

7A 650V N-channel Enhancement Mode Power MOSFET

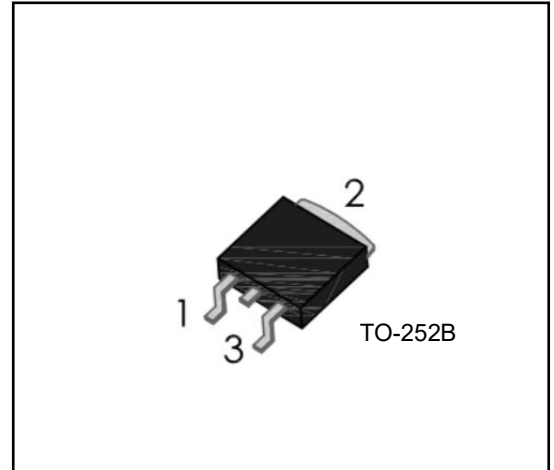
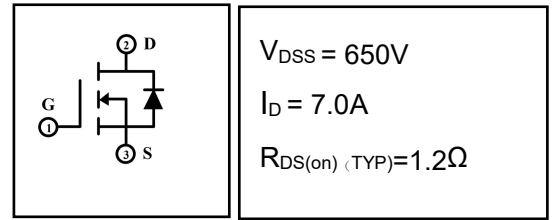
1 Description

These N-channel enhanced vdmofets, is obtained by the self-aligned planar technology which reduce the conduction loss, improve switching performance and enhance the avalanche energy. Which accords with the RoHS standard.

- Fast switching
- ESD improved capability
- Low on resistance($R_{dson} \leq 1.4\Omega$)
- Low gate charge(Typ: 24nC)
- Low reverse transfer capacitances(Typ: 5.5pF)
- 100% single pulse avalanche energy test
- 100% ΔV_{DS} test

3 Applications

- Used in various power switching circuit for system miniaturization and higher efficiency.
- Power switch circuit of electron ballast and adaptor.



4 Electrical Characteristics

4.1 Absolute Maximum Ratings (Tc=25°C, unless otherwise noted)

PARAMETER	SYMBOL	VALUE	UNIT
Drian-Source Voltage	V_{DS}	650	V
Gate-Source Voltage	V_{GS}	± 30	V
Drain Current(continuous) ^(Note 3)	I_D	7	A
Drain Current(continuous)(T=100°C) ^(Note 3)	I_D	4.4	A
Drain Current(Pulsed)	I_{DM}	28	A
Single Pulse Avalanche Energy ^(Note 4)	E_{AS}	350	mJ
Derating Factor above	$T_a = 25^\circ C$	0.8	W
Power Dissipation	$T_c = 25^\circ C$		
Operating Junction Temperature Range	T_j	-55 ~ 150	°C
Storage Temperature Range	T_{stg}	-55 ~ 150	°C

4.2 Thermal Characteristics

PARAMETER	SYMBOL	VALUE	UNIT
Thermal Resistance, Junction to Case-sink	R_{thJC}	1.25	°C/W
Thermal Resistance, Junction to Ambient	R_{thJA}	100	°C/W

