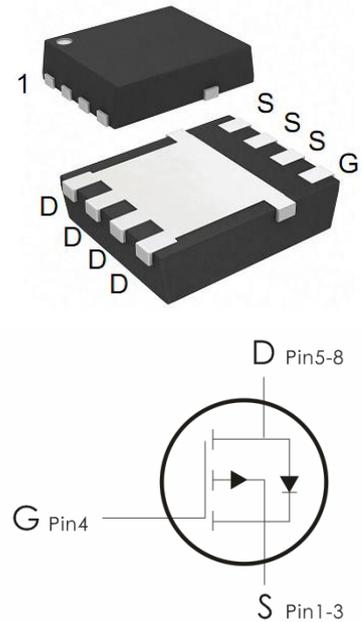


## Description:

This P-Channel MOSFET uses advanced trench 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)  $V_{DS}=-60V, I_D=-50A, R_{DS(ON)}<20m\ \Omega @V_{GS}=-10V$
- 2) Low gate charge.
- 3) Green device available.
- 4) Advanced high cell density trench technology for ultra low  $R_{DS(ON)}$ .
- 5) Excellent package for good heat dissipation.



## Package Marking and Ordering Information:

Part NO.	Marking	Package	Packing
NE020PG	E020P	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	-60	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Continuous Drain Current- $T_C=25^\circ\text{C}$	-50	A
	Continuous Drain Current- $T_C=100^\circ\text{C}$	-35	A
$I_{DM}$	Pulsed Drain Current <sup>1</sup>	-260	A
$P_D$	Total Power Dissipation	240	W
$E_{AS}$	Single Pulsed Avalanche Energy	650	mJ
$T_J, T_{STG}$	Operating and Storage Junction Temperature Range	-55 to +150	$^\circ\text{C}$

## Thermal Characteristics:

Symbol	Parameter	Max	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case	0.52	$^\circ\text{C}/\text{W}$

**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	$V_{GS}=0V, I_D=-250\ \mu\text{A}$	-60	---	---	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{GS}=0V, V_{DS}=-60V$	---	---	-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	$V_{GS}=V_{DS}, I_D=-250\ \mu\text{A}$	-1.1	-1.6	-2.2	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS}=-10V, I_D=-20A$	---	16.5	20	m $\Omega$
		$V_{GS}=-4.5V, I_D=-20A$	---	18.5	22	
<b>Dynamic Characteristics</b>						
$C_{iss}$	Input Capacitance	$V_{DS}=-20V, V_{GS}=0V, f=1\text{MHz}$	---	4399	---	pF
$C_{oss}$	Output Capacitance		---	258	---	
$C_{rss}$	Reverse Transfer Capacitance		---	211	---	
<b>Switching Characteristics</b>						
$t_{d(on)}$	Turn-On Delay Time	$V_{DD}=-30V, I_D=-20A,$ $V_{GS}=-10V, R_G=1\ \Omega$	---	23	---	ns
$t_r$	Rise Time		---	17	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	55	---	ns
$t_f$	Fall Time		---	29	---	ns
$Q_g$	Total Gate Charge	$V_{GS}=-10V, V_{DS}=-30V,$ $I_D=-20A$	---	114	---	nC
$Q_{gs}$	Gate-Source Charge		---	27.3	---	nC
$Q_{gd}$	Gate-Drain "Miller" Charge		---	49	---	nC
<b>Drain-Source Diode Characteristics</b>						
$V_{SD}$	Drain Diode Forward Voltage	$V_{GS}=0V, I_S=-20A$	---	---	-1.2	V

<b>I<sub>s</sub></b>	Continuous Source Current	$V_G=V_D=0V$	---	---	-50	A
<b>I<sub>SM</sub></b>	Pulsed Source Current		---	---	-260	A
<b>T<sub>rr</sub></b>	Reverse Recovery Time	$T_J = 25^\circ C, I_F = -20A,$ $di/dt = 100A/\mu s$	---	117	---	nS
<b>Q<sub>rr</sub></b>	Reverse Recovery Charge		---	420	---	nC

### Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. EAS condition:  $T_J = 25^\circ C, V_{DD} = -25V, V_G = -5V, R_G = 25\Omega, L = 0.5mH, I_{AS}$
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 0.5\%$

