

Description:

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

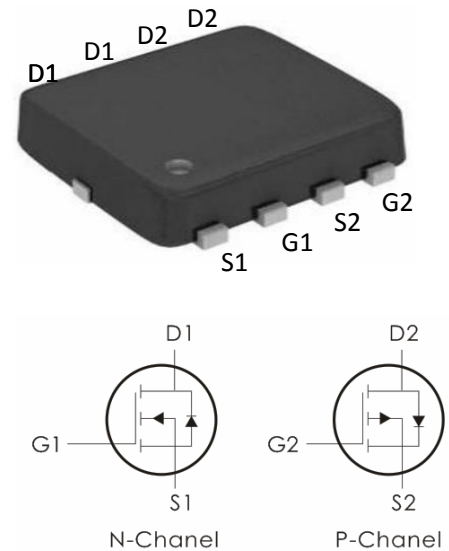
It can be used in a wide variety of applications.

Features:

N-Channel: $V_{DS}=20V, I_D=20A, R_{DS(on)} < 20m\Omega @ V_{GS}=4.5V$

P-Channel: $V_{DS}=-20V, I_D=-18A, R_{DS(on)} < 35m\Omega @ V_{GS}=-4.5V$

- 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.



Package Marking and Ordering Information:

Part NO.	Marking	Package	Packing
DOZ4604A	Z4604A	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	20	-20	V
V_{GS}	Gate-Source Voltage	± 12	± 12	V
I_D	Continuous Drain Current- $T_C=25^\circ C$	20	-18	A
	Continuous Drain Current- $T_C=100^\circ C$	14	-12	
I_{DM}	Pulsed Drain Current ¹	60	-55	A
E_{AS}	Single pulse avalanche energy ²	80	65	mJ
P_D	Power Dissipation - $T_C=25^\circ C$	20.8	20.8	W
$R_{\theta JC}$	Thermal Resistance, Junction to Cast ²	6	6	$^\circ C/W$
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150		$^\circ C$

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-Sourctce Breakdown Voltage	V _{GS} =0V, I _D =250 μ A	20	---	---	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{GS} =0V, V _{DS} =20V	---	---	1	μ A
I _{GSS}	Gate-Source Leakage Current	V _{GS} =± 12V, V _{DS} =0A	---	---	± 100	nA
On Characteristics						
V _{GS(th)}	Gate-Source Threshold Voltage	V _{GS} =V _{DS} , I _D =250 μ A	0.5	0.75	1	V
R _{DS(ON)}	Drain-Source On Resistance ³	V _{GS} =4.5V, I _D =4A	---	13	20	m Ω
		V _{GS} =2.5V, I _D =3A	---	20	30	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =10V, V _{GS} =0V, f=1MHz	---	676.4	---	pF
C _{oss}	Output Capacitance		---	121	---	
C _{rss}	Reverse Transfer Capacitance		---	108.1	---	
Q _g	Gate Charge	V _{GS} =0 to 4.5V , V _{DD} =10V I _D =3A	---	9.45	---	nC
Q _{gs}	Gate-Source Charge		---	1.69	---	
Q _{gd}	Gate-Drain Charge		---	2.62	---	
Switching Characteristics ⁴						
t _{d(on)}	Turn-On Delay Time	V _{DD} =10 V, I _D =3A, R _{REN} =3 Ω ,V _{GS} =4.5V	---	5.25	---	ns
t _r	Rise Time		---	16.8	---	ns
t _{d(off)}	Turn-Off Delay Time		---	24.15	---	ns
t _f	Fall Time		---	7.35	---	ns
Drain-Source Diode Characteristics						
I _S	Continuous Drain to Source Diode	VD=VG=0V	---	----	20	A
I _{SM}	Pulsed Drain to Source Diode ¹	VD=VG=0V	---	---	60	A
V _{SD}	Source-Drain Diode Forward Voltage	V _{GS} =0V, I _S =6.8A	---	---	1.2	V

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
2. $R_{\theta JA}$ is measured with the device mounted on a 1inch² pad of 2oz copper FR4 PCB
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$.

