

Description:

This N+P Channel MOSFET uses advanced trench technology and design to provide excellent $R_{DS(on)}$ with low gate charge.

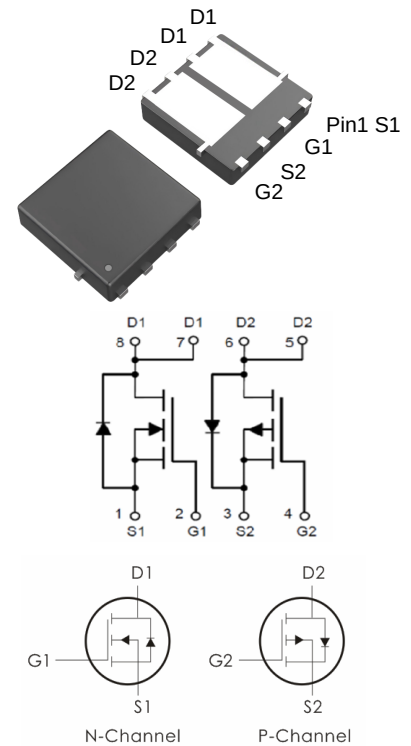
It can be used in a wide variety of applications.

Features:

N-Channel: $V_{DS}=60V, I_D=16A, R_{DS(on)} < 40m\Omega @ V_{GS}=10V$ (Typ: $29m\Omega$)

P-Channel: $V_{DS}=-60V, I_D=-16A, R_{DS(on)} < 65m\Omega @ V_{GS}=-10V$ (Typ: $50m\Omega$)

- 1) Low gate charge.
- 2) Green device available.
- 3) Advanced high cell density trench technology for ultra low $R_{DS(on)}$.
- 4) Excellent package for good heat dissipation.
- 5) MSL3



Package Marking and Ordering Information:

Part NO.	Marking	Package	Packing
DOZ4612F	4612F	DFN3*3-8D	5000 pcs/Reel

Absolute Maximum Ratings: ($T_C=25^\circ C$ unless otherwise noted)

Symbol	Parameter	N-Channel	P-Channel	Units
V_{DS}	Drain-Source Voltage	60	-60	V
V_{GS}	Gate-Source Voltage	± 20	± 20	V
I_D	Continuous Drain Current- $T_C=25^\circ C$ ¹	16	-16	A
	Continuous Drain Current- $T_C=100^\circ C$ ¹	11.2	-11.2	
I_{DM}	Pulsed Drain Current ²	64	-64	A
E_{AS}	Single pulse avalanche energy ³	17.6	81	mJ
P_D	Power Dissipation - $T_C=25^\circ C$	21	25	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150		$^\circ C$

Thermal Characteristics:

Symbol	Parameter	N-CH	P-CH	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Cast	6	5	$^\circ C/W$

