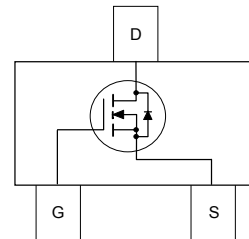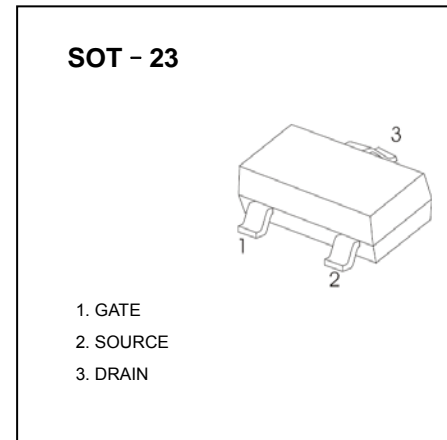# UDF®

FDV305
N-Channel 20 V (D-S) MOSFET

Applications

- Load switch
- Battery protection
- Power management

Features

- $V_{DS(V)}$ = 20V
- $R_{DS(ON)}$ <45m Ω (V $_{GS}$ = 4.5V)
- $R_{DS(ON)}$ <60m Ω (V $_{GS}$ = 2.5V)

SOT－23

1. GATE
2. SOURCE
3. DRAIN

Absolute Maximum Ratings T_A=25°C unless otherwise noted

Symbol	Parameter	Ratings	Units
V_{DSS}	Drain-Source Voltage	20	V
V_{GSS}	Gate-Source Voltage	$\pm$ 12	V
I_D	Drain Current – Continuous	0.9	A
	– Pulsed	2	
P_D	Maximum Power Dissipation	0.35	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	−55 to +150	°C
Thermal Characteristics			
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	357	°C/W

Electrical Characteristics

T_A = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain–Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250 μA	20			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	I_D = 250 μA, Referenced to 25°C		15		mV/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 16 V, V_{GS} = 0 V			1	μA
I_{GSSF}	Gate–Body Leakage, Forward	V_{GS} = 12 V, V_{DS} = 0 V			100	nA
I_{GSSR}	Gate–Body Leakage, Reverse	V_{GS} = –12 V, V_{DS} = 0 V			–100	nA
On Characteristics **(Note 2)**						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250 μA	0.6	1	1.5	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate Threshold Voltage Temperature Coefficient	I_D = 250 μA, Referenced to 25°C		–3		mV/°C
$R_{DS(on)}$	Static Drain–Source On–Resistance	V_{GS} = 4.5 V, I_D = 0.9 A			45	mΩ
		V_{GS} = 2.5 V, I_D = 0.7 A			60	
$I_{D(on)}$	On–State Drain Current	V_{GS} = 4.5V, V_{DS} = 5 V	1			A
g_{FS}	Forward Transconductance	V_{DS} = 5V, I_D = 0.9 A		3		S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 10 V, V_{GS} = 0 V, f = 1.0 MHz		109		pF
C_{oss}	Output Capacitance			30		pF
C_{rss}	Reverse Transfer Capacitance			14		pF
Switching Characteristics **(Note 2)**						
$t_{d(on)}$	Turn–On Delay Time	V_{DD} = 10 V, I_D = 1 A, V_{GS} = 4.5 V, R_{GEN} = 6 Ω		4.5	9	ns
t_r	Turn–On Rise Time			7	14	ns
$t_{d(off)}$	Turn–Off Delay Time			8	16	ns
t_f	Turn–Off Fall Time			1.4	2.8	ns
Q_g	Total Gate Charge	V_{DS} = 10 V, I_D = 0.9 A, V_{GS} = 4.5 V		1.1	1.5	nC
Q_{gs}	Gate–Source Charge			0.26		nC
Q_{gd}	Gate–Drain Charge			0.26		nC
Drain–Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain–Source Diode Forward Current				0.29	A
V_{SD}	Drain–Source Diode Forward Voltage	V_{GS} = 0 V, I_S = 0.29 A		0.75	1.2	V
t_{rr}	Diode Reverse Recovery Time	I_F = 0.9 A, d_{iF}/d_t = 100 A/μs		7.4		nS
Q_{rr}	Diode Reverse Recovery Charge			2.2		nC

Notes:

1. Pulse Test: Pulse Width $\leq$ 300 μs, Duty Cycle $\leq$ 2.0%
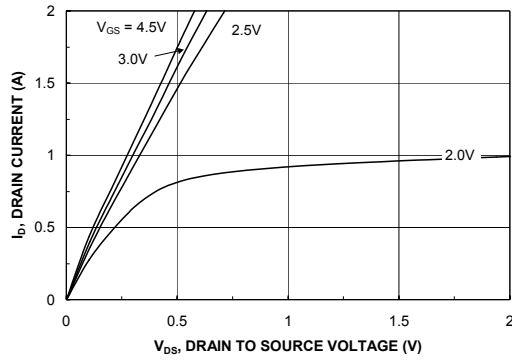
Typical Characteristics
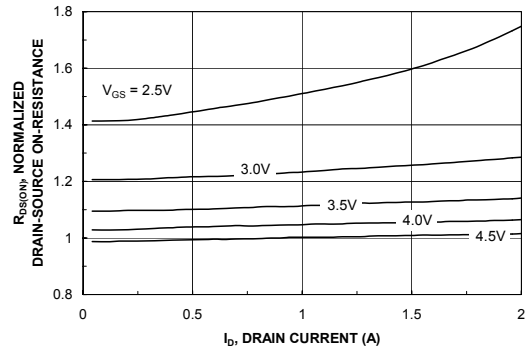

Figure 1. On-Region Characteristics.

