

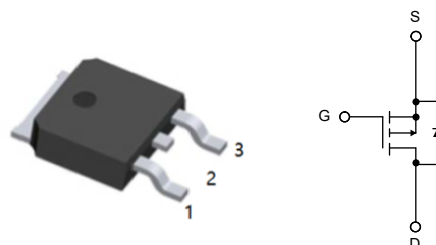
1.Features

- $V_{DS(V)} = -40V$
- $R_{DS(ON)} < 17m\Omega (V_{GS} = -10V)$
- $R_{DS(ON)} < 28m\Omega (V_{GS} = -4.5V)$
- Package with low thermal resistance

2.Pinning information

Pin	Symbol	Description
1	G	GATE
3	S	SOURCE
2	D	DRAIN

TO-252(DPAK)
top view



3.Absolute Maximum Ratings $T_c = 25^\circ C$

Parameter		Symbol	Rating	Units
Drain-Source Voltage		V_{DS}	-40	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current	$T_c = 25^\circ C^a$	I_D	-50	A
	$T_c = 125^\circ C$		-39	
Continuous Source Current (Diode Conduction) ^a		I_S	-50	
Pulsed Drain Current ^b		I_{DM}	-200	
Single Pulse Avalanche Current	L=0.1mH	I_{AS}	-40	
Single Pulse Avalanche Energy		E_{AS}	80	mJ
Maximum Power Dissipation ^b	$T_A = 25^\circ C$	P_D	3	W
	$T_c = 25^\circ C$		136	W
	$T_c = 125^\circ C$		45	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 175	$^\circ C$



4.Thermal resistance rating

Parameter		Symbol	Max	Units
Junction-to-Ambient	PCB Mount ^c	R _{thJA}	50	°C/W
Junction-to-Foot (Drain)		R _{thJC}	1.1	°C/W

Notes

- a. Package limited.
- b. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %.
- c. When mounted on 1" square PCB (FR4 material).
- d. Parametric verification ongoing.



5. Electrical Characteristic ($T_c=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static						
Drain-source breakdown voltage	V _{DS}	V _{GS} =0V, I _D =-250μA	-40			V
Gate-source threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =-250μA	-1.5		3.5	V
Gate-source leakage	I _{GSS}	V _{DS} =0V, V _{GS} =±20V			+100	nA
Zero gate voltage drain current	I _{DSS}	V _{GS} =0V, V _{DS} =-40V			-1	μA
		V _{GS} =0V, V _{DS} =-40V, T _J =125°C			-50	μA
		V _{GS} =0V, V _{DS} =-40V, T _J =175°C			-150	μA
On-State Drain Current ^a	I _{D(ON)}	V _{GS} =-10V, V _{DS} ≤-5V	-50			A
Drain-Source On-State Resistance ^a	R _{DS(ON)}	V _{GS} =-10V, I _D =-17A			17	mΩ
		V _{GS} =-4.5V, I _D =-14A			29	mΩ
Forward transconductance ^a	g _{FS}	V _{DS} =-15V, I _D =-17A		61		S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{DS} =-25V, V _{GS} =0V, f=1MHz		2872	3950	pF
Output Capacitance	C _{oss}			508	635	pF
Reverse Transfer Capacitance	C _{rss}			352	440	pF
Total gate charge ^c	Q _g	V _{DS} =-30V, V _{GS} =-10V, I _D =-50A		60	80	nC
Gate-source charge ^c	Q _{gs}			5.7	8.6	nC
Gate-drain charge ^c	Q _{gd}			14.7	22	nC
Gate resistance	R _g	f=1MHz	1.5	3	4.5	Ω
Turn-On Delay Time ^c	t _{D(on)}	V _{DD} =-20V R _L =0.4Ω, I _D ≈-50A V _{GEN} =-10V, R _G =1Ω		10	15	ns
Rise Time ^c	t _r			12	18	ns
Turn-Off Delay Time ^c	t _{D(off)}			40	60	ns
Fall time ^c	t _f			16	24	ns
Source-Drain Diode Ratings and Characteristics ^b						
Pulsed Current ^a	I _{SM}				-200	A
Forward Voltage	V _{SD}	I _F =-50A, V _{GS} =0V		-1	-1.5	V

