

- ★ Green Device Available
- ★ Super Low Gate Charge
- ★ Excellent CdV/dt effect decline
- ★ Advanced high cell density Trench technology

Product Summary

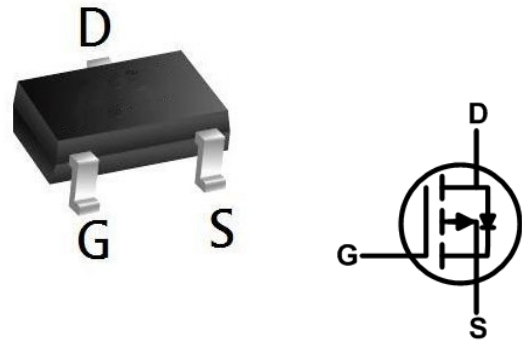


BVDSS	RDS(on)	ID
-40V	45mΩ	-5 A

Description

The UD5P04L is the high cell density trench P-ch MOSFETs, which provides excellent $R_{DS(on)}$ and efficiency for most of the small power switching and load switch applications. The UD5P04L meet the RoHS and Green Product requirement with full function reliability approved.

SOT 23 -3L Pin Configurations



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-40	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_A=25^\circ C$	Continuous Drain Current	-5	A
$I_D@T_A=70^\circ C$	Continuous Drain Current	-3.6	A
I_{DM}	Pulsed Drain Current ²	-22	A
$P_D@T_A=25^\circ C$	Total Power Dissipation ³	2.0	W
$P_D@T_A=70^\circ C$	Total Power Dissipation ³	1.5	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	---	65	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹ (t ≤ 10s)	---	48	$^\circ C/W$

Electrical Characteristics (T_J=25°C unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D = -250μA	-40	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = -40V, V _{GS} =0V	-	-	-1	μA
I _{GSS}	Gate to Body Leakage Current	V _{DS} =0V, V _{GS} = ±20V	-	-	±100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D = -250μA	-1.0	-1.6	-2.5	V
R _{DS(on)}	Static Drain-Source on-Resistance Note2	V _{GS} = -10V, I _D = -5A	-	45	54	mΩ
		V _{GS} = -4.5V, I _D = -4A	-	60	85	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} = -20V, V _{GS} =0V, f=1.0MHz	-	869	-	pF
C _{oss}	Output Capacitance		-	94	-	pF
C _{rss}	Reverse Transfer Capacitance		-	69	-	pF
Q _g	Total Gate Charge	V _{DS} = -20V, I _D = -4A, V _{GS} = -10V	-	17.3	-	nC
Q _{gs}	Gate-Source Charge		-	3.2	-	nC
Q _{gd}	Gate-Drain(“Miller”) Charge		-	4.3	-	nC
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DS} = -20V, I _D = -4A, V _{GS} = -10V, R _{GEN} =3Ω	-	10.3	-	ns
t _r	Turn-on Rise Time		-	4.3	-	ns
t _{d(off)}	Turn-off Delay Time		-	39	-	ns
t _f	Turn-off Fall Time		-	46.5	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Drain to Source Diode Forward Current		-	-	-5.0	A
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-22	A
V _{SD}	Drain to Source Diode Forward Voltage	V _{GS} =0V, I _S = -5.5A	-	-0.8	-1.2	V
t _{rr}	Reverse Recovery Time	V _{GS} =0V, I _S = -5.5A, di/dt=100A/μs	-	17	-	ns
Q _{rr}	Reverse Recovery Charge		-	11.5	-	nC