4.3 Electrical Characteristics (Tc=25°C, unless otherwise noted)

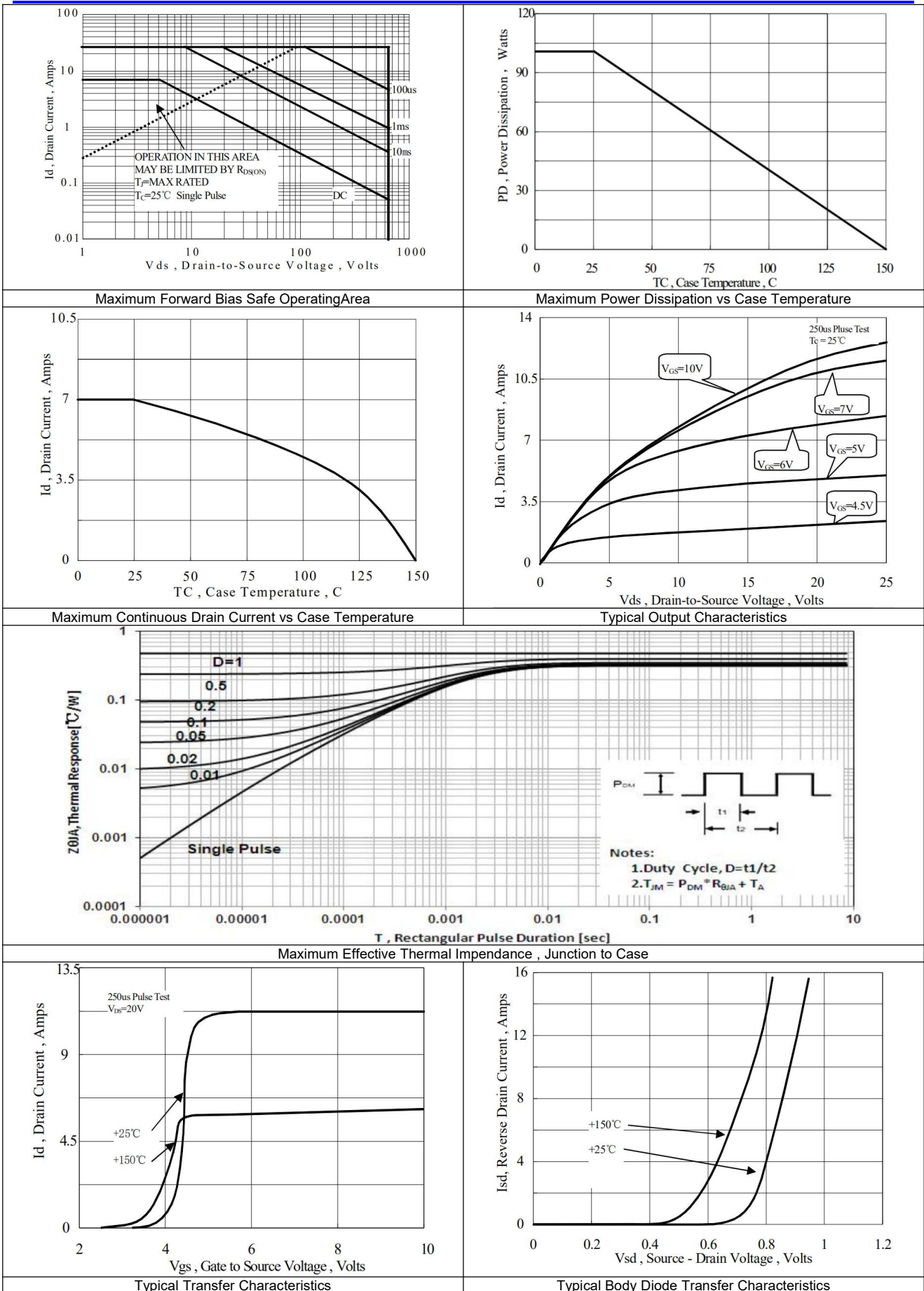
PARAMETER	SYMBOL	Test Condition	VALUE			UNIT
			MIN	TYP	MAX	
Off Characteristics						
Drain-source Breakdown Voltage	BV_{DSS}	$I_D=250\mu A, V_{GS}=0V$	650	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=650V, V_{GS}=0V, T_C=25^\circ C$	--	--	1	μA
		$V_{DS}=520V, V_{GS}=0V, T_C=125^\circ C$	--	--	100	μA
Gate-to-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 30V, V_{DS}=0V$	--	--	± 100	nA
On Characteristics (Note 3)						
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0	--	4.0	V
Drain-source on Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=3.5A$	--	1.2	1.4	Ω
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=25V, f=1.0MHz$	--	1130	--	pF
Output Capacitance	C_{oss}		--	93	--	
Reverse Transfer Capacitance	C_{rss}		--	5.5	--	
Turn-on Delay Time	$T_{d(on)}$	$I_D=7A, V_{DD}=325V, V_{GS}=10V, R_G=10\Omega$	--	19	--	ns
Turn-on Rise Time	t_r		--	21	--	
Turn-off Delay Time	$T_{d(off)}$		--	42	--	
Turn-off Fall	t_f		--	19	--	
Total Gate Charge	Q_g	$I_D=7A, V_{DD}=520V, V_{GS}=10V$	--	24	--	nC
Gate-to-Source Charge	Q_{gs}		--	5.1	--	
Gate-to-Drain("Miller")C harge	Q_{gd}		--	9.5	--	
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{FSD}	$V_{GS}=0V, I_S=7A$	--	--	1.5	V
Continuous Source Current (BodyDiode) (Note 3)	I_S		--	--	7	A
Reverse Recovery Time	t_{rr}	$T_J=25^\circ C, I_F=7A, dI_F/dt=100A/\mu S, V_{GS}=0V$	--	385	--	ns
Reverse Recovery Charge	Q_{rr}		--	2000	--	nC