N-Channel Electrical Characteristics: ($T_C=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV _{DSS}	Drain-Sourtce Breakdown Voltage	V _{GS} =0V, I _D =250 μ A	60	---	---	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{GS} =0V, V _{DS} =60V	---	---	1	μ A
I _{GSS}	Gate-Source Leakage Current	V _{GS} = ± 20V, V _{DS} =0A	---	---	± 100	nA
On Characteristics						
V _{GS(th)}	Gate-Source Threshold Voltage	V _{GS} =V _{DS} , I _D =250 μ A	1.2	1.57	2.5	V
R _{DS(ON)}	Drain-Source On Resistance ⁴	V _{GS} =10V, I _D =10A	---	29	40	m Ω
		V _{GS} =4.5V, I _D =5A	---	36	50	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =25V, V _{GS} =0V, f=1MHz	---	650	---	pF
C _{oss}	Output Capacitance		---	44	---	
C _{rss}	Reverse Transfer Capacitance		---	39.9	---	
Switching Characteristics ⁴						
t _{d(on)}	Turn-On Delay Time	V _{DS} =30V, I _D =10A, R _{REN} =2.7 Ω ,V _{GS} =10V	---	10.5	---	ns
t _r	Rise Time		---	73.5	---	ns
t _{d(off)}	Turn-Off Delay Time		---	16	---	ns
t _f	Fall Time		---	5	---	ns
Q _g	Total Gate Charge	V _{GS} =10V, V _{DS} =30V, I _D =10A	---	19	---	nC
Q _{gs}	Gate-Source Charge		---	4.2	---	nC
Q _{gd}	Gate-Drain “Miller” Charge		---	3.9	---	nC
Drain-Source Diode Characteristics						
I _S	Continuous Drain to Source Diode	V _D =V _G =0V	---	----	13.3	A
I _{SM}	Pulsed Drain to Source Diode		---	---	53.3	A
V _{SD}	Source-Drain Diode Forward Voltage	V _{GS} =0V, I _S =15A	---	---	1.2	V
T _{rr}	Reverse Recovery Time	I _F =10A, T _J =25 °C	---	19	---	ns
Q _{rr}	Reverse Recovery Charge		dl/dt=100A/us	---	21	---