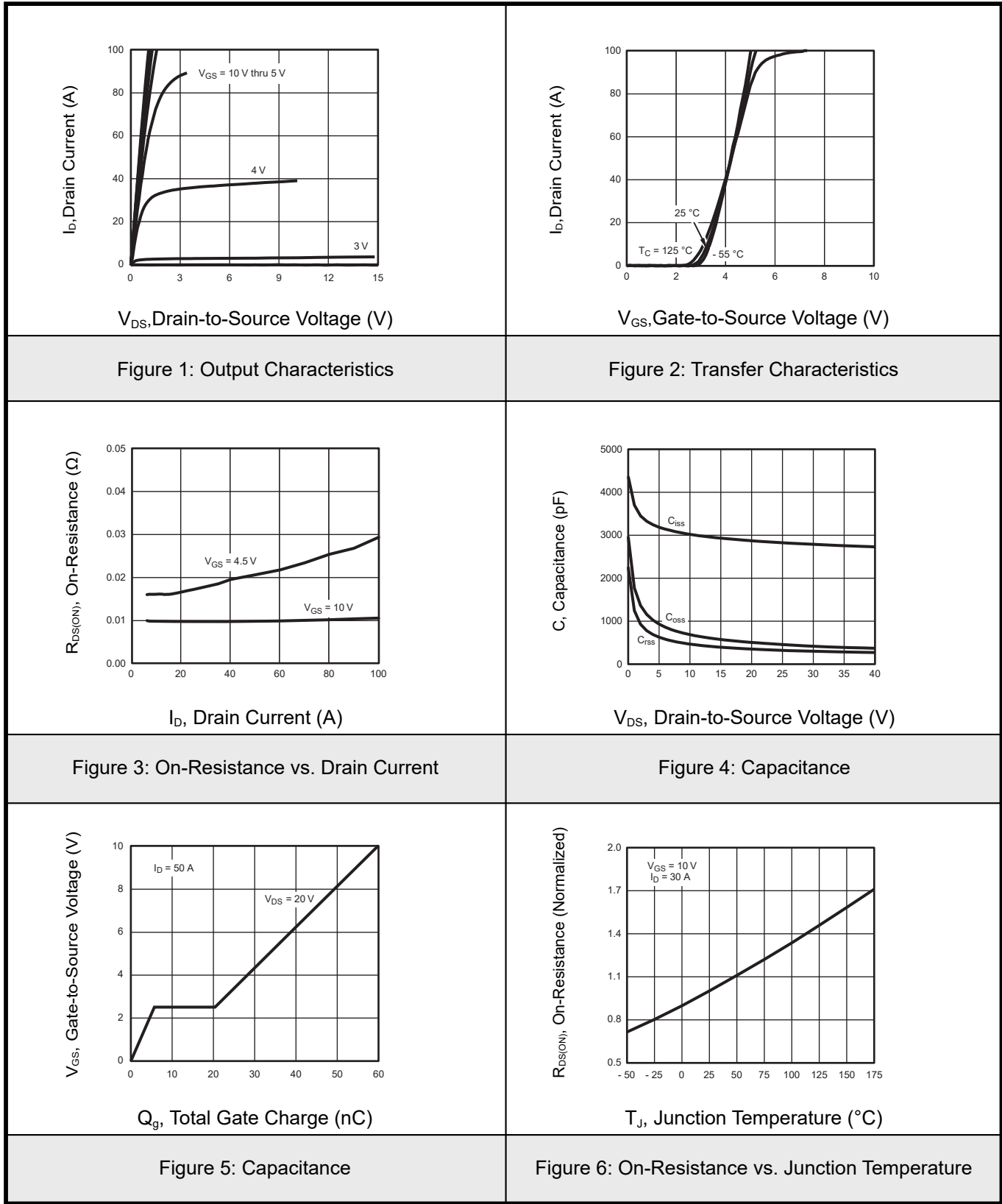
a. Pulse test; pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

c. Independent of operating temperature.

b. Guaranteed by design, not subject to production testing.



