

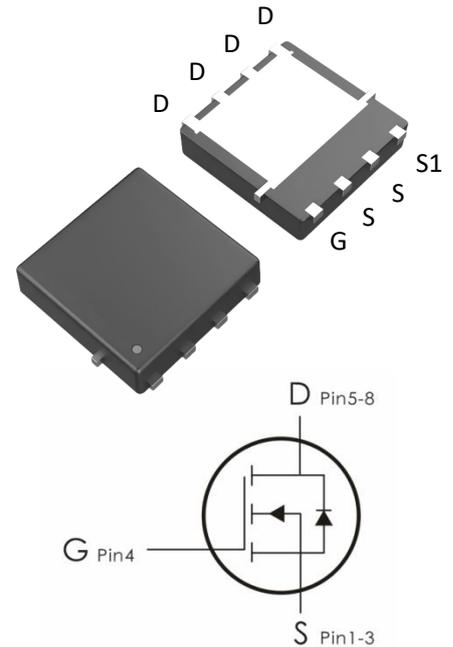
Description:

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) $V_{DS}=40V, I_D=70A, R_{DS(ON)} < 5.5m\Omega @ V_{GS}=10V$ (Typ: $4.2m\Omega$)
- 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
ZD5R5NG	D5R5N	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	40	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current	70	A
	Continuous Drain Current- $T_c=100^\circ\text{C}$	44.3	
I_{DM}	Pulsed Drain Current ¹	280	
P_D	Power Dissipation	52	W
E_{AS}	Single pulse avalanche energy ²	100	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	2.4	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	62	

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\ \mu\text{A}$	40	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{GS}=0V, V_{DS}=40V$	---	---	1	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0A$	---	---	± 100	nA
On Characteristics						
$V_{GS(th)}$	Gate-Source Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\ \mu\text{A}$	1.1	1.6	2.1	V
$R_{DS(on)}$	Drain-Source On Resistance ³	$V_{GS}=10V, I_D=20A$	---	4.2	5.5	$m\Omega$
		$V_{GS}=4.5V, I_D=10A$	---	5.5	7	
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{DS}=25V, V_{GS}=0V, f=1\text{MHz}$	---	2410	---	pF
C_{oss}	Output Capacitance		---	233	--	
C_{rss}	Reverse Transfer Capacitance		---	152	---	
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	$V_{DS}=20V, I_D=1A,$ $R_G=3.3\ \Omega, V_{GS}10V$	---	14.2	---	ns
t_r	Rise Time		---	18.3	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	38.8	---	ns
t_f	Fall Time		---	13.9	---	ns
Q_g	Total Gate Charge	$V_{GS}=4.5V, V_{DS}=32V,$ $I_D=10A$	---	25	---	nC
Q_{gs}	Gate-Source Charge		---	6.4	---	nC
Q_{gd}	Gate-Drain "Miller" Charge		---	12.1	---	nC
Drain-Source Diode Characteristics						
V_{SD}	Diode Forward Voltage	$V_{GS}=0V, I_{SD}=1A$	---	---	1	V
I_S	Continuous Drain Current	$V_D=V_G=0V$	---	---	70	A
I_{SM}	Pulsed Drain Current		---	---	280	A

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. EAS condition : $T_J=25^\circ\text{C}, V_{DD}=20V, V_G=10V, L=0.5\text{mH}$
3. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 0.5\%$