N-Typical Characteristics: ($T_C=25^\circ C$ unless otherwise noted)

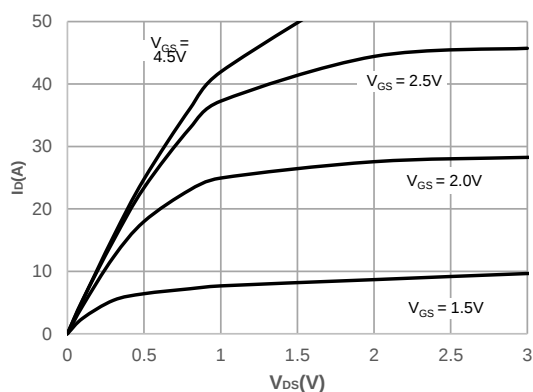


Figure 1: Output Characteristics

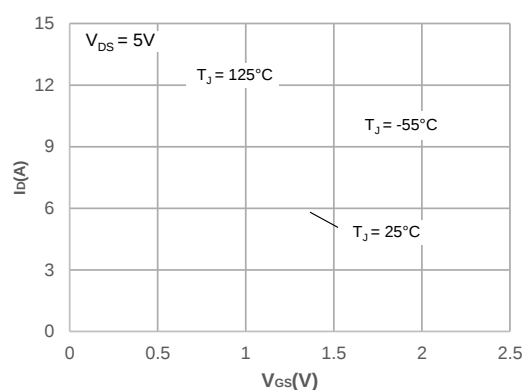


Figure 2: Typical Transfer Characteristics

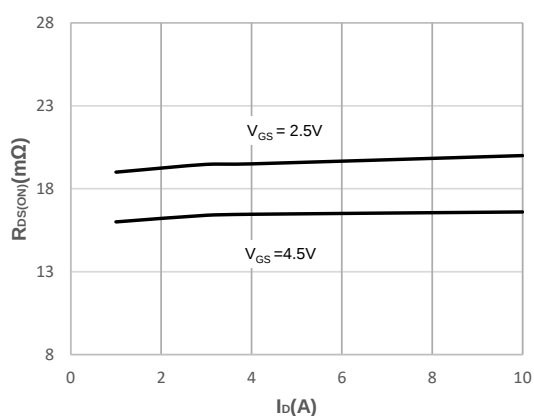


Figure 3: On-resistance vs. Drain Current

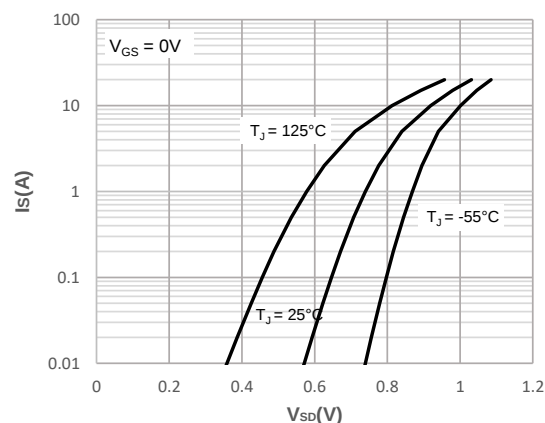


Figure 4: Body Diode Characteristics

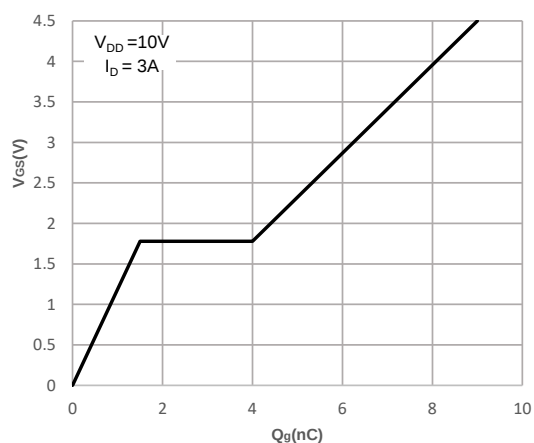


Figure 5: Gate Charge Characteristics

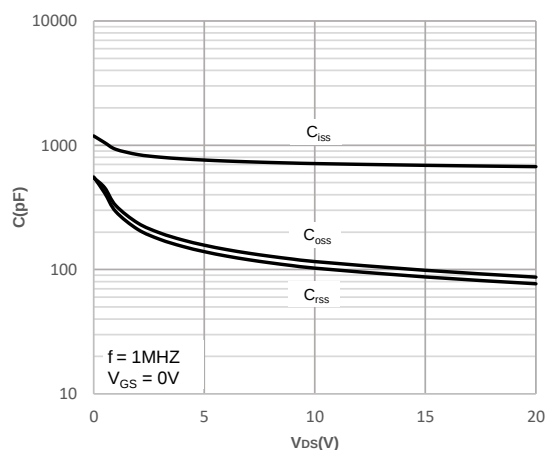


Figure 6: Capacitance Characteristics

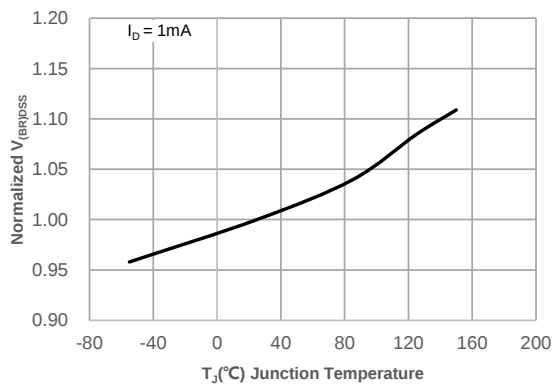


Figure 7: Normalized Breakdown voltage vs. Junction Temperature

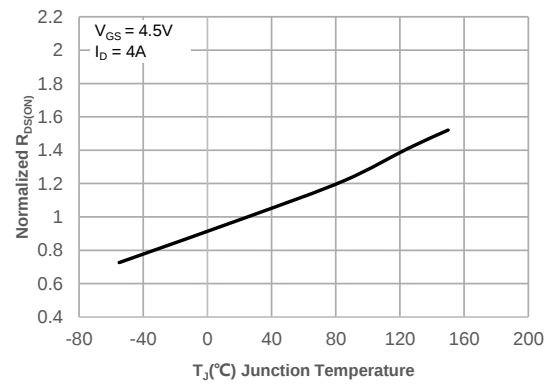


Figure 8: Normalized on Resistance vs. Junction Temperature

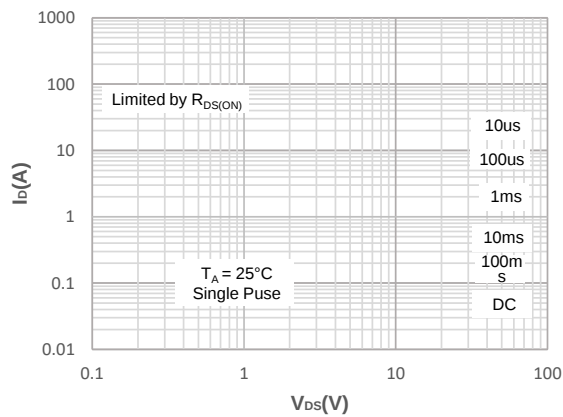


Figure 9: Maximum Safe Operating Area