6.1Typical characteristic





6.2 Typical characteristic

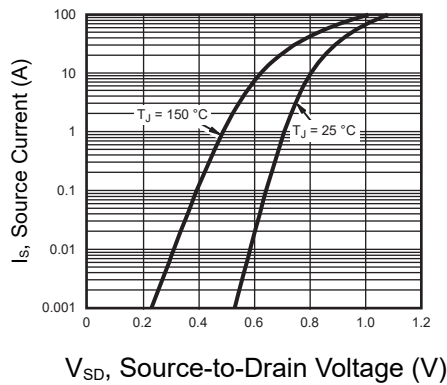


Figure 7: Source Drain Diode Forward Volt

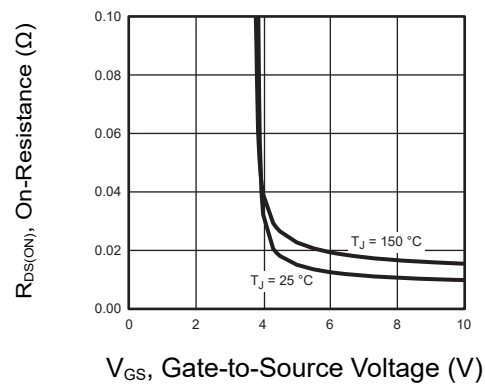


Figure 8: On-Resistance vs. Gate-to-Source Voltage

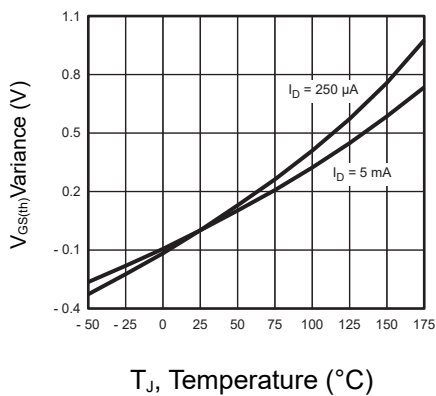


Figure 9: Threshold Voltage

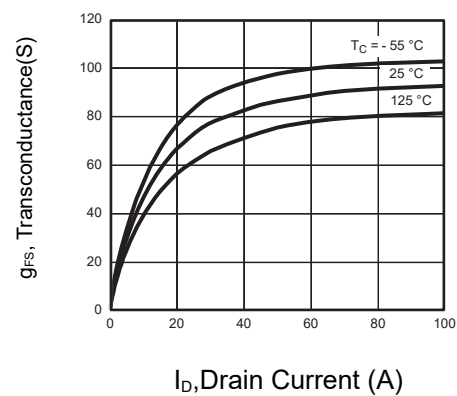


Figure 10: Transconductance

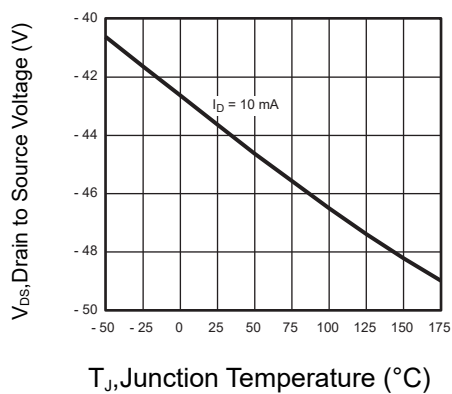
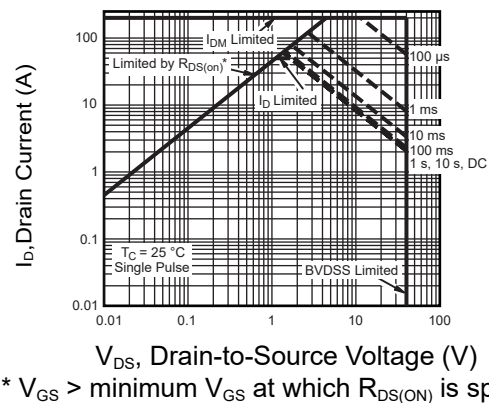


