Common-Drain Dual N-Channel MOSFET

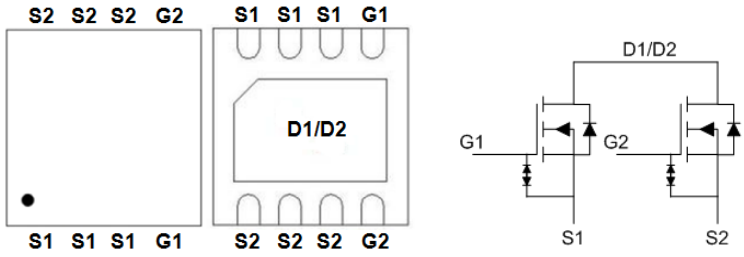
Features

V_{DS} = 20V,
I_D = 40.4A
$R_{DS(ON)}$ @V_{GS}= 4.5V, TYP 4.8mΩ
$R_{DS(ON)}$ @V_{GS}= 4.0V, TYP 4.9mΩ
$R_{DS(ON)}$ @V_{GS}= 3.8V, TYP 5.0mΩ
$R_{DS(ON)}$ @V_{GS}= 3.1V, TYP 5.3mΩ
$R_{DS(ON)}$ @V_{GS}= 2.5V, TYP 6.0mΩ

General Description

• Battery protection
• Load switching

Pin Configurations



TDFN3*3-8L

Absolute Maximum Ratings @T_A=25℃ unless otherwise noted

Parameter		Symbol	Ratings	Unit
Drain-Source Voltage		V_{DSS}	20	V
Gate-Source Voltage		V_{GSS}	±12	V
Drain Current (Continuous) *C	T_C=25°C	I_D	40.4	A
	T_C=70°C		32.3	
Drain Current (Pulse) *B		I_{DM}	90	A
Power Dissipation	T_C=25°C	P_D	14.7	W
Operating Temperature/ Storage Temperature		T_J/T_{STG}	-55~150	℃

Thermal Resistance Ratings

Parameter		Symbol	Maximum	Unit
Maximum Junction-to-Ambient *A	t≤10s	R_{thJA}	50	°C/W
Maximum Junction-to-Case (Drain)	Steady State	R_{thJC}	8.5	

● **Electrical Characteristics** @T_A=25℃ unless otherwise noted

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static *D						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D= 250μA	20	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 16V, V_{GS} = 0V	--	--	1	μA
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS}, I_{DS}= 250μA	0.3	--	1	V
Gate Leakage Current	I_{GSS}	V_{GS}= ±10V, V_{DS}=0V	--	--	±10	μA
Drain-Source On-state Resistance	$R_{DS(on)}$	V_{GS} = 4.5V, I_D = 3A	--	4.8	6.0	mΩ
	$R_{DS(on)}$	V_{GS} = 4.0V, I_D = 3A	--	4.9	6.1	mΩ
	$R_{DS(on)}$	V_{GS} = 3.8V, I_D = 3A	--	5.0	6.3	mΩ
	$R_{DS(on)}$	V_{GS} = 3.1V, I_D = 3A	--	5.3	6.6	mΩ
	$R_{DS(on)}$	V_{GS} = 2.5V, I_D = 3A	--	6.0	8.0	mΩ
Diode Forward Voltage	V_{SD}	I_{SD}= 1A , V_{GS}=0V	--	--	1.2	V
Diode Forward Current *C	I_S	T_C =25°C	--	--	12	A
Switching						
Total Gate Charge	Q_g	V_{DS}=10V,I_D=3A, V_{GS}=4.5V	--	11	--	nC
Gate-Source Charge	Q_{gs}		--	3	--	nC
Gate-Drain Charge	Q_{gd}		--	2.5	--	nC
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=10V , I_D=3A V_{GEN}=4.5V, R_G=6Ω	--	11	--	ns
Turn-on Rise Time	t_r		--	16	--	ns
Turn-off Delay Time	$t_{d(off)}$		--	21	--	ns
Turn-Off Fall Time	t_f		--	26	--	ns
Dynamic						
Input Capacitance	C_{iss}	V_{DS}=10V,V_{GS}=0V, f=1.0MHz	--	960	--	pF
Output Capacitance	C_{oss}		--	220	--	pF
Reverse Transfer Capacitance	C_{rss}		--	55	--	pF

A: The value of $R_{\theta JA}$ is measured with the device mounted on 1in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The value in any given application depends on the user's specific board design.