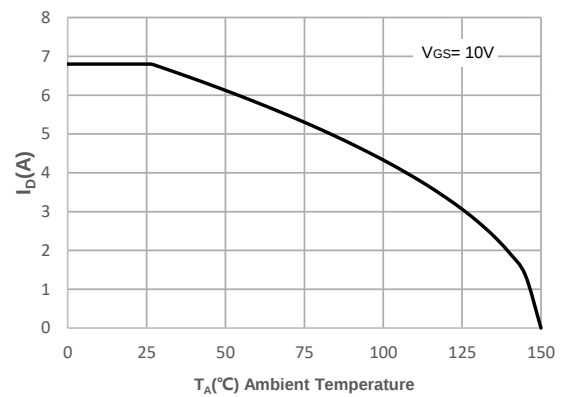


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

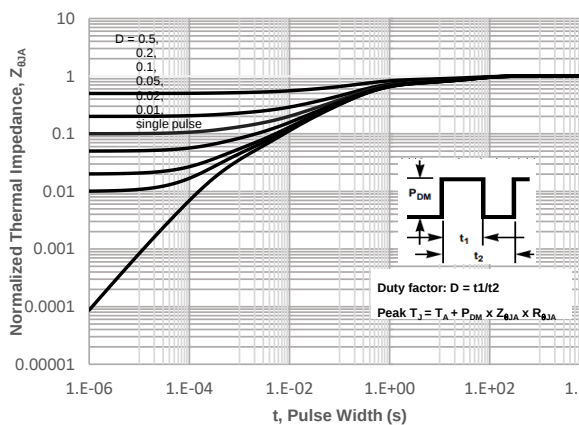


Figure 11: Normalized Maximum Transient Thermal Impedance

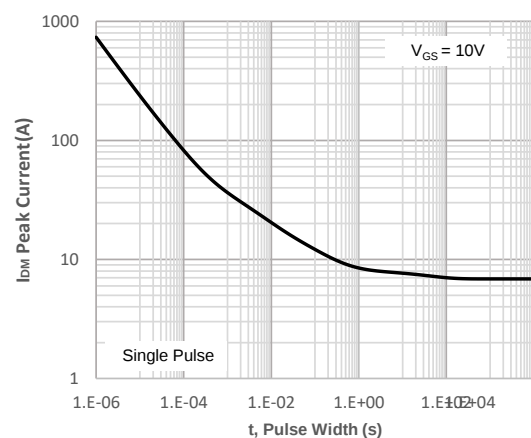


Figure 12: Peak Current Capacity

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-Sourctce Breakdown Voltage	V _{GS} =0V, I _D =-250 μ A	-20	---	---	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{GS} =0V, V _{DS} =-20V	---	---	-1	μ A
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±12V, V _{DS} =0A	---	---	±100	nA
On Characteristics						
V _{GS(th)}	Gate-Source Threshold Voltage	V _{GS} =V _{DS} , I _D =-250 μ A	-0.4	-0.7	-1	V
R _{DS(ON)}	Drain-Source On Resistance ³	V _{GS} =-4.5V, I _D =-4A	---	24	35	m Ω