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

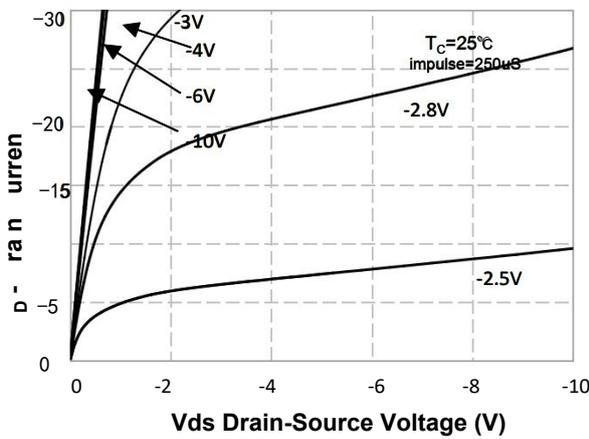


Figure 1. On-Region Characteristics

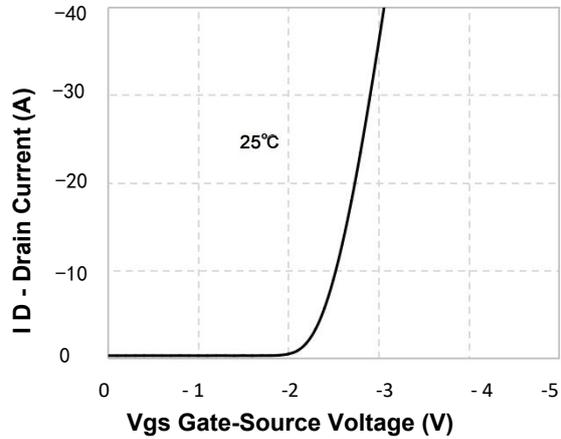


Figure 2. Transfer Characteristics

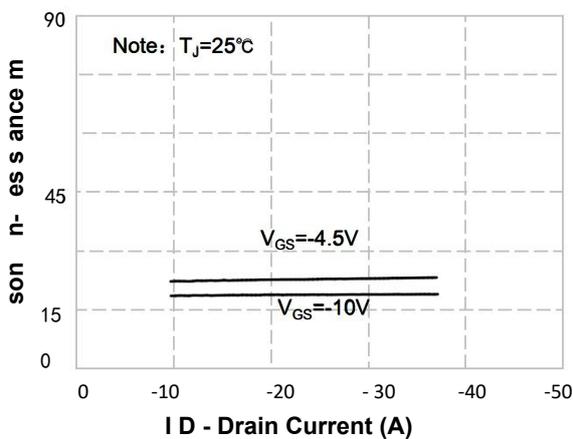


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

