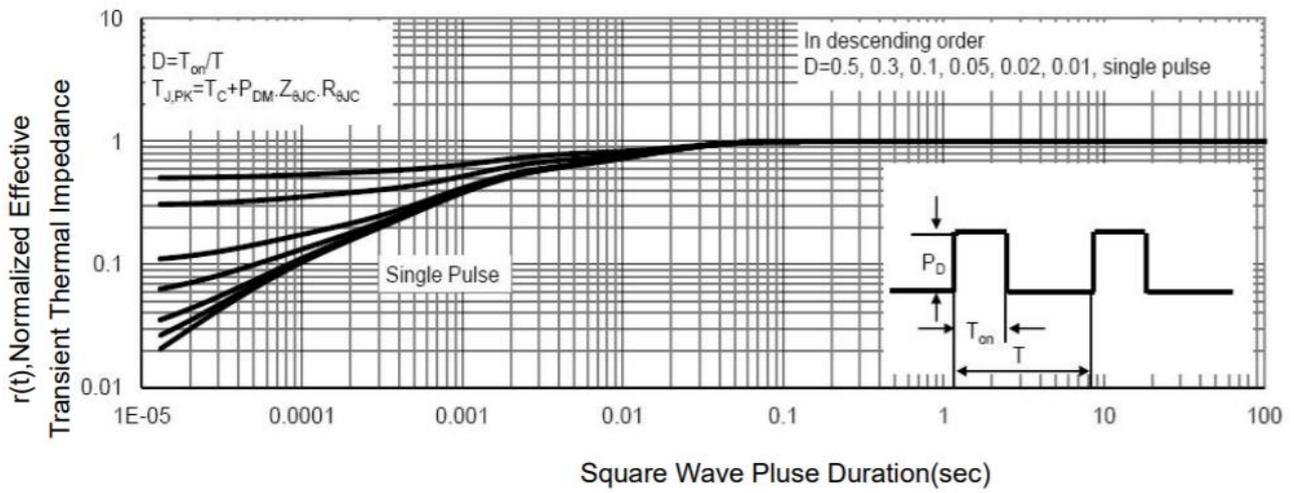
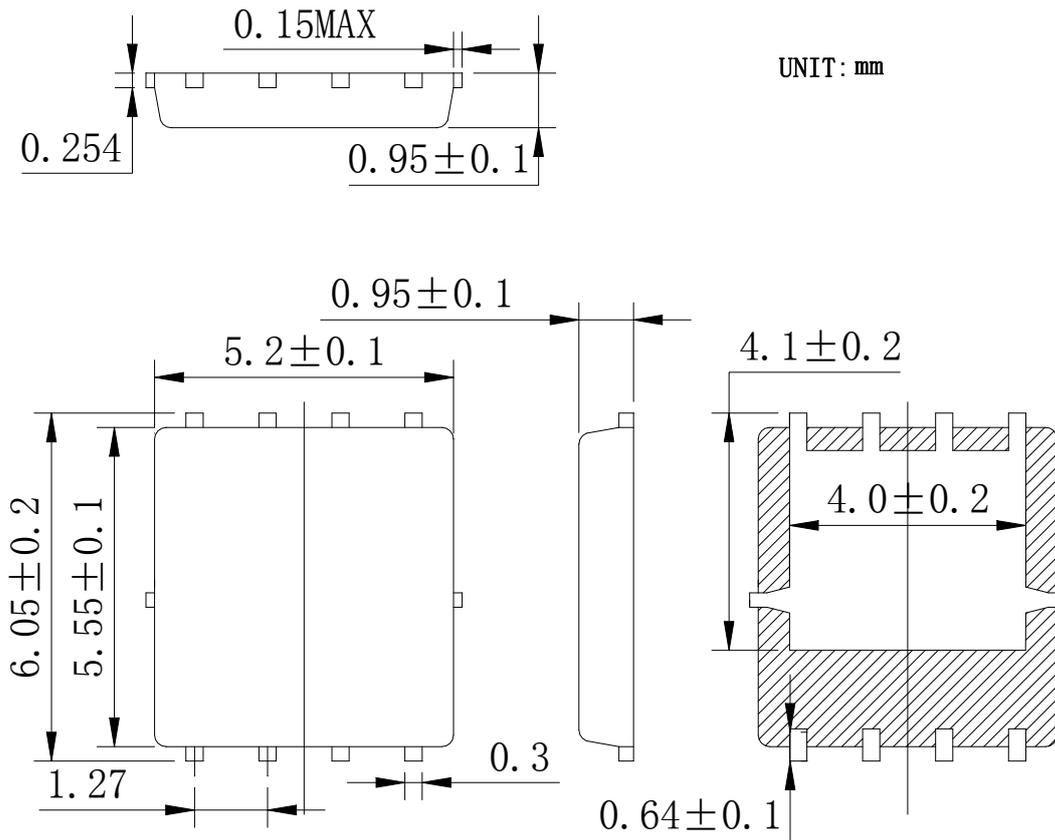


