UMW FDC604P

-20V P-Channel MOSFET

1.Description

The FDC604P is the high cell density trenched P-channel MOSFETs, which provide excellent $R_{DS(ON)}$ and gate charge for most of the synchr-onous buck converter applications.

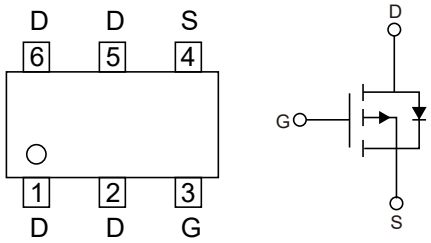
2.Features

- $V_{DS\ (V)}$=-20V
- I_D=-6A(V_{GS}=10V)
- $R_{DS(ON)}$<28mΩ(V_{GS}=4.5V)
- $R_{DS(ON)}$<38mΩ(V_{GS}=2.5V)

3.Pinning information

Pin	Symbol	Description
1,2,5,6	D	DRAIN
3	G	GATE
4	S	SOURCE

SOP-8



4.Absolute Maximum Ratings T_A=25°C unless otherwise noted

Parameter		Symbol	Rating	Units
Drain Source Voltage		V_{DS}	-20	V
Gate Source Voltage		V_{GS}	±12	V
Continuous Drain Current, V_{GS}=-4.5V [1]	T_A=25°C	I_D	-6	A
	T_A=70°C		-3	A
Pulsed Drain Current [2]		I_{DM}	-16	A
Total Power Dissipation [3]	T_A=25°C	P_D	1.31	W
Total Power Dissipation [3]	T_A=70°C		0.84	W
Storage Temperature Range		T_{STG}	-55 to 150	°C
Operating Junction Temperature Range		T_J	-40 to 105	°C

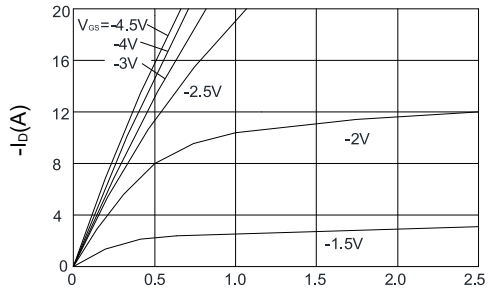
5.Electrical Characteristics (T_J=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_{DS}=-250μA	-20			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-20V, V_{GS}=0V			1	μA
Gate-Body Leakage	I_{GSS}	V_{GS}=±12V, V_{DS}=0V			±100	nA
ON CHARACTERISTIC						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_{DS}=-250μA	-0.4	-0.7	-1	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=-4.5V, I_D=-4.1A		28	35	mΩ
		V_{GS}=-2.5V, I_D=-3A		38	53	mΩ
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{iss}	V_{DS}=-10V, V_{GS}=0V, f=1MHz		830		pF
Output Capacitance	C_{oss}			132		pF
Reverse Transfer Capacitance	C_{rss}			85		pF
Total Gate Charge	Q_g	V_{DS}=-10V, I_D=-2A, V_{GS}=-4.5V		8.8		nC
Gate-Source Charge	Q_{gs}			1.4		nC
Gate-Drain(“Miller”) Charge	Q_{gd}			1.9		nC
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	$t_{D(on)}$	V_{DD}=-10V, I_D=-3.3A R_G=1Ω, V_{GEN}=-4.5A		10		ns
Rise Time	t_r			32		ns
Turn-Off Delay Time	$t_{D(off)}$			50		ns
Fall Time	t_f			51		ns
Maximum Continuous Drain to Source Diode ForwardCurrent	I_S				-5	A
Maximum Pulsed Drain to Source Diode Forward Current	I_{SM}				-16	A
Drain to Source Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=-4.1A			-1.2	V

Notes: 1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.

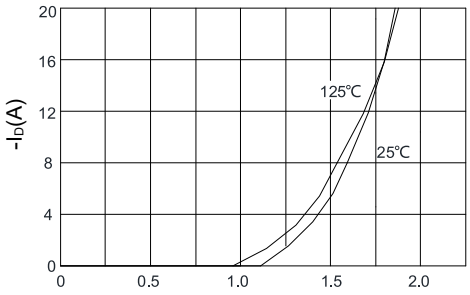
2. Pulse Test: Pulse Width≤300μs, Duty Cycle ≤ 2%.