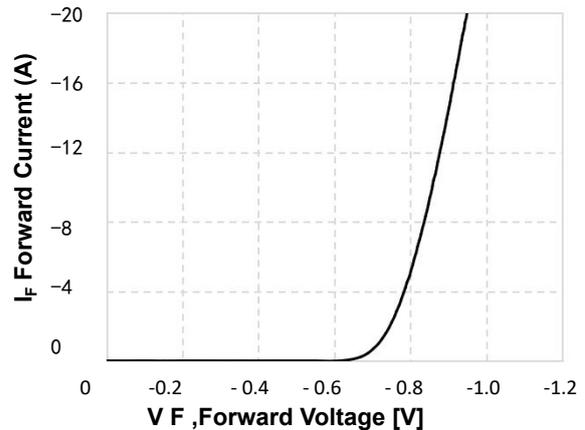
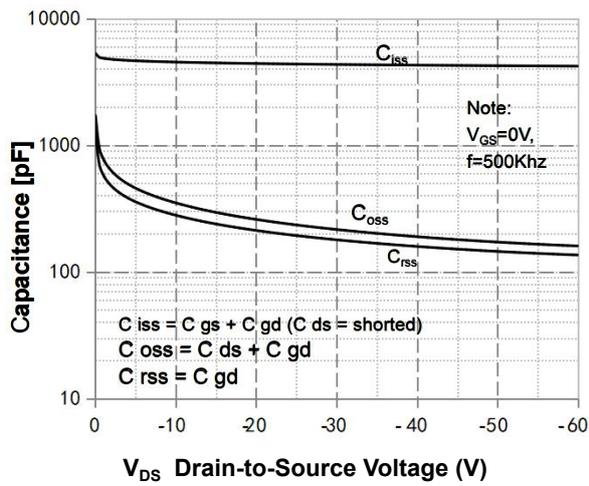
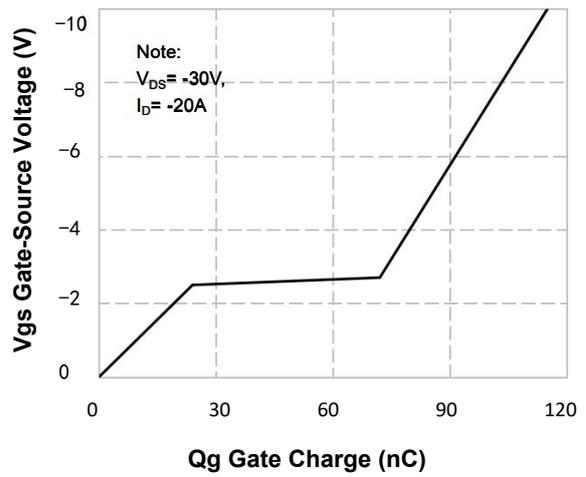
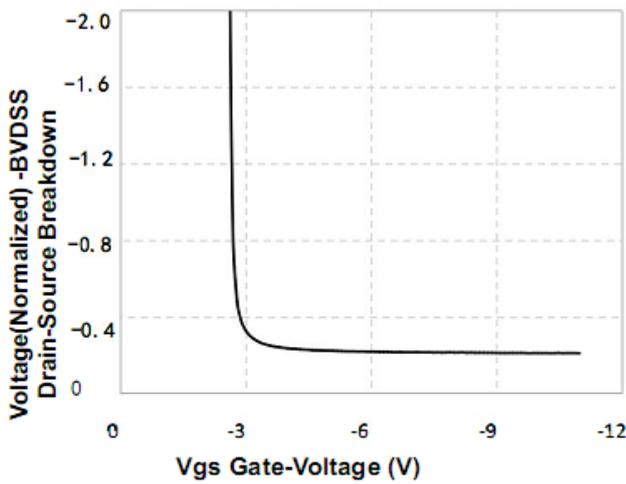
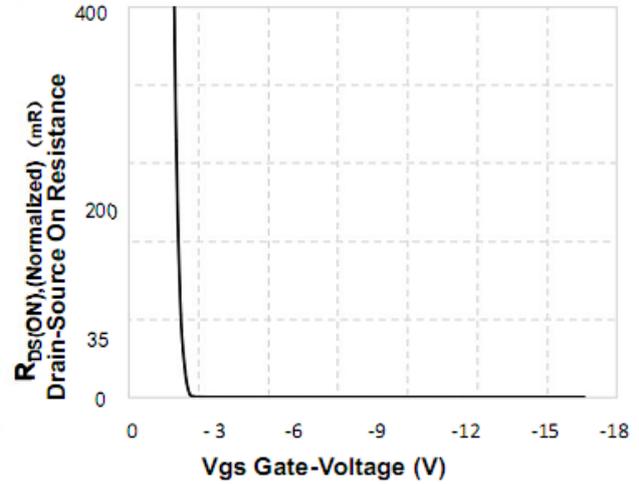
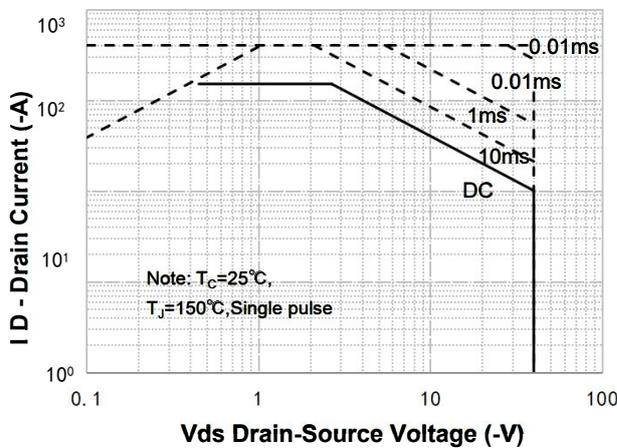
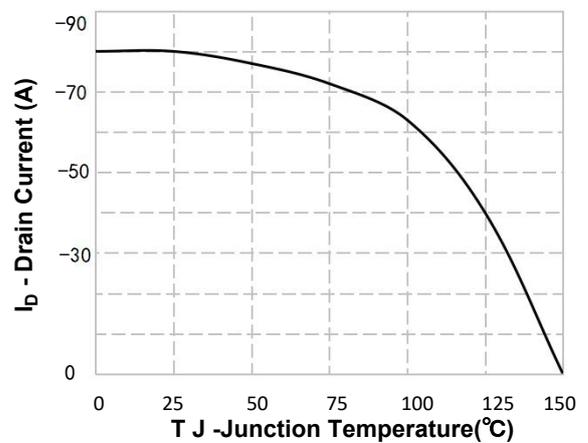