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

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



Typical Performance Characteristics

Figure 1: Output Characteristics

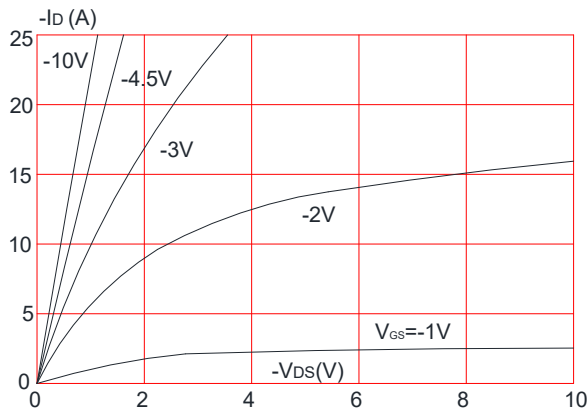


Figure 2: Typical Transfer Characteristics

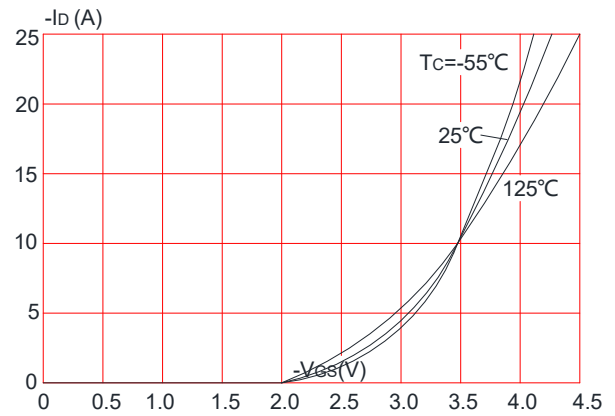


Figure 3: On-resistance vs. Drain Current

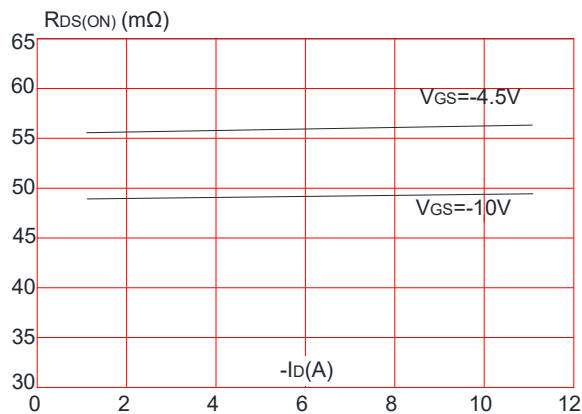


Figure 4: Body Diode Characteristics

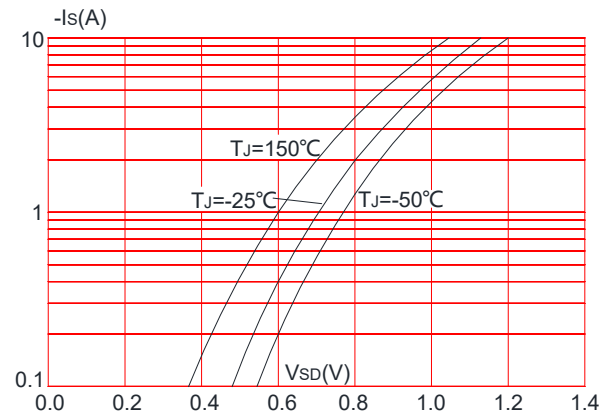


Figure 5: Gate Charge Characteristics

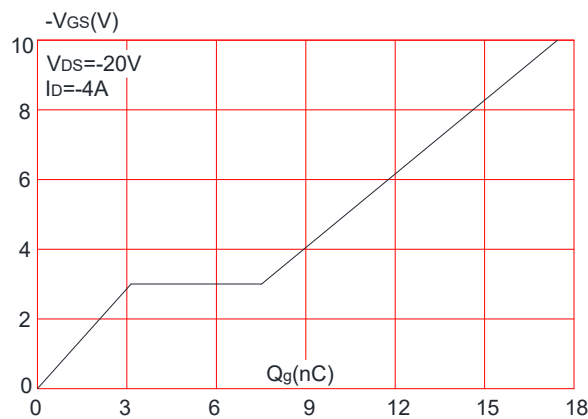
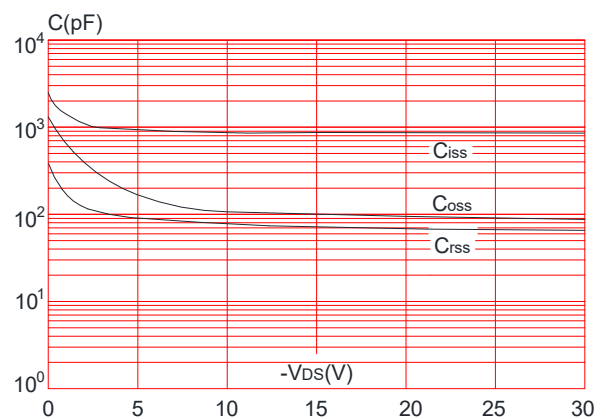