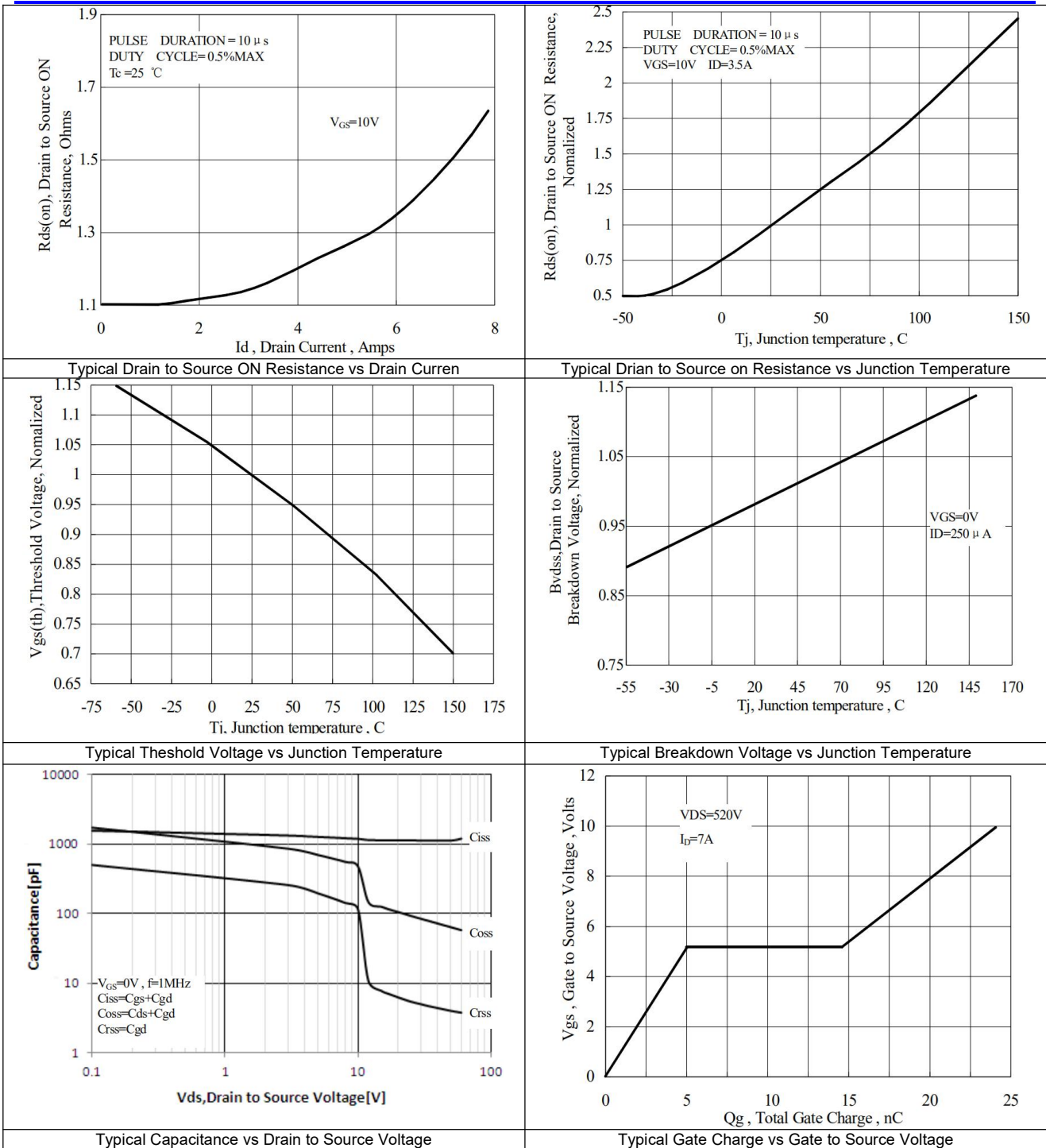
Notes:

