

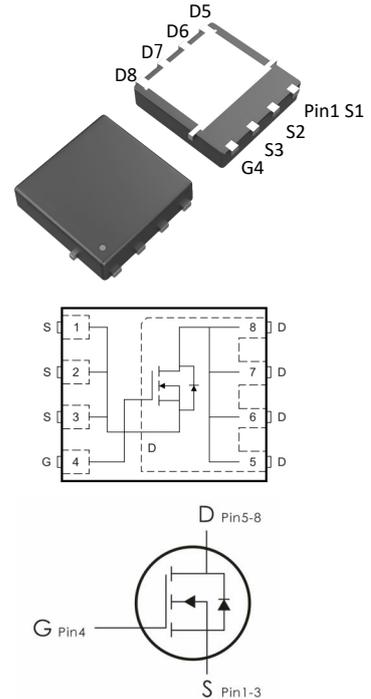
## Description:

This N-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)  $V_{DS}=60V, I_D=20A, R_{DS(ON)} < 28m\ \Omega @ V_{GS}=10V$  (Typ:  $22m\ \Omega$ )
- 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.
- 6) MSL3



## Package Marking and Ordering Information:

Part NO.	Marking	Package	Packing
ZE028NG	E028N	DFN3*3-8	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 <sup>1</sup>	20	A
	Continuous Drain Current- $T_c=100^\circ\text{C}$ <sup>1</sup>	14	
$I_{DM}$	Pulsed Drain Current <sup>2</sup>	80	
$P_D$	Power Dissipation	22.7	W
$E_{AS}$	Single pulse avalanche energy <sup>3</sup>	18	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	5.5	$^\circ\text{C}/\text{W}$

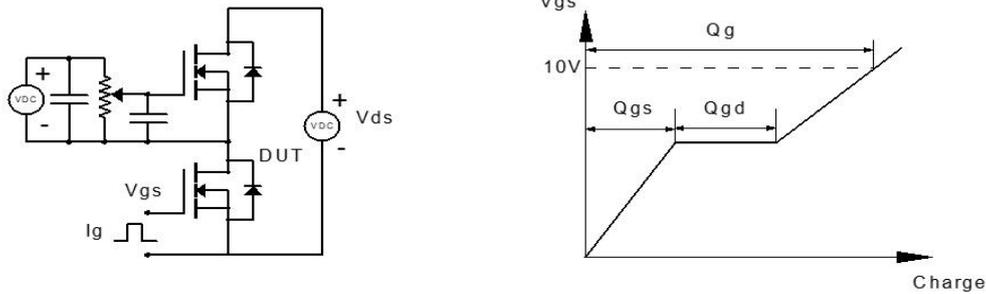
**Electrical Characteristics:** ( $T_c=25^\circ\text{C}$  unless otherwise noted)

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	$V_{GS}=V_{DS}, I_D=250\ \mu\text{A}$	1.2	1.7	2.5	V
$R_{DS(on)}$	Drain-Source On Resistance <sup>4</sup>	$V_{GS}=10V, I_D=10A$	---	22	28	m $\Omega$
		$V_{GS}=4.5V, I_D=5A$	---	28	36	
<b>Dynamic Characteristics</b>						
$C_{iss}$	Input Capacitance	$V_{DS}=25V, V_{GS}=0V, f=1\text{MHz}$	---	1035	---	pF
$C_{oss}$	Output Capacitance		---	68	--	
$C_{rss}$	Reverse Transfer Capacitance		---	63	---	
<b>Switching Characteristics</b>						
$t_{d(on)}$	Turn-On Delay Time	$V_{DS}=30V, I_D=20A,$ $R_G=3\ \Omega, V_{GS}=10V$	---	7	---	ns
$t_r$	Rise Time		---	21	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	16.8	---	ns
$t_f$	Fall Time		---	24	---	ns
$Q_g$	Total Gate Charge	$V_{GS}=10V, V_{DS}=30V,$ $I_D=10A$	---	25	---	nC
$Q_{gs}$	Gate-Source Charge		---	4.5	---	nC
$Q_{gd}$	Gate-Drain "Miller" Charge		---	6.5	---	nC
<b>Drain-Source Diode Characteristics</b>						
$V_{SD}$	Diode Forward Voltage	$V_{GS}=0V, I_{SD}=20A$	---	---	1.2	V
$I_S$	Continuous Drain Current	$V_D=V_G=0V$	---	---	16.6	A
$I_{SM}$	Pulsed Drain Current		---	---	66.6	A
$T_{rr}$	Reverse Recovery Time	$I_F=10A, T_J=25^\circ\text{C}$	---	29	---	ns
$Q_{rr}$	Reverse Recovery Charge	$dI/dt=100A/\mu\text{s}$	---	49	---	nC