		V _{GS} =-2.5V, I _D =-3A	---	35	50	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =-10V, V _{GS} =0V, f=1MHz	---	788.5	---	pF
C _{oss}	Output Capacitance		---	138.6	---	
C _{rss}	Reverse Transfer Capacitance		---	89.25	---	
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time	V _{DD} = -10V, I _D =-3.3A V _{GS} = -4.5V, R _{GEN} =1 Ω	---	10.5	---	ns
t _r	Rise Time		---	33.6	---	ns
t _{d(off)}	Turn-Off Delay Time		---	52.5	---	ns
t _f	Fall Time		---	53.55	---	ns
Q _g	Total Gate Charge	V _{GS} =-10V, V _{DD} =-4.5V, I _D =-2A	---	9.24	---	nC
Q _{gs}	Gate-Source Charge		---	1.47	---	nC
Q _{gd}	Gate-Drain “Miller” Charge		---	1.99	---	nC
Drain-Source Diode Characteristics						
I _S	Continuous Drain to Source Diode	V _D =V _G =0V	---	---	-18	A
I _{SM}	Pulsed Drain to Source Diode ¹		---	---	-55	---
V _{SD}	Source-Drain Diode Forward Voltage	V _{GS} =0V, I _S =-7A	---	---	-1.2	V