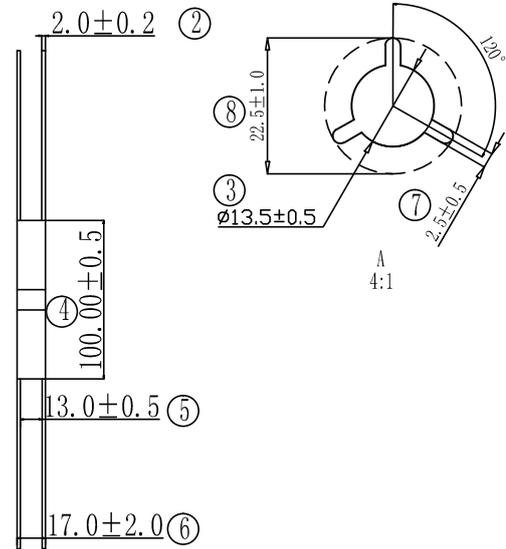
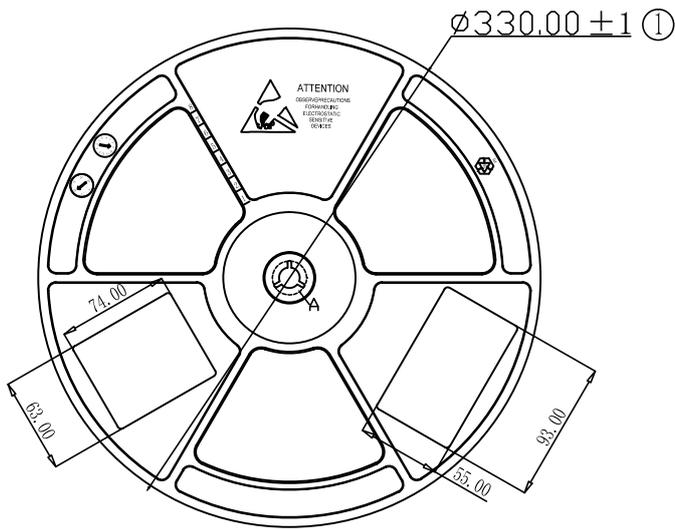
Figure 13: **Max. transient thermal impedance**

## DFN5x6-8 Package Information:

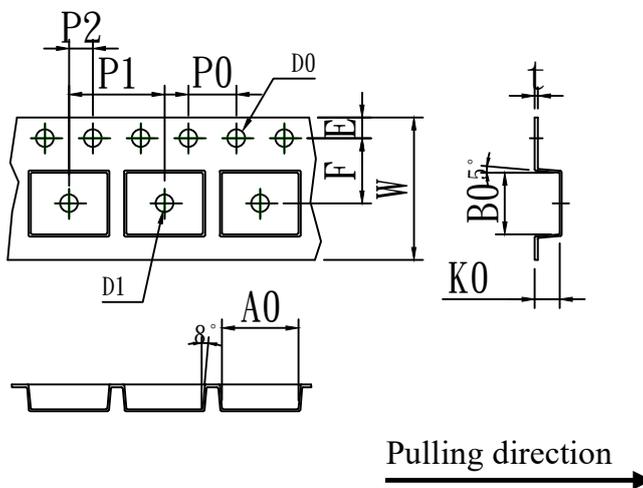


## Tape & Reel Information

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

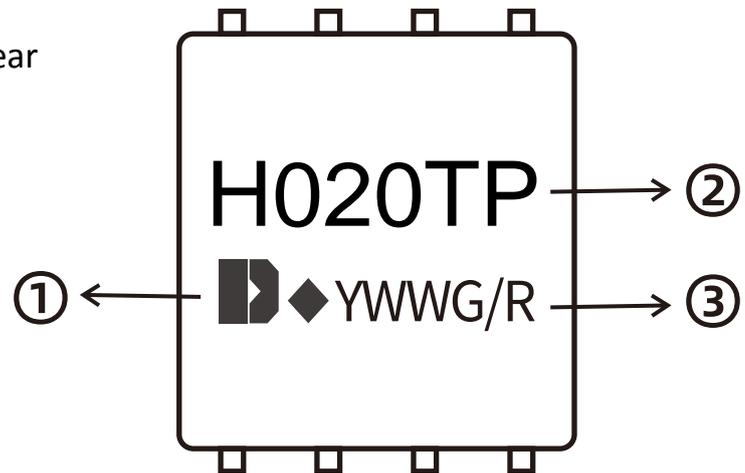
②. Part NO.

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)
1.1	2025-10-05	Release of final version

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