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

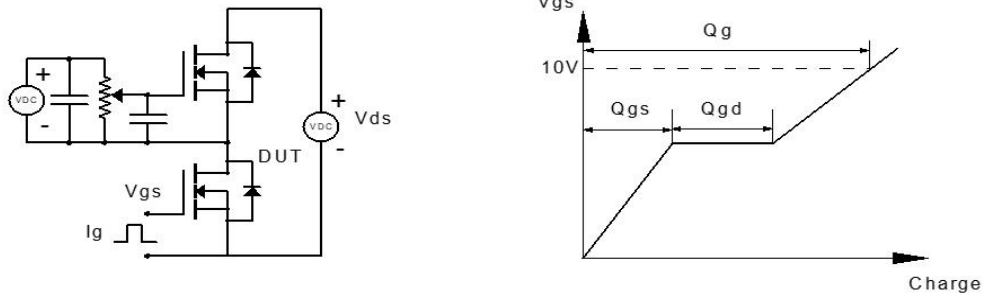


Figure 1: Gate Charge Test Circuit & Waveform

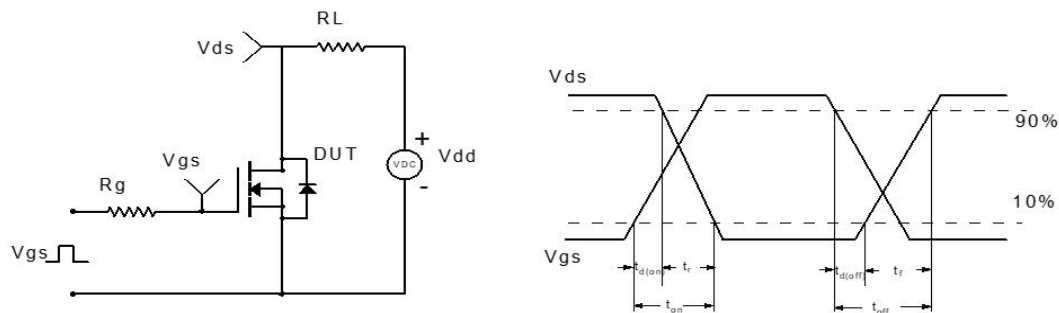


Figure 2: Resistive Switching Test Circuit & Waveform

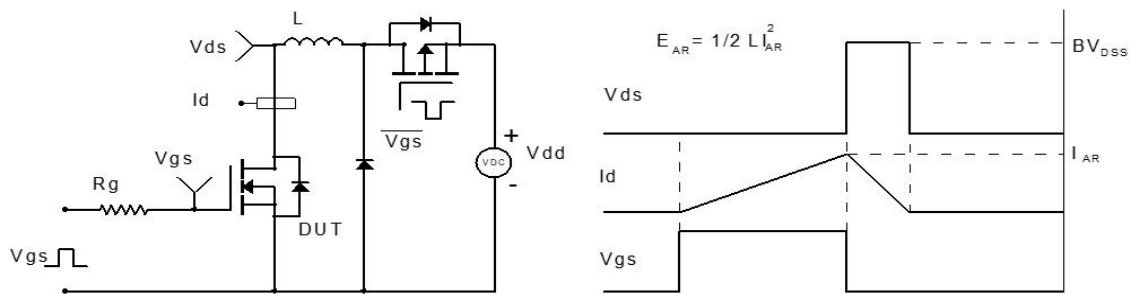


Figure 3: Unclamped Inductive Switching Test Circuit & Waveform

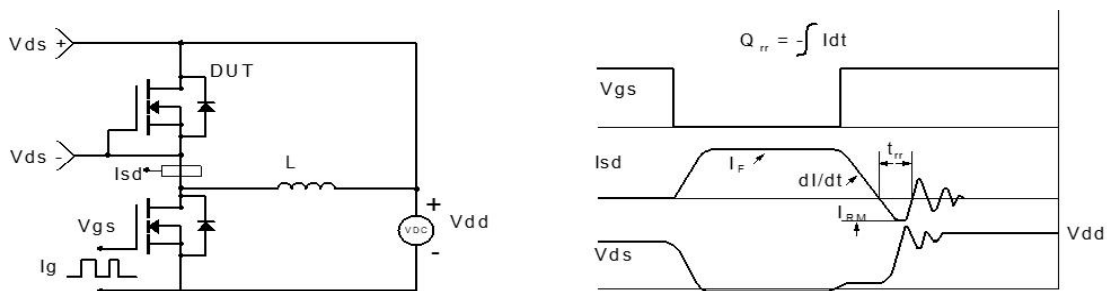


Figure 4: Diode Recovery Test Circuit & Waveform

P-Channel Electrical Characteristics: ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250 μ A	-60	---	---	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{GS} =0V, V _{DS} =-60V	---	---	-1	μ A
I _{GSS}	Gate-Source Leakage Current	V _{GS} =± 20V, V _{DS} =0A	---	---	± 100	nA
On Characteristics						
V _{GS(th)}	Gate-Source Threshold Voltage	V _{GS} =V _{DS} , I _D =250 μ A	-1	-1.6	-2.5	V
R _{DS(ON)}	Drain-Source On Resistance ⁴	V _{GS} =-10V, I _D =-10A	---	50	65	m Ω