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

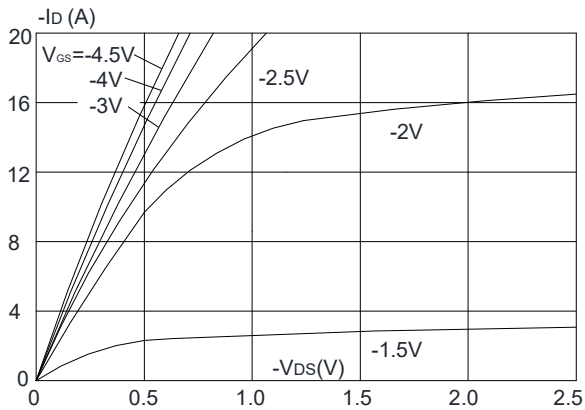


Figure 1: Output Characteristics

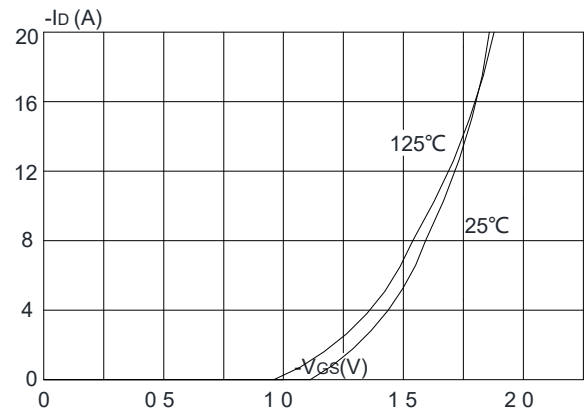


Figure 2: Typical Transfer Characteristics

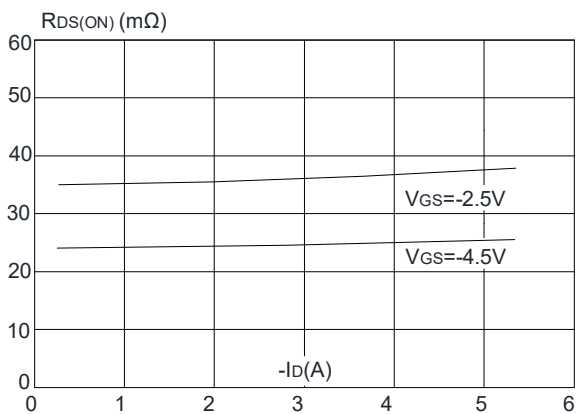


Figure 3: On-resistance vs. Drain Current

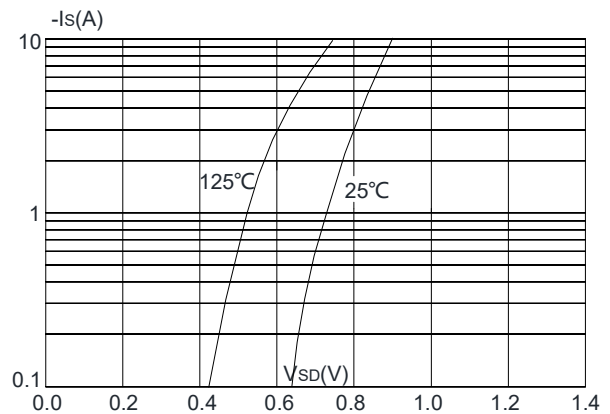


Figure 4: Body Diode Characteristics

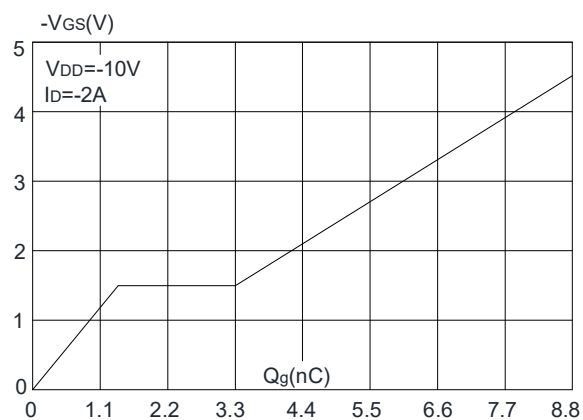


Figure 5: Gate Charge Characteristics