- 1: Repetitive rating, pulse width limited by maximum junction temperature.
- 2: Surface mounted on FR4 Board, $t_s \leq 10sec$.
- 3: Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
- 4: $L=10mH, I_D=8.4A, V_{DD}=50V, Start T_J=25^\circ C$.

5 Typical Test Circuit and Waveform

<p style="text-align: center;">Gate Charge Test Circuit</p>	<p style="text-align: center;">Gate Charge Waveforms</p>
<p style="text-align: center;">Resistive Switching Test Circuit</p>	<p style="text-align: center;">Resistive Switching Waveforms</p>
<p style="text-align: center;">Diode Reverse Recovery Test Circuit</p>	<p style="text-align: center;">Diode Reverse Recovery Waveform</p> $E_{AS} = \frac{I_{AS}^2 L}{2}$
<p style="text-align: center;">Unclamped Inductive Switching Test Circuit</p>	<p style="text-align: center;">Unclamped Inductive Switching Waveform</p>



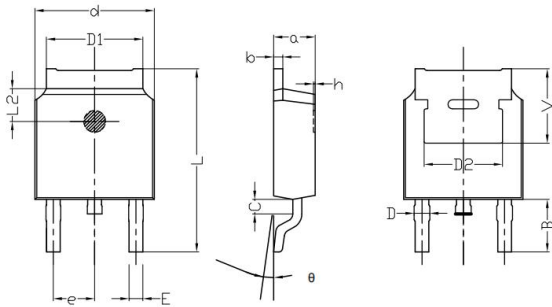


6 Product Specifications and Packaging Models

Product Model	Package Type	Mark Name	RoHS	Package	Quantity
D7N65	TO-252	DHD7N65	Pb-free	Braid	2500/disc

7 Dimensions

TO-252 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	min.	max.	min.	max.
a	2.20	2.40	0.087	0.095
b	0.46	0.58	0.018	0.023
c	0.70	0.90	0.028	0.035
D	0.80	0.90	0.032	0.035
d	6.50	6.70	0.2561	0.2640
D1	5.10	5.46	0.201	0.215
D2	4.73	4.93	0.1864	0.1942
A	6.00	6.20	0.2364	0.2443
e	2.19	2.39	0.0861	0.0940
L	10.40	11.00	0.4098	0.4334
B	3.5	3.7	0.1379	0.1458
L2	1.5	1.7	0.0591	0.0670
theta	0	8	0	8
h	0	0.3	0	0.0118
V	5.25	5.45	0.2069	0.2147
E	0.6	0.8	0.0236	0.0315

8 Attentions

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- Product promotion is endless, our company will be dedicated to provide customers with better products.

9 Appendix

Revision history:

Date	REV.	Description	Page
2020.03.09	1.0	Original	
2023.8.09	1.1	Modify company name	all