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

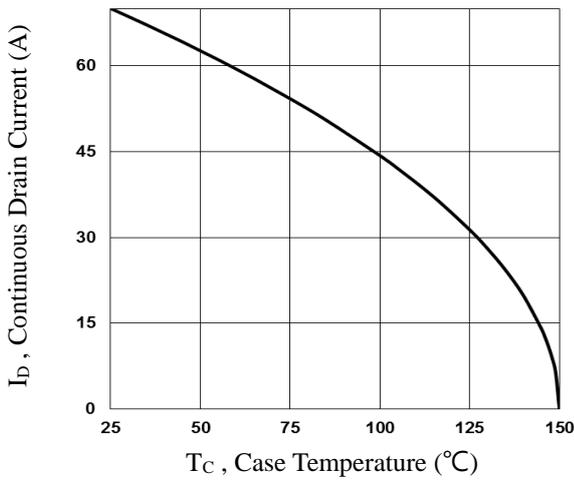


Fig.1 Continuous Drain Current vs. T_C

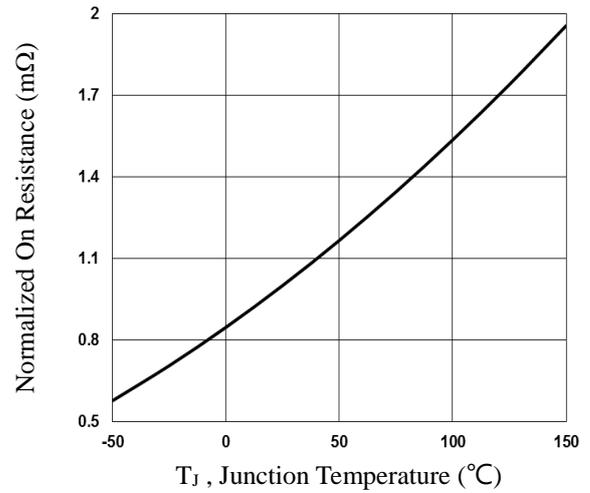


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

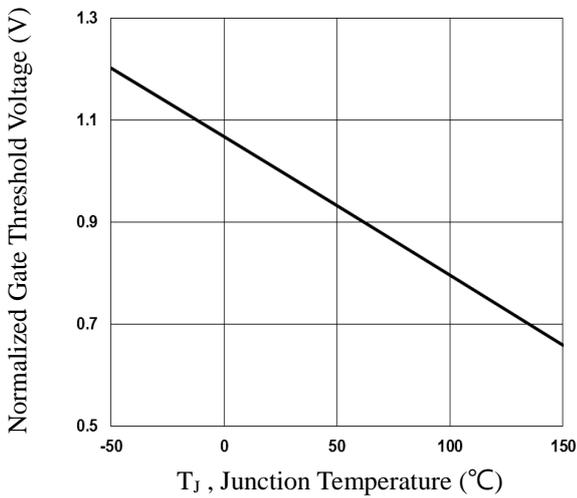