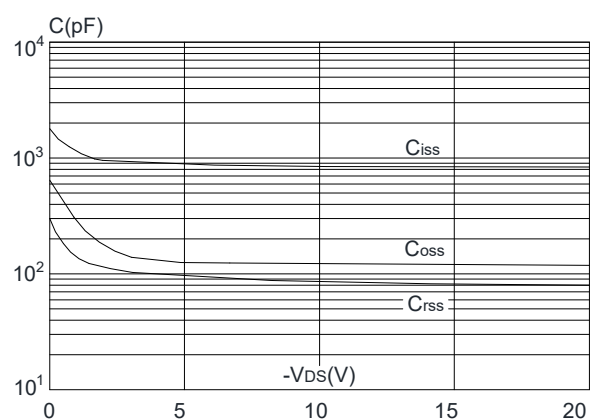


Figure 6: Capacitance Characteristics

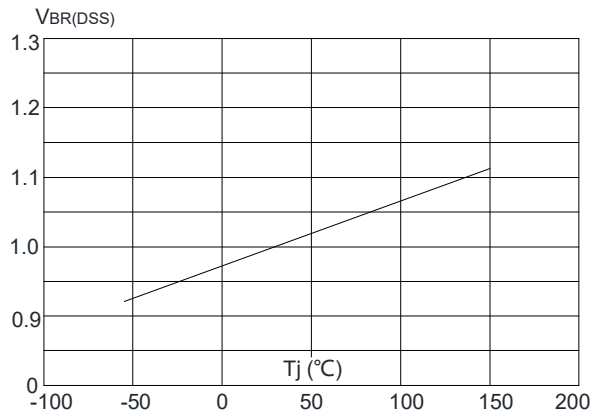


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

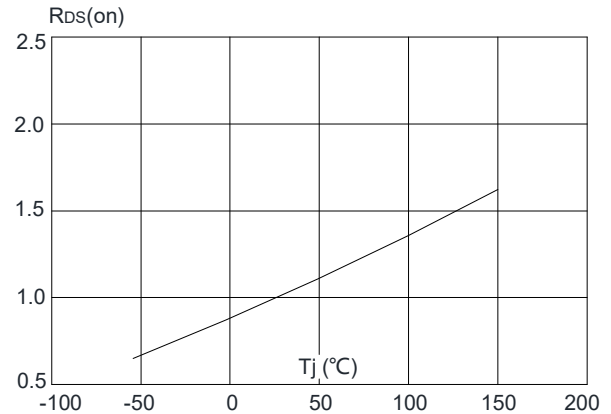


Figure 8: Normalized on Resistance vs. Junction Temperature

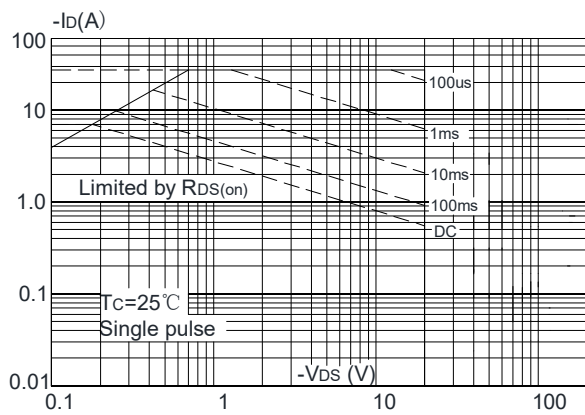


Figure 9: Maximum Safe Operating Area

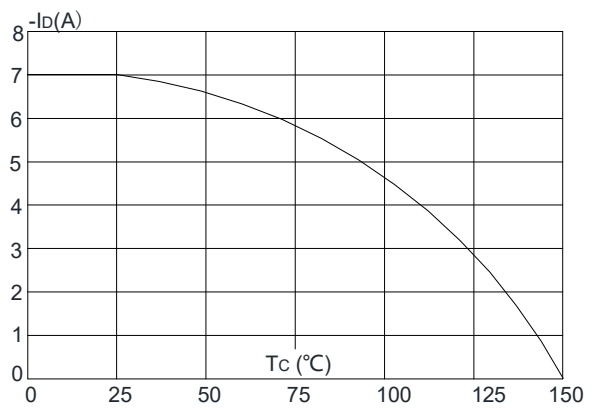


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