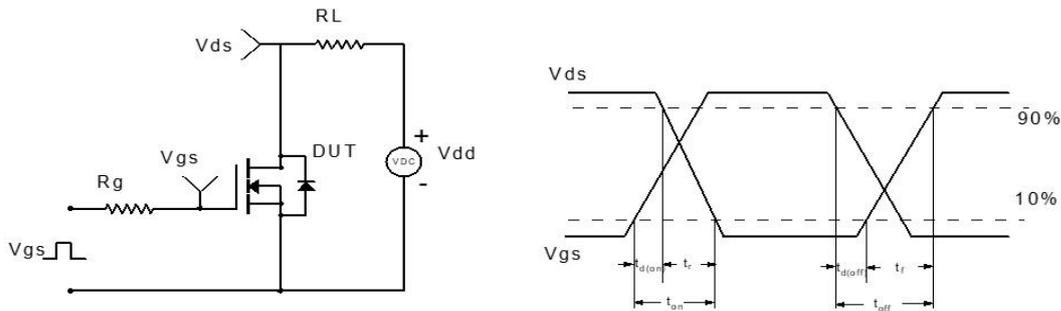
### Notes:

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 :  $T_J=25^{\circ}C, V_{DD}=30V, V_G=10V, L=0.5mH$
4. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 0.5\%$

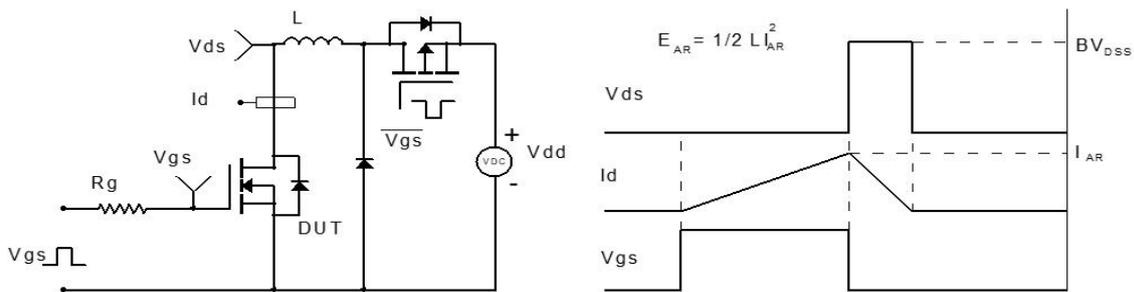
### Test Circuit



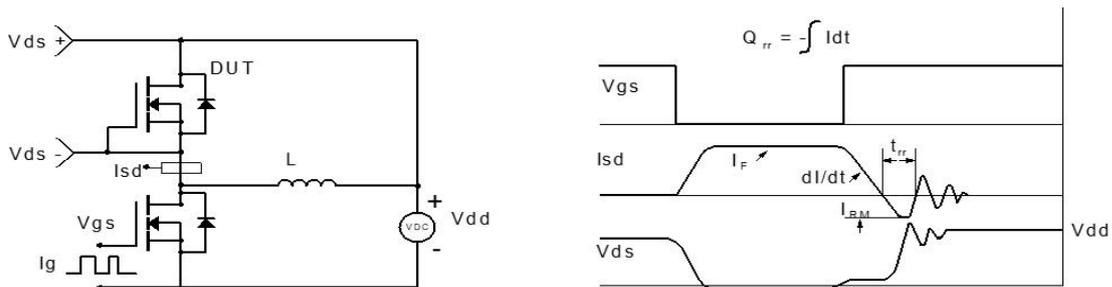
**Figure 1: Gate Charge Test Circuit & Waveform**