B: Repetitive rating, pulse width limited by junction temperature.

C: The current rating is based on the t≤ 10s junction to ambient thermal resistance rating.

D: Pulse Test：Pulse Wide≤ 300μs，Duty Cycle≤ 2%.

- **Typical Performance Characteristics（TJ = 25 °C, unless otherwise noted）**

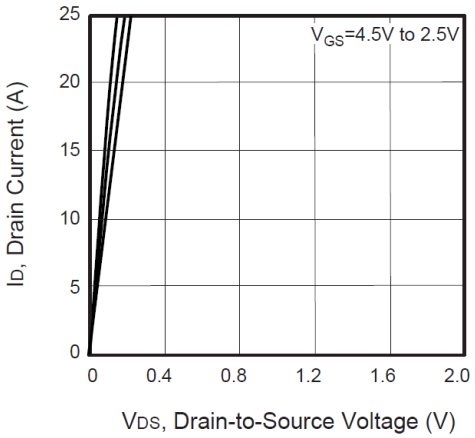


Figure 1. Output Characteristics

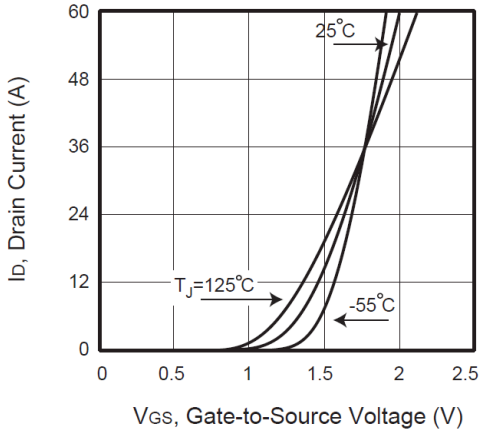


Figure 2. Transfer Characteristics

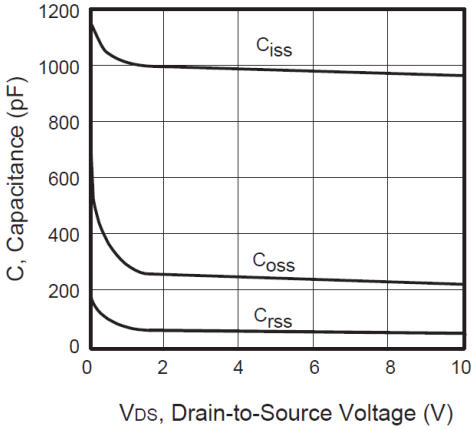


Figure 3. Capacitance

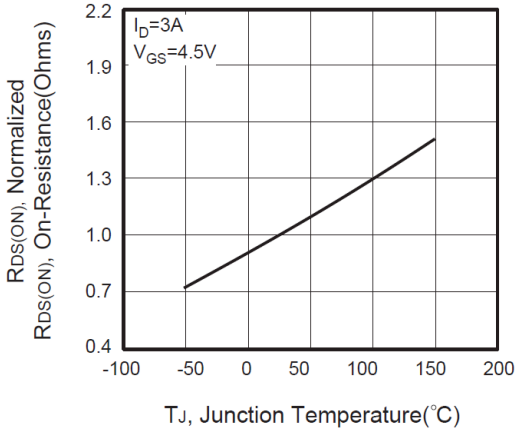


Figure 4. On-Resistance Variation with Temperature

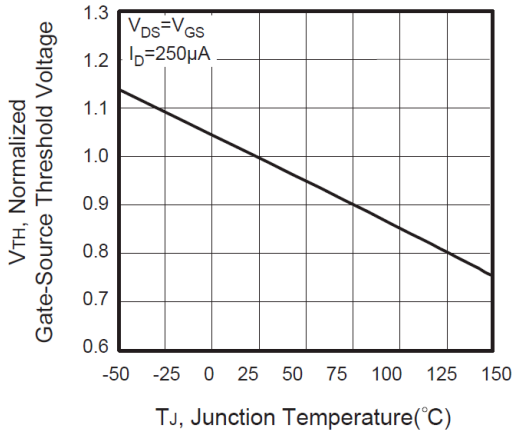


Figure 5. Gate Threshold Variation with Temperature