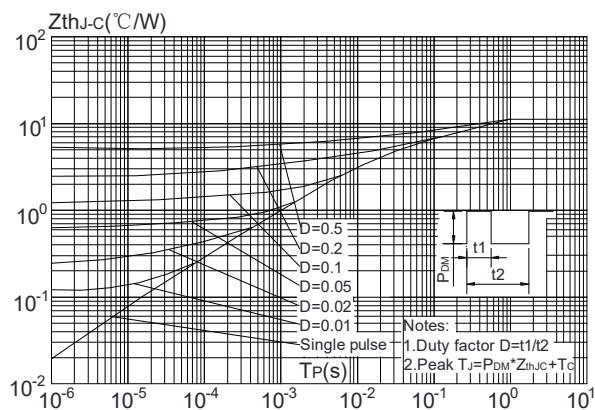
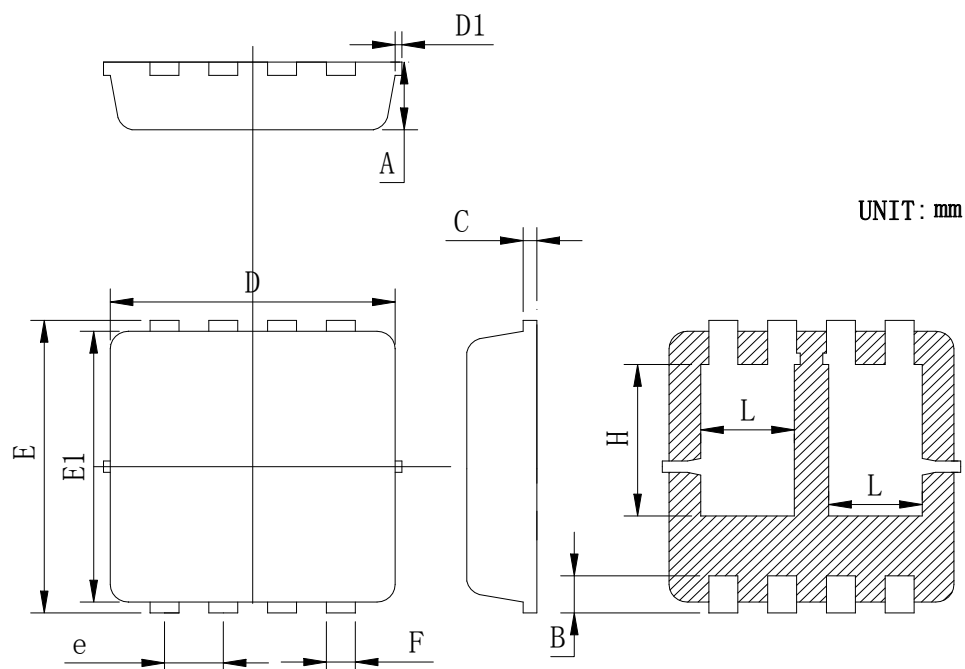


Figure 11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

DFN3X3-8D Package 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

Marking Information:

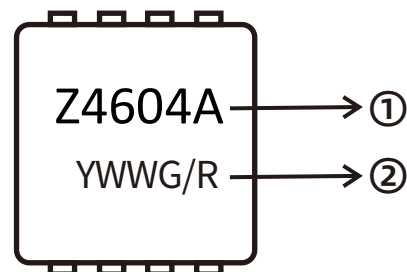
①: Part NO.

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	2024-04-12	Release of final version

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