		V _{GS} =-4.5V, I _D =-5A	---	62	80	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =-30V, V _{GS} =0V, f=1MHz	---	1620	---	pF
C _{oss}	Output Capacitance		---	72.5	---	
C _{rss}	Reverse Transfer Capacitance		---	61.9	---	
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time	V _{DD} = -30V, I _D =-10A V _{GS} = -10V, R _{GEN} =3 Ω	---	8	---	ns
t _r	Rise Time		---	39	---	ns
t _{d(off)}	Turn-Off Delay Time		---	67.6	---	ns
t _f	Fall Time		---	21	---	ns
Q _g	Total Gate Charge	V _{GS} =-10V, V _{DS} =-30V, I _D =-10A	---	82	---	nC
Q _{gs}	Gate-Source Charge		---	12.4	---	nC
Q _{gd}	Gate-Drain “Miller” Charge		---	13.4	---	nC
Drain-Source Diode Characteristics						
I _S	Continuous Drain to Source Diode	V _D =V _G =0V	---	---	-13.3	A
I _{SM}	Pulsed Drain to Source Diode		---	---	-64	---
T _{rr}	Reverse Recovery Time	I _F =-10A, T _J =25 °C	---	24	---	ns
Q _{rr}	Reverse Recovery Charge	dI/dt=100A/us	---	25.2	---	nC
V _{SD}	Source-Drain Diode Forward Voltage	V _{GS} =0V, I _S =-9A	---	---	-1.2	V