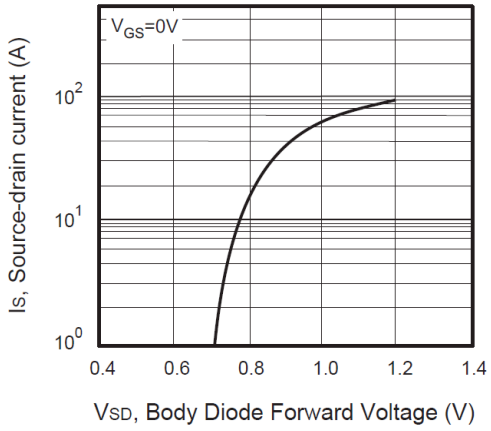


Figure 6. Body Diode Forward Voltage Variation with Source Current

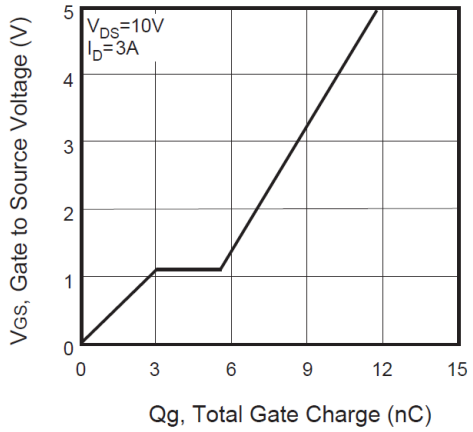


Figure 7. Gate Charge

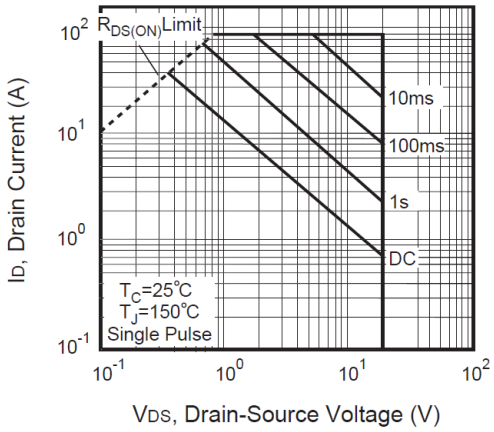


Figure 8. Maximum Safe Operating Area

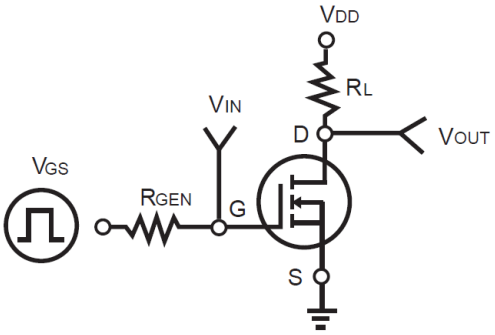


Figure 9. Switching Test Circuit

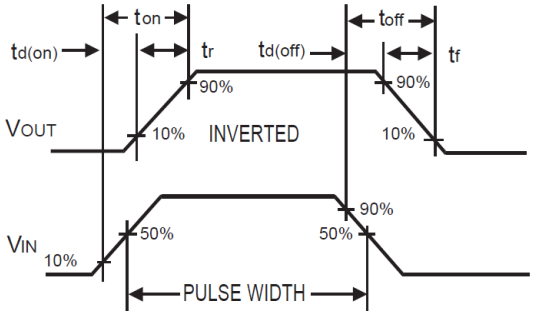


Figure 10. Switching Waveforms

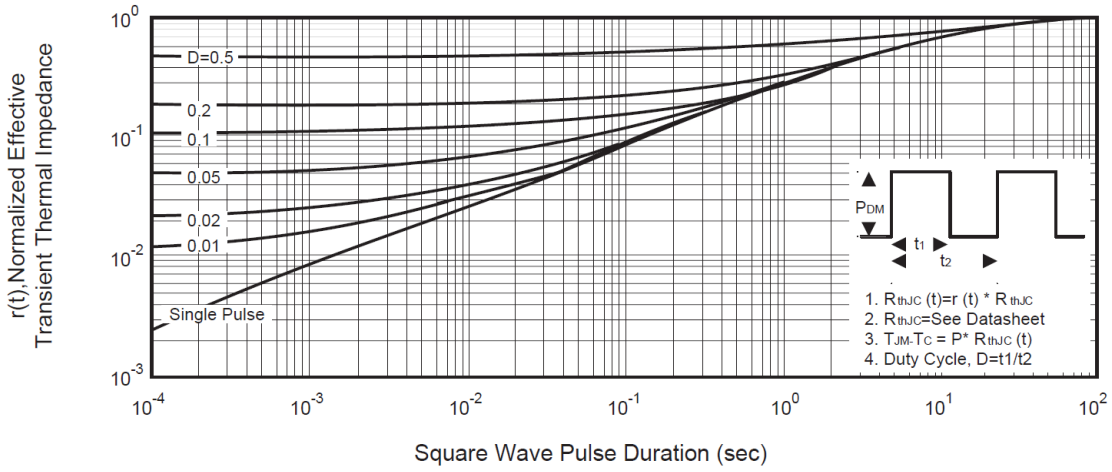
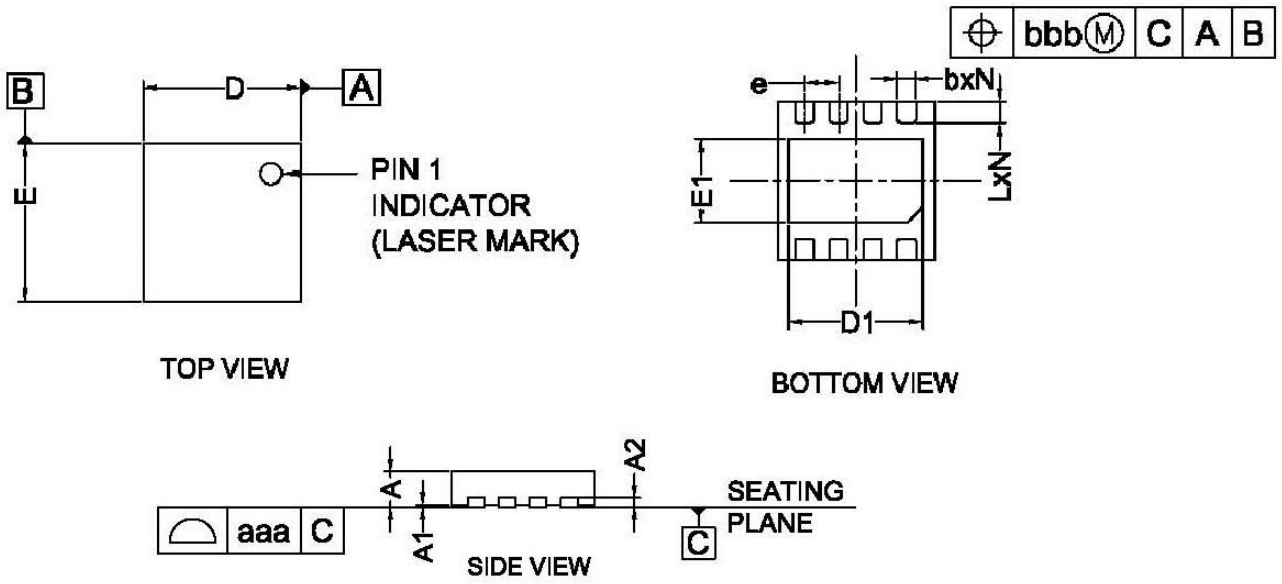


Figure 10. Normalized Thermal Transient Impedance Curve

- **Package Information**



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	TYP	MAX
A	0.70	0.75	0.80
A1	0.00	0.02	0.05
A2		0.203	
b	0.25	0.30	0.35
D	2.924	3.00	3.076
D1	2.20	2.30	2.40
E	2.924	3.00	3.076
E1	1.40	1.50	1.60
e		0.65BSC	
L	0.35	0.40	0.45
K	0.20	-	-
N		8	
aaa		0.08	
bbb		0.10	

NOTES:
1.CONTROLLING DIMENSIONS ARE IN MILLIMETERS(ANGLES IN DEGREES).
2. COPLANARITY APPLIES TO THE EXPOSED PAD AS THE TERMINALS.

Flow (wave) soldering (solder dipping)

Product	Peak Temperature	Dipping Time
Pb device	245℃±5℃	5sec±1sec
Pb-Free device	260℃+0/-5℃	5sec±1sec

This integrated circuit can be damaged by ESD UniverChip Corporation recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedure can cause damage. ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

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