Figure 6: Capacitance Characteristics





P-Ch 40V Fast Switching MOSFETs

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

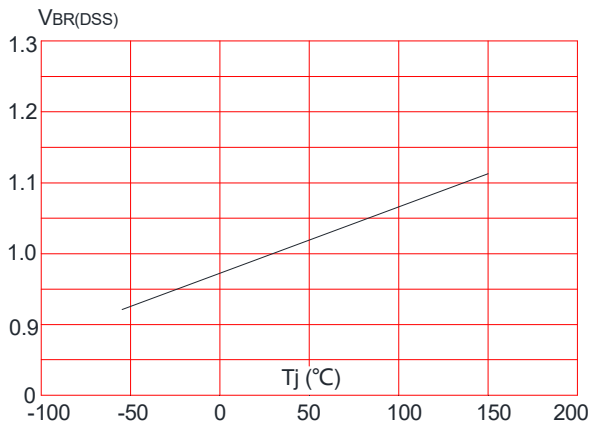


Figure 8: Normalized on Resistance vs. Junction Temperature

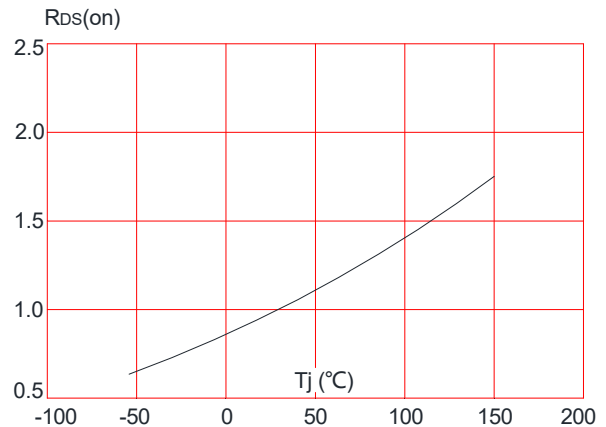


Figure 9: Maximum Safe Operating Area

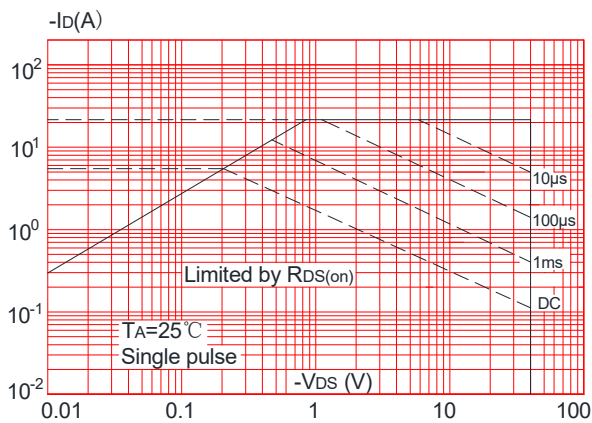


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

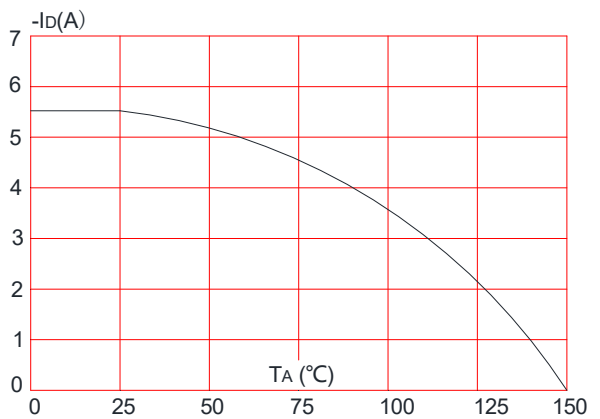
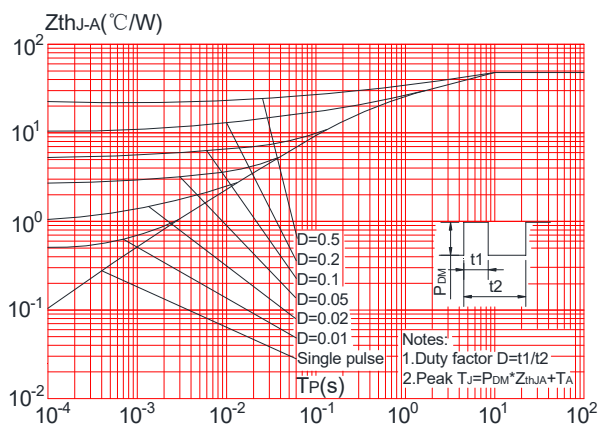
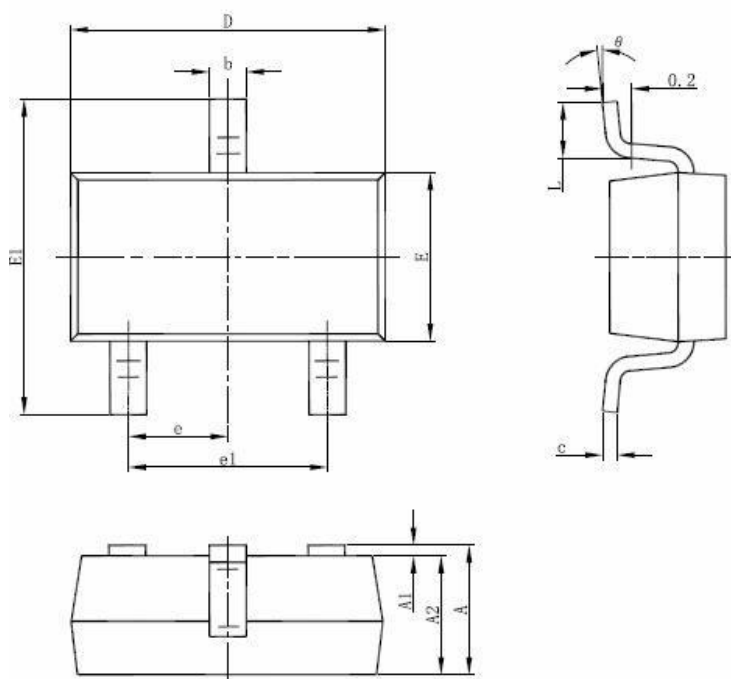


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



Package Mechanical Data-SOT-23-3L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°