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature


**Figure 5. Capacitance Characteristics**

**Figure 6. Gate Charge Characteristics**

**Figure 7. Breakdown Voltage Variation vs Gate-Voltage**

**Figure 8. On-Resistance Variation vs Gate Voltage**

**Figure 9. Maximum Safe Operating Area**

**Figure 10. Maximum PContinuous Drain Current vs Case Temperature**

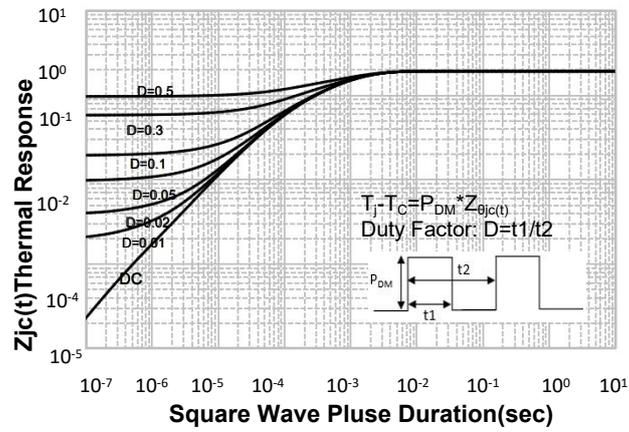
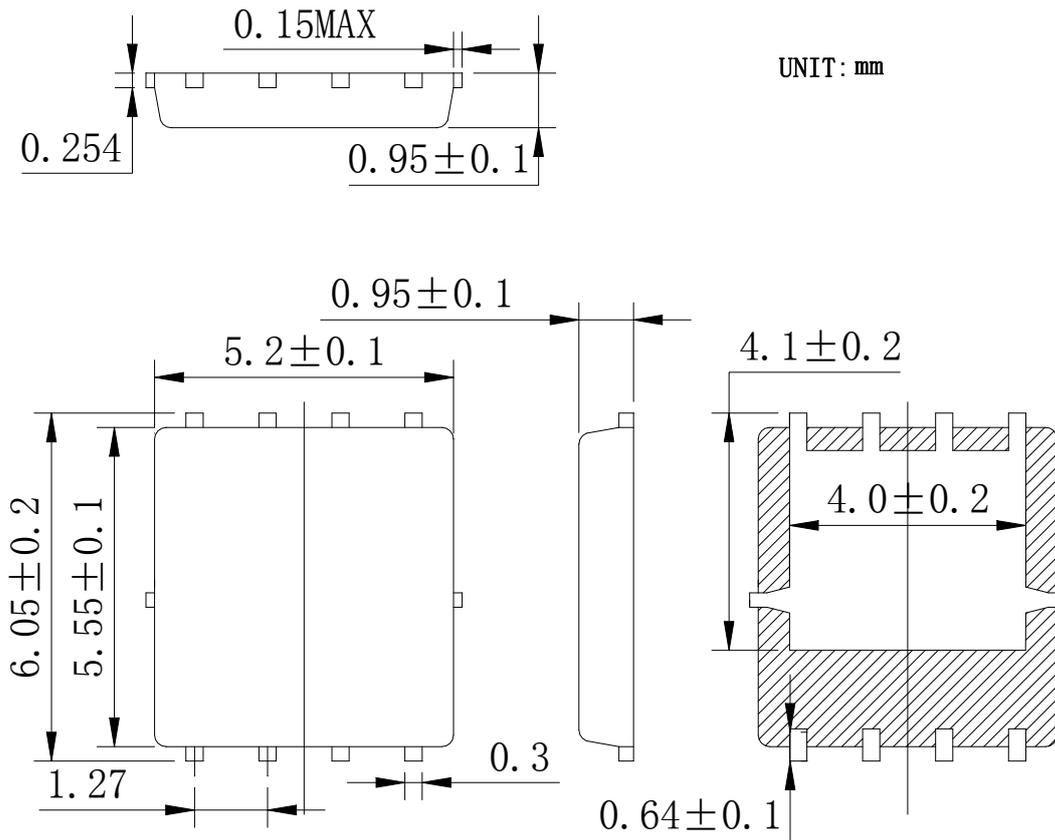


Figure 11. Transient Thermal Response Curve

DFN5x6-8 Package Information:



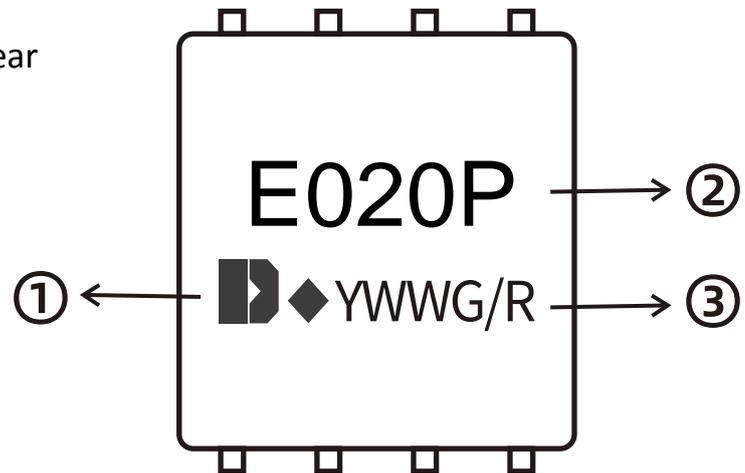
### Marking Information:

- 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)



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