Figure 11: Drain Source Breakdown vs. Junction Temperature



* $V_{GS} > \text{minimum } V_{GS} \text{ at which } R_{DS(ON)}$ is specified

Figure 12: Safe Operating Area



6.3 Typical characteristic

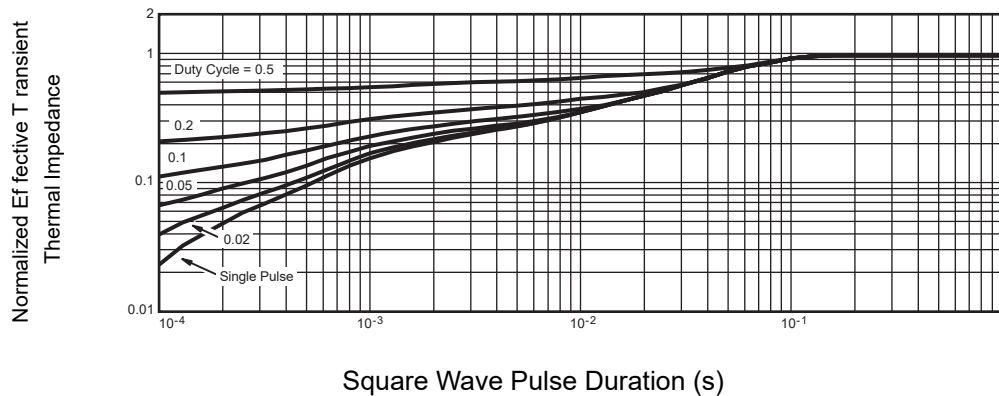


Figure 13: Normalized Thermal Transient Impedance, Junction-to-Ambient

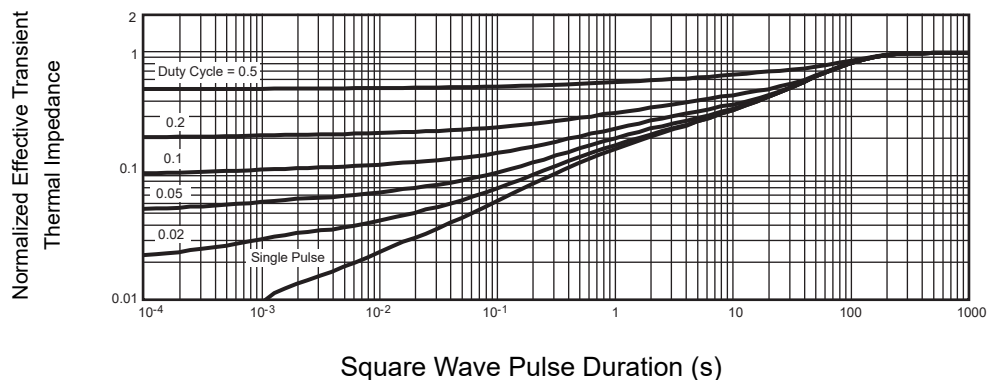


Figure 14: Normalized Thermal Transient Impedance, Junction-to-Foot

Notes:

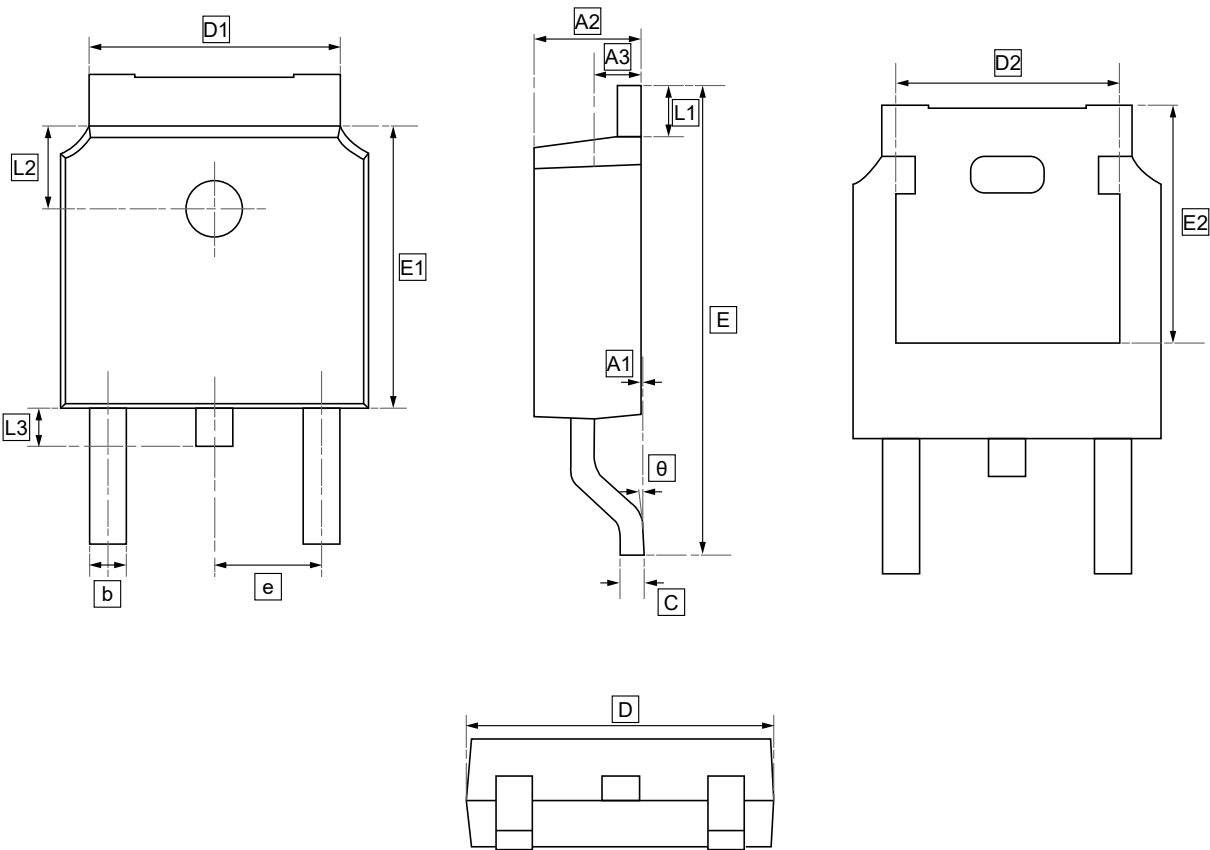
The characteristics shown in the two graphs

- Normalized Transient Thermal Impedance Junction-to-Ambient (25 °C)
- Normalized Transient Thermal Impedance Junction-to-Case (25 °C)

are given for general guidelines only to enable the user to get a "ball park" indication of part capabilities. The data are extracted from single pulse transient thermal impedance characteristics which are developed from empirical measurements. The latter is valid for the part mounted on printed circuit board - FR4, size 1" x 1" x 0.062", double sided with 2 oz. copper, 100 % on both sides. The part capabilities can widely vary depending on actual application parameters and operating conditions.



7.TO-252 Package Outline Dimensions

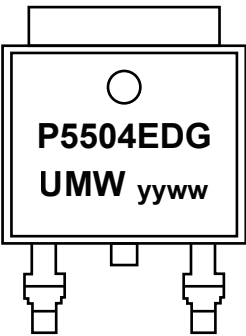


DIMENSIONS (mm are the original dimensions)

Symbol	A1	A2	A3	b	c	D	D1	D2	E	E1	E2	e	L1	L2	L3	θ
Min	0.00	2.18	0.90	0.65	0.46	6.35	4.95	4.32	9.40	5.97	5.21	2.286 BSC	0.89	1.70	0.60	0.00
Max	0.13	2.39	1.10	0.85	0.61	6.73	5.46	4.90	10.41	6.22	5.38		1.27	1.90	1.00	8.00



8.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW P5504EDG	TO-252	2500	Tape and reel



9.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.

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