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

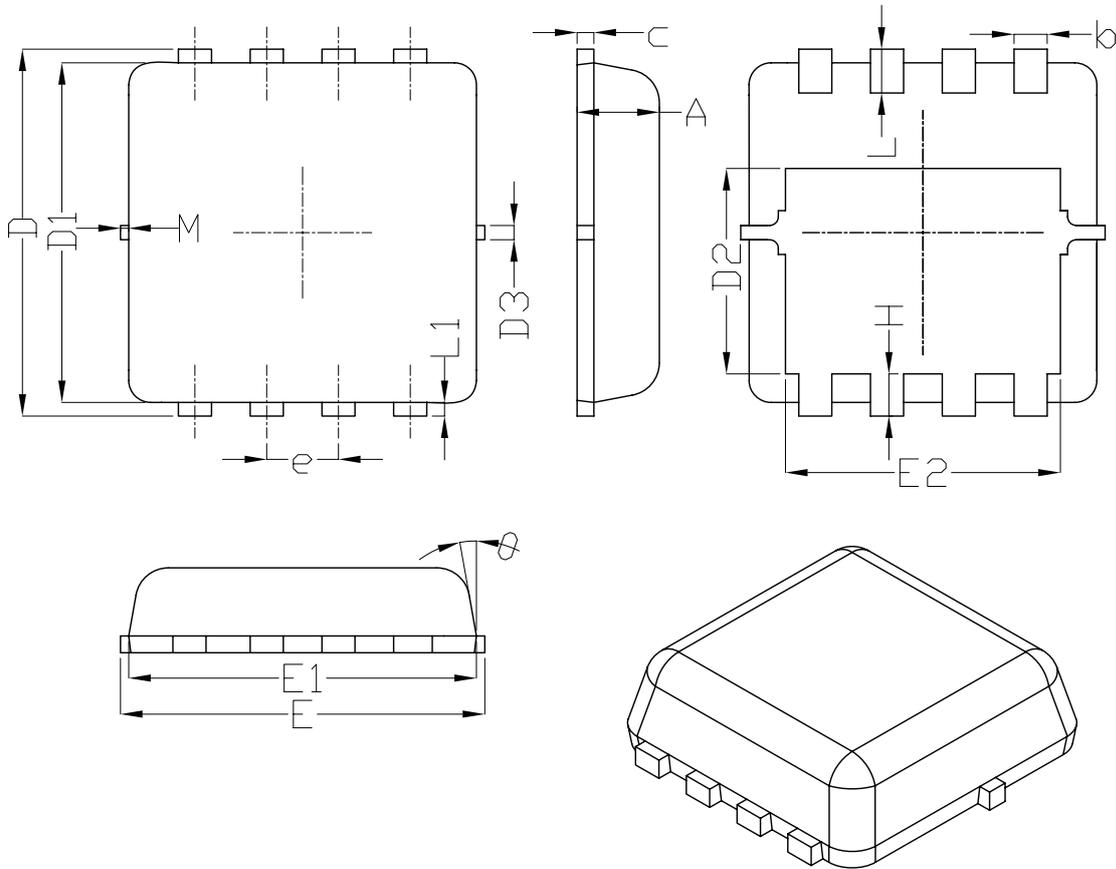


**Figure 3: Unclamped Inductive Switching Test Circuit & Waveform**

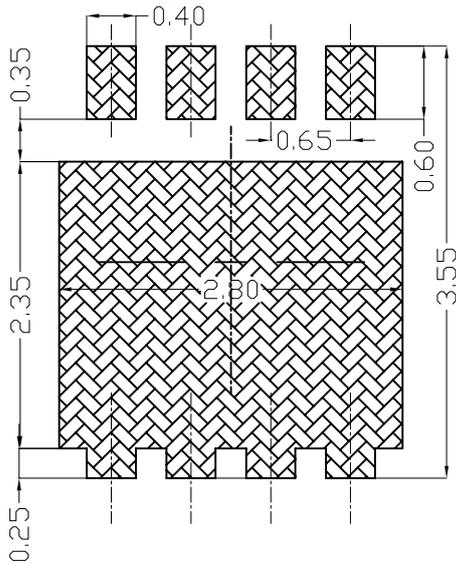


**Figure 4: Diode Recovery Test Circuit & Waveform**

## DFN3X3-8 Package Outline Data



**Land Pattern  
(Only for Reference)**



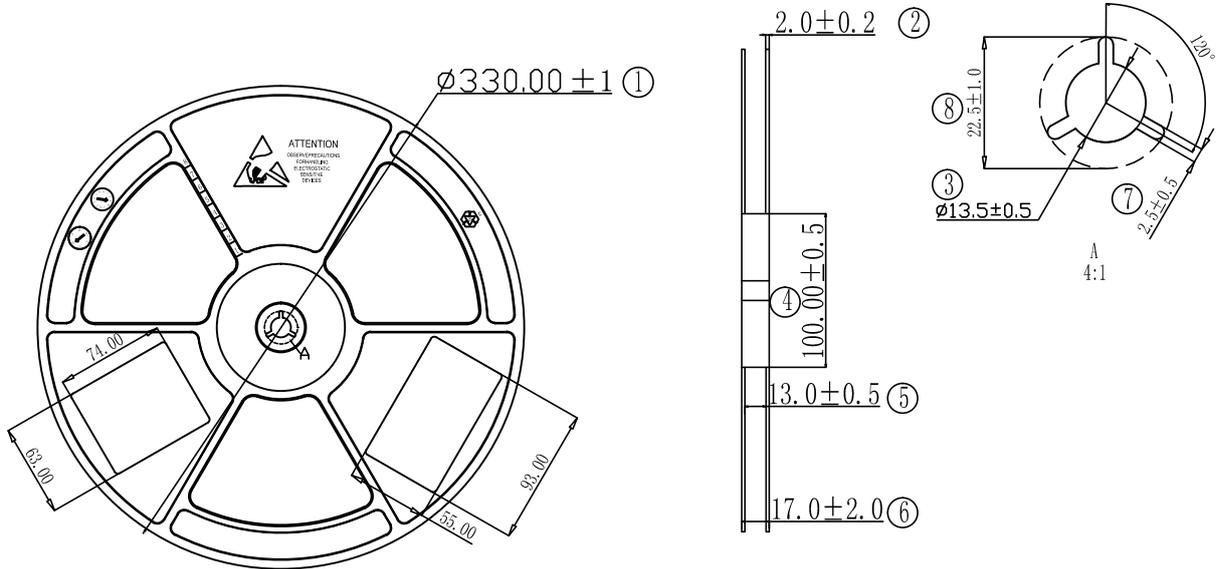
UNIT: mm

SYMBOL	DIMENSIONAL REQMTS		
	MIN	NOM	MAX
A	0.70	0.75	0.80
b	0.25	0.30	0.35
c	0.10	0.15	0.25
D	3.25	3.35	3.45
D1	3.00	3.10	3.20
D2	1.78	1.88	1.98
D3	---	0.13	---
E	3.20	3.30	3.40
E1	3.00	3.15	3.20
E2	2.39	2.49	2.59
e	0.65BSC		