Fig.3 Normalized V_{th} vs. T_J

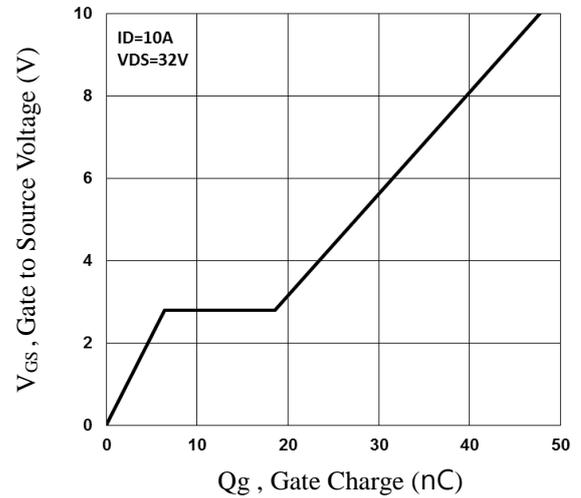


Fig.4 Gate Charge Waveform

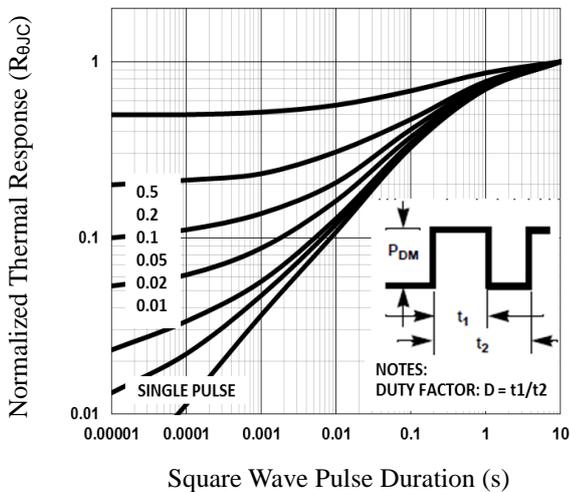


Fig.5 Normalized Transient Impedance

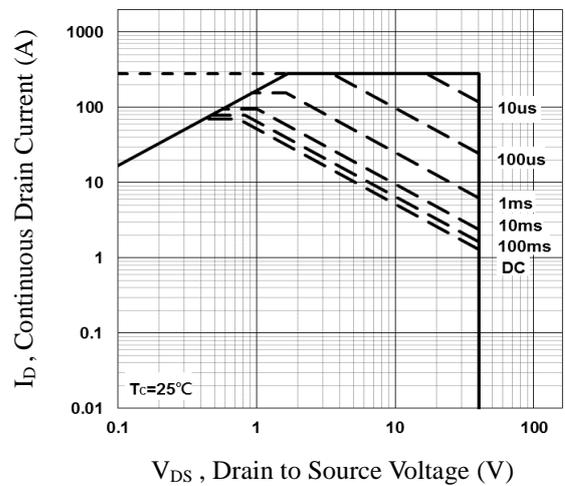


Fig.6 Maximum Safe Operation Area