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

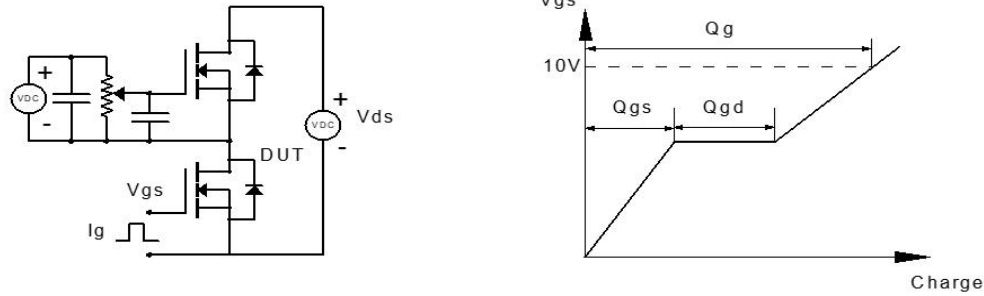


Figure 1: Gate Charge Test Circuit & Waveform

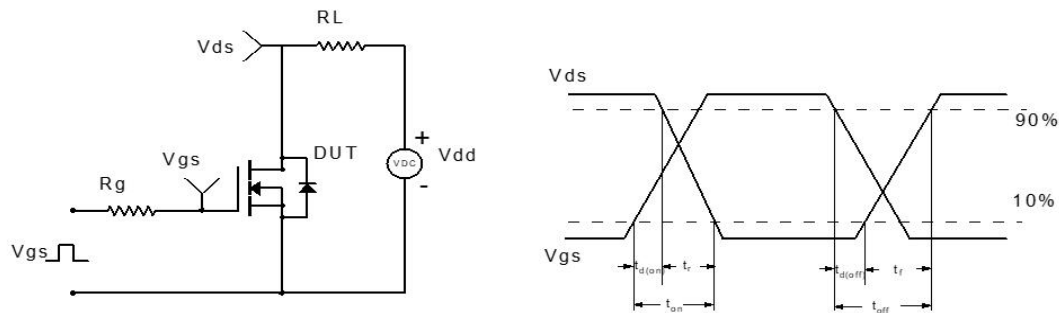


Figure 2: Resistive Switching Test Circuit & Waveform

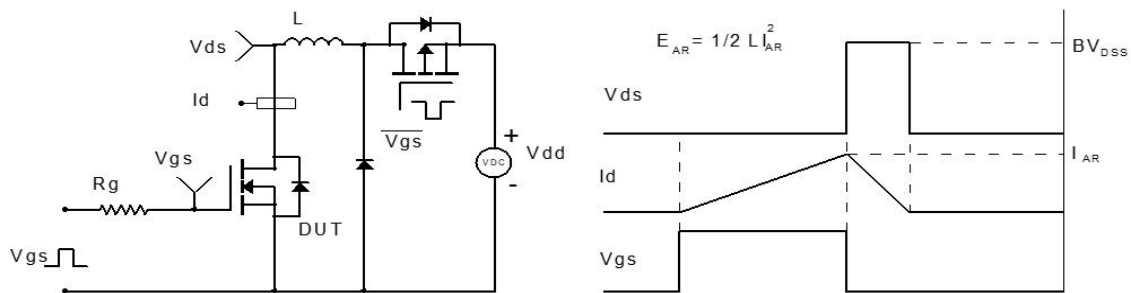


Figure 3: Unclamped Inductive Switching Test Circuit & Waveform

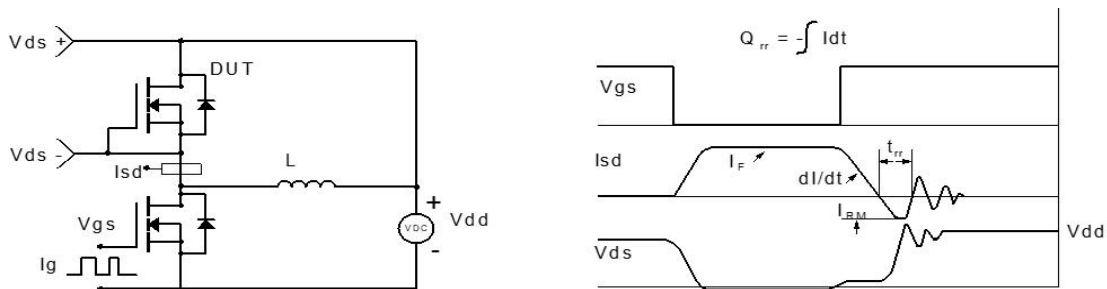
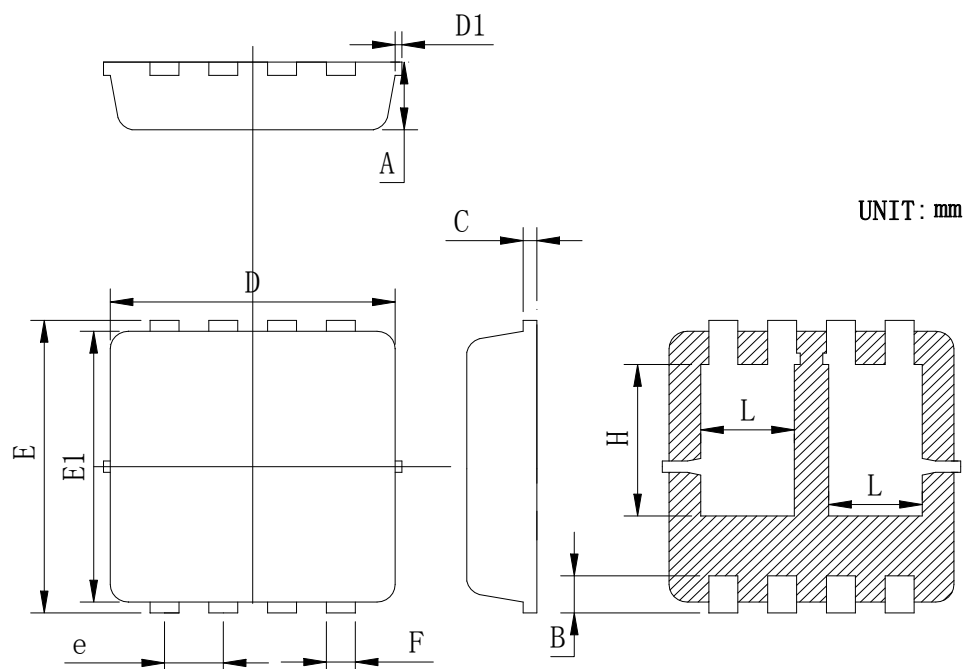