H	0.30	0.39	0.50
L	0.30	0.40	0.50
L1	---	0.13	---
$\theta$	---	10°	12°
M	*	*	0.15

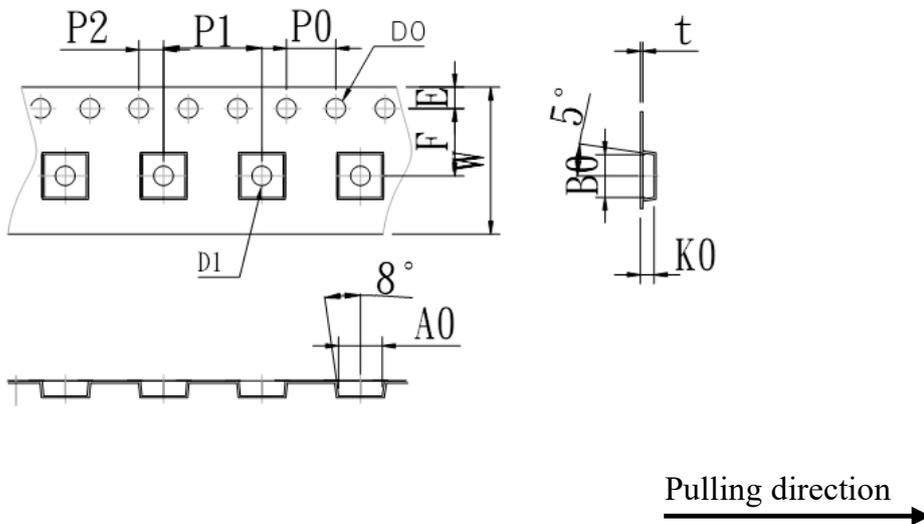
\* Not specified

## Tape & Reel Information

Dimensions in mm



Symbol	A0	B0	K0	D0	D1	P0	P1	10*P0
Spec	3.55±0.10	3.45±0.10	1.13±0.10	1.55±0.10	1.55±0.10	4.00±0.10	8.00±0.10	40.0±0.10
Symbol	W	E	F	P2	t			
Spec	12.00±0.10	1.75±0.10	5.50±0.10	2.00±0.10	0.20±0.05			



## Marking Information:

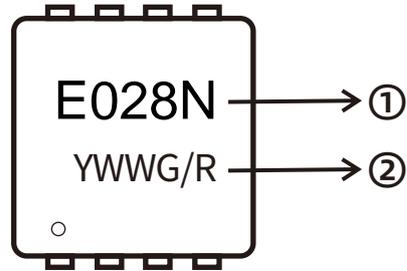
①. Part NO.

②. 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	2025-07-08	Release of final version

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