6.1Typical Characterisitics



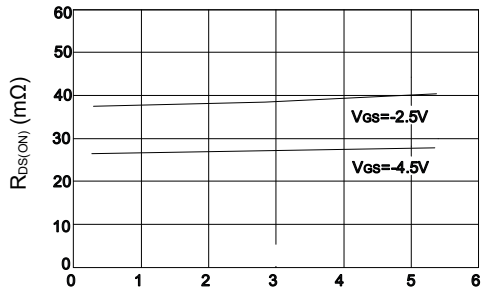
$-V_{DS}(V)$

Figure 1: Output Characteristics



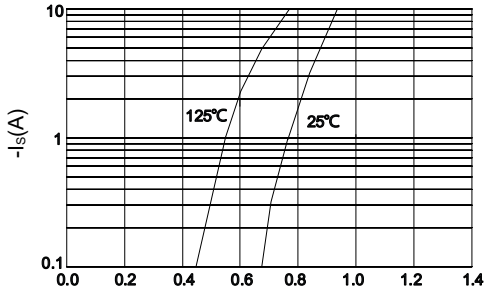
$-V_{GS}(V)$

Figure 2: Typical Transfer Characteristics



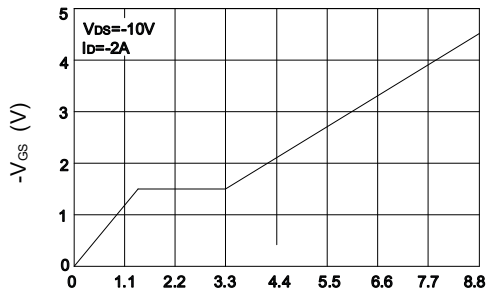
$-I_D$ (A)

Figure 3: On-resistance vs. Drain Current



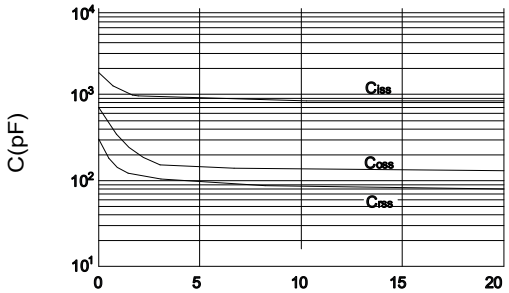
$V_{SD}(V)$

Figure 4: Body Diode Characteristics



Q_g (nC)