Figure 2. On-Resistance Variation with
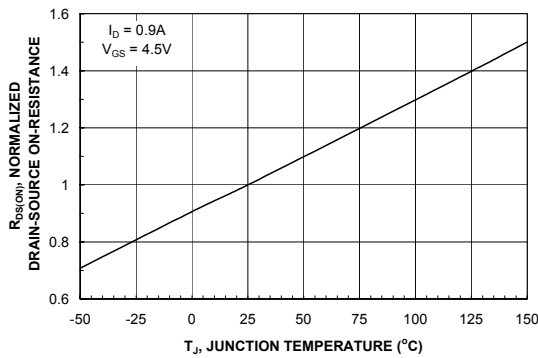Drain Current and Gate Voltage.

Figure 3. On-Resistance Variation with
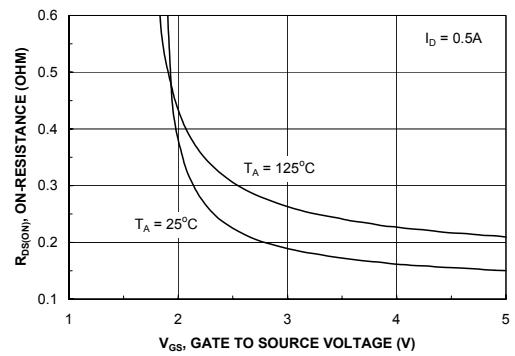Temperature.

Figure 4. On-Resistance Variation with
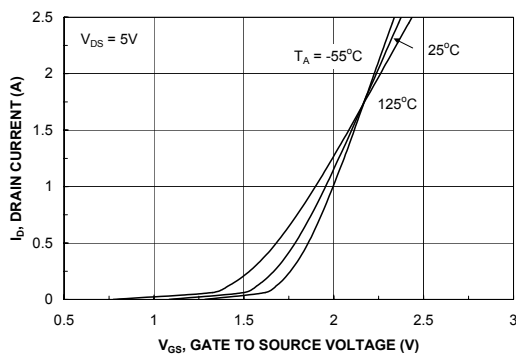Gate-to-Source Voltage.
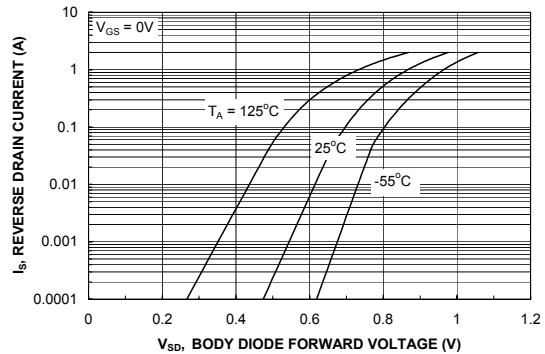

Figure 5. Transfer Characteristics.

Figure 6. Body Diode Forward Voltage Variation
with Source Current and Temperature.
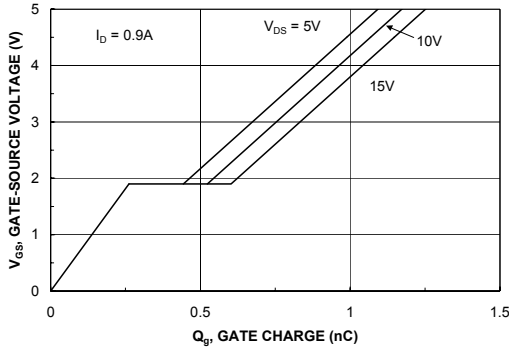
Typical Characteristics
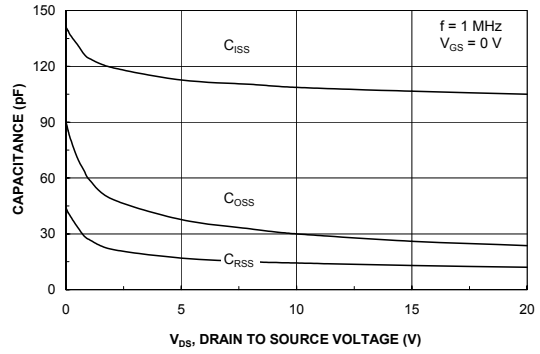

Figure 7. Gate Charge Characteristics.
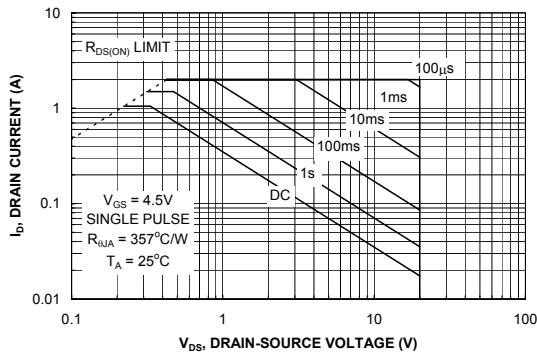

Figure 8. Capacitance Characteristics.
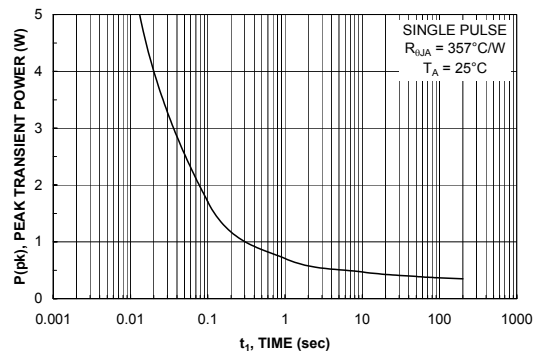

Figure 9. Maximum Safe Operating Area.