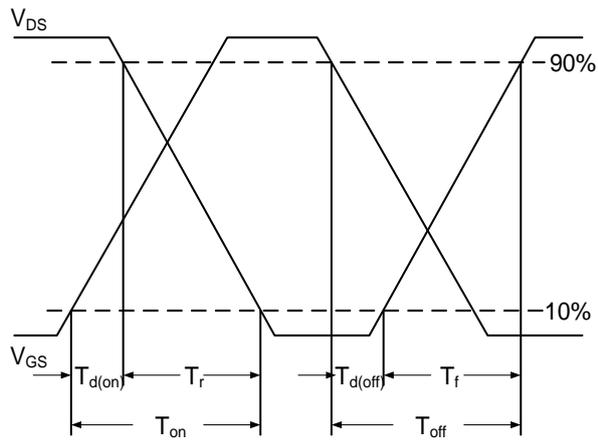


Fig.7 Switching Time Waveform

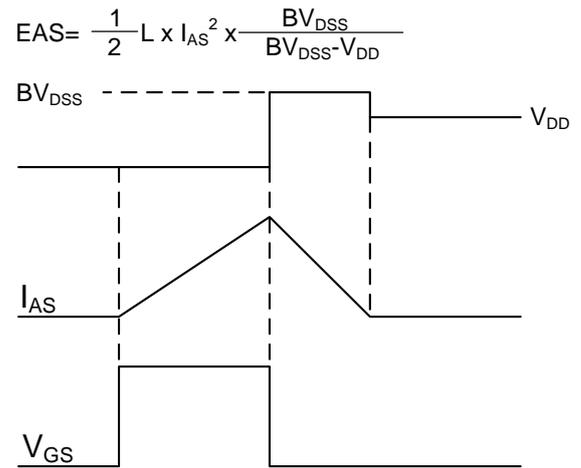
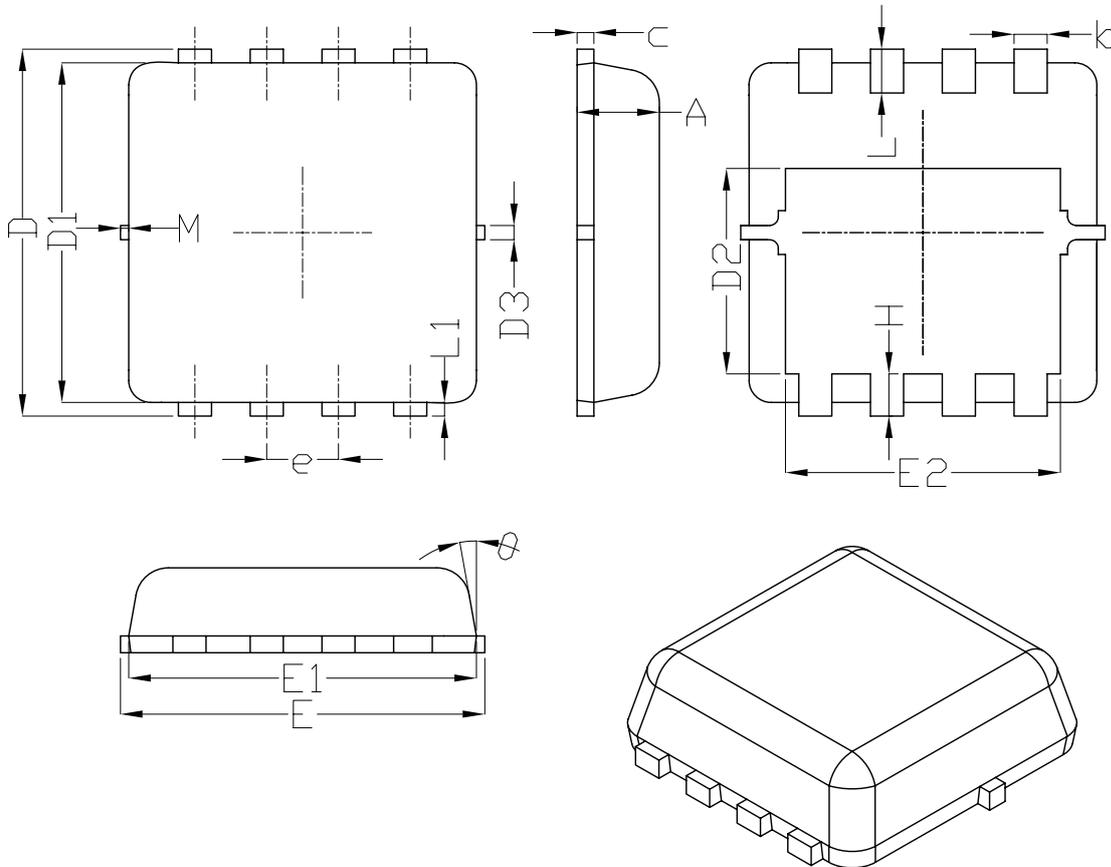


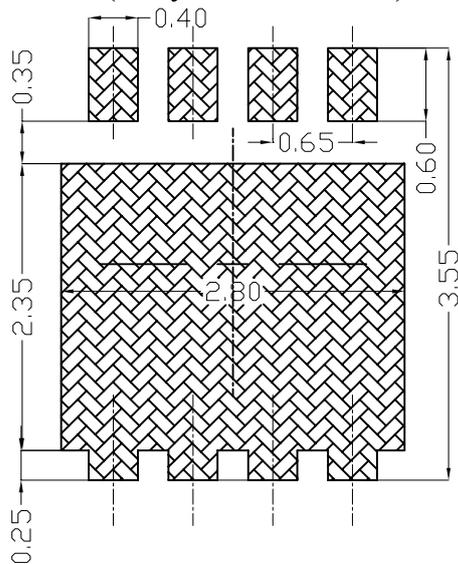
Fig.8 EAS Waveform

DFN3X3-8 Package Information :