Figure 4: Diode Recovery Test Circuit & Waveform

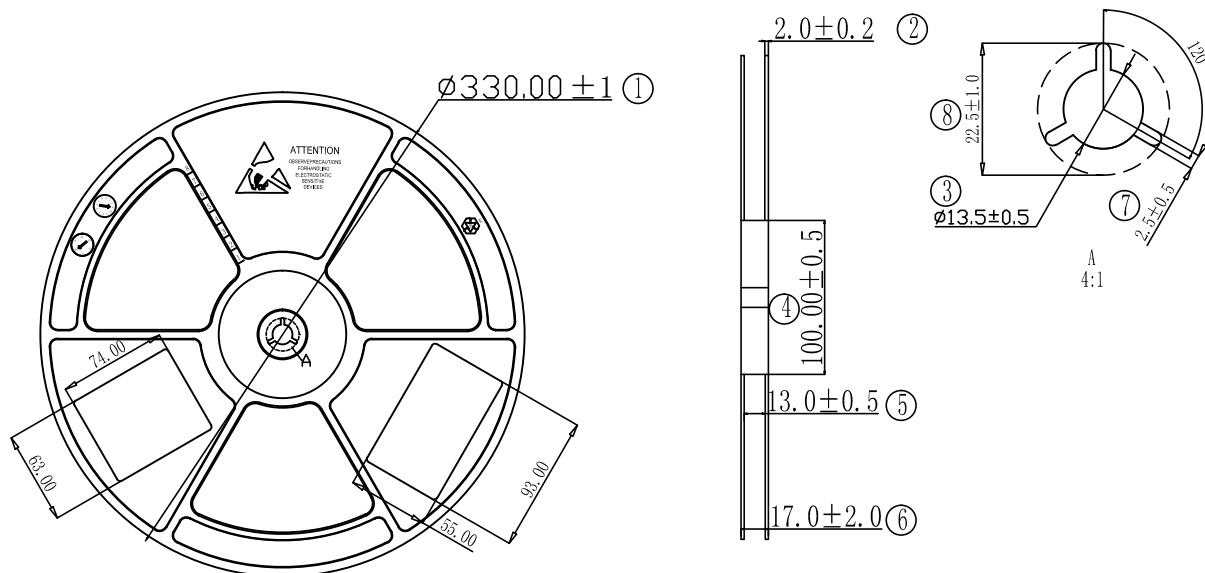
DFN3X3-8DPackage Outline Data



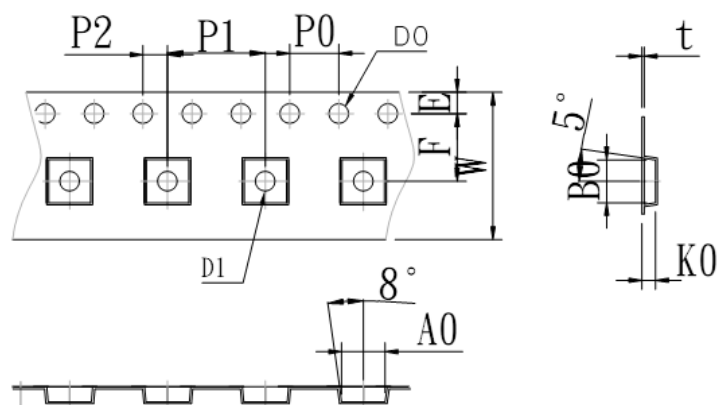
Symbol	Min	Typ	Max
A	0.725	0.775	0.825
B	0.28	0.38	0.48
C	0.13	0.15	0.20
D	3.05	3.15	3.25
D1			0.10
E	3.25	3.35	3.45
E1	3.0	3.1	3.2
e	0.60	0.65	0.70
F	0.27	0.32	0.37
H	1.63	1.73	1.83
L	0.93	1.03	1.13

Tape & Reel Information

Dimensions in mm



Symbol	A0	B0	K0	D0	D1	P0	P1	10*P0
Spec	3.55 $\pm$ 0.10	3.45 $\pm$ 0.10	1.13 $\pm$ 0.10	1.55 $\pm$ 0.10	1.55 $\pm$ 0.10	4.00 $\pm$ 0.10	8.00 $\pm$ 0.10	40.0 $\pm$ 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			



Pulling direction →

Marking Information:

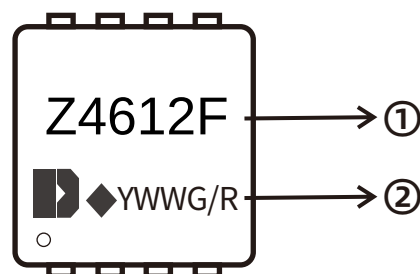
①:Part NO.

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)
1.1	2026-01-25	Release of final version

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