Figure 5: Gate Charge Characteristics



$-V_{DS}(V)$

Figure 6: Capacitance Characteristics

6.2Typical Characterisitics

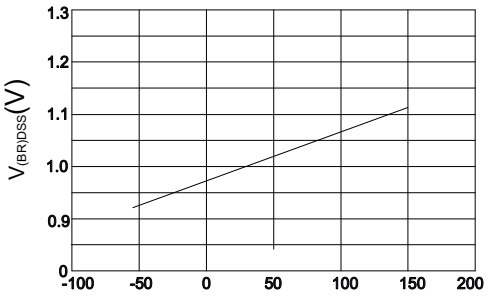


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

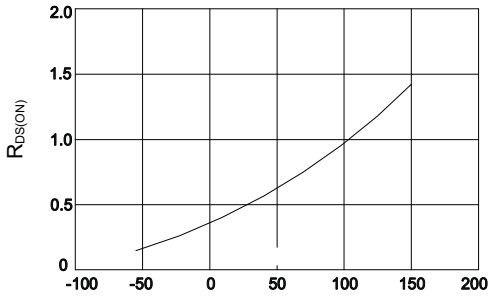


Figure 8: Normalized on Resistance vs. Junction Temperature

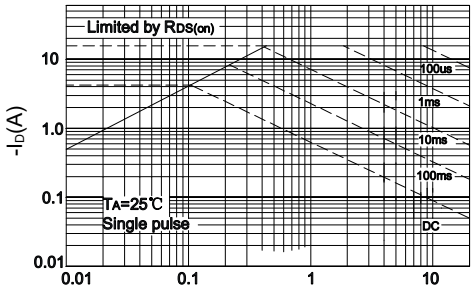


Figure 9: Maximum Safe Operating Area

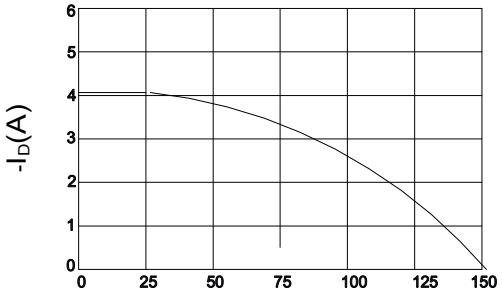


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

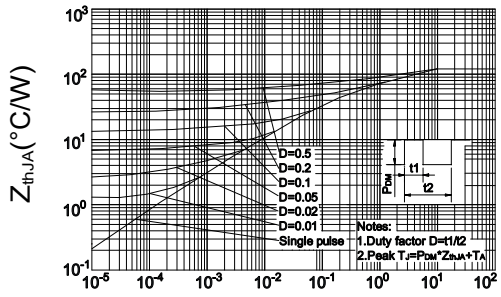
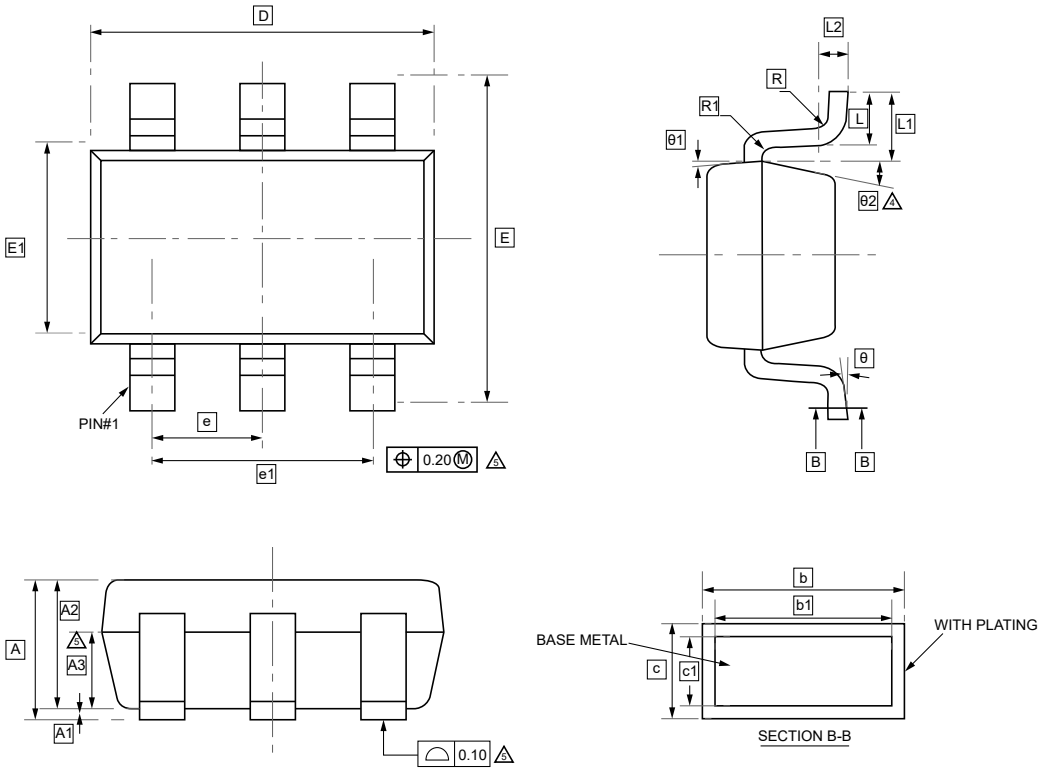


Figure 11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

7.SOT23-6 Package Outline Dimensions

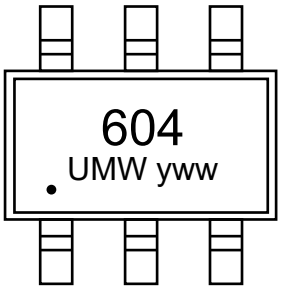


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	A3	b	b1	c	c1	D	E	E1	e	e1	L	L1	L2
Min		0	1.00	0.60	0.36	0.36	0.14	0.14	2.826	2.60	1.526	0.90	1.80	0.35	0.59	0.25
Max	1.25	0.15	1.20	0.70	0.50	0.45	0.16	0.16	3.026	3.00	1.726	1.00	2.00	0.60	REF	BSC

Symbol	R	R1	θ	θ1	θ2
Min	0.10	0.10	0°	3°	6°
Max		0.20	8°	7°	14°

8.Ordering information



yww: Batch Code

Order Code	Package	Base QTY	Delivery Mode
UMW FDC604P	SOT23-6	3000	Tape and reel

10.Disclaimer

UMW reserves the right to make changes to all products, specifications. Customers should obtain the latest version of product documentation and verify the completeness and currency of the information before placing an order.

When applying our products, please do not exceed the maximum rated values, as this may affect the reliability of the entire system. Under certain conditions, any semiconductor product may experience faults or failures. Buyers are responsible for adhering to safety standards and implementing safety measures during system design, prototyping, and manufacturing when using our products to prevent potential failure risks that could lead to personal injury or property damage.

Unless explicitly stated in writing, UMW products are not intended for use in medical, life-saving, or life-sustaining applications, nor for any other applications where product failure could result in personal injury or death. If customers use or sell the product for such applications without explicit authorization, they assume all associated risks.

When reselling, applying, or exporting, please comply with export control laws and regulations of China, the United States, the United Kingdom, the European Union, and other relevant countries, regions, and international organizations.

This document and any actions by UMW do not grant any intellectual property rights, whether express or implied, by estoppel or otherwise. The product names and marks mentioned herein may be trademarks of their respective owners.