**Land Pattern
(Only for Reference)**

UNIT: mm

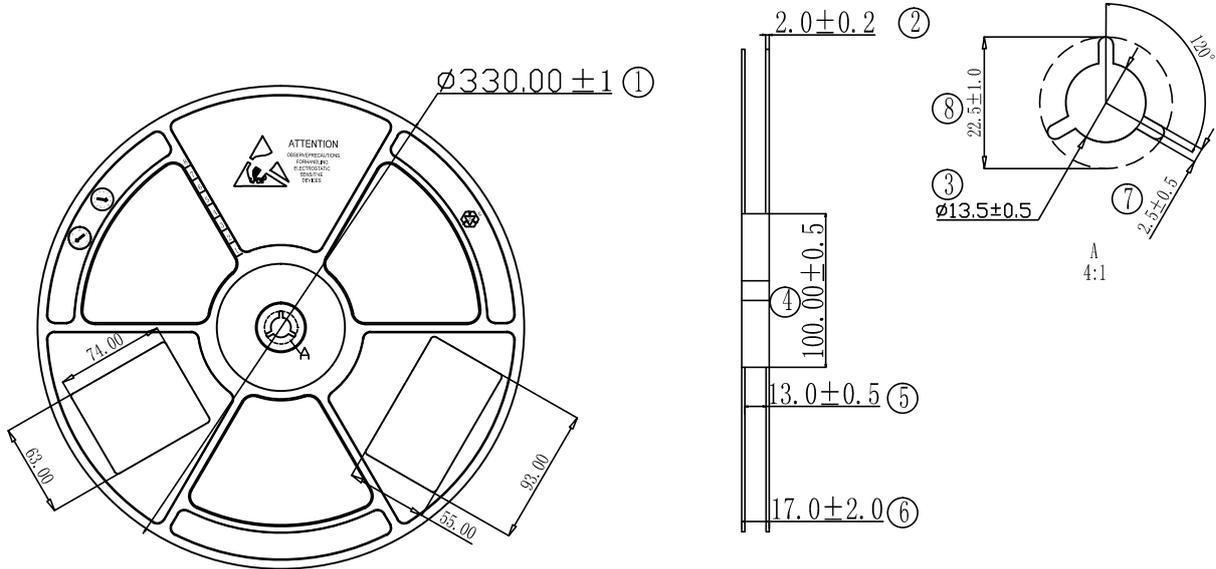


SYMBOL	DIMENSIONAL REQMTS		
	MIN	NOM	MAX
A	0.70	0.75	0.80
b	0.25	0.30	0.35
c	0.10	0.15	0.25
D	3.25	3.35	3.45
D1	3.00	3.10	3.20
D2	1.78	1.88	1.98
D3	---	0.13	---
E	3.20	3.30	3.40
E1	3.00	3.15	3.20
E2	2.39	2.49	2.59
e	0.65BSC		
H	0.30	0.39	0.50
L	0.30	0.40	0.50
L1	---	0.13	---
θ	---	10°	12°
M	*	*	0.15

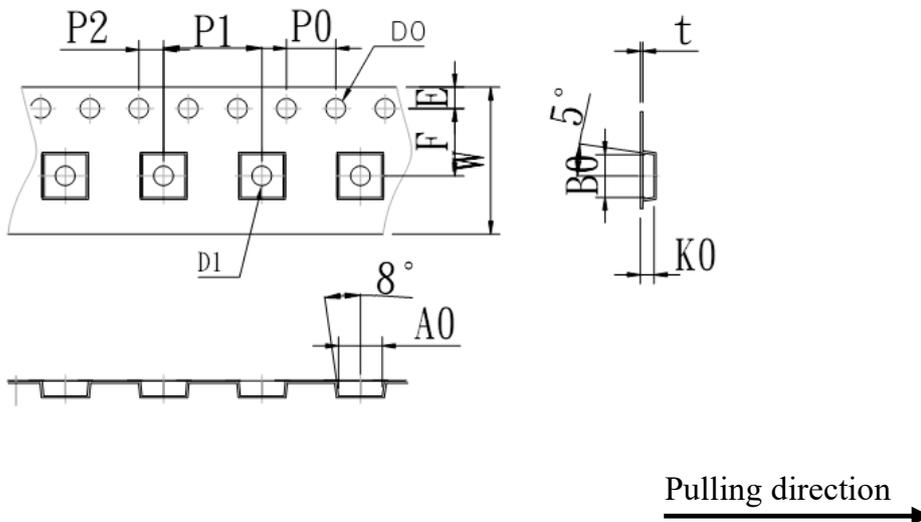
* Not specified

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:

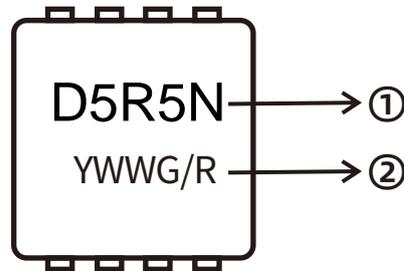
①. Part NO.

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	2024-09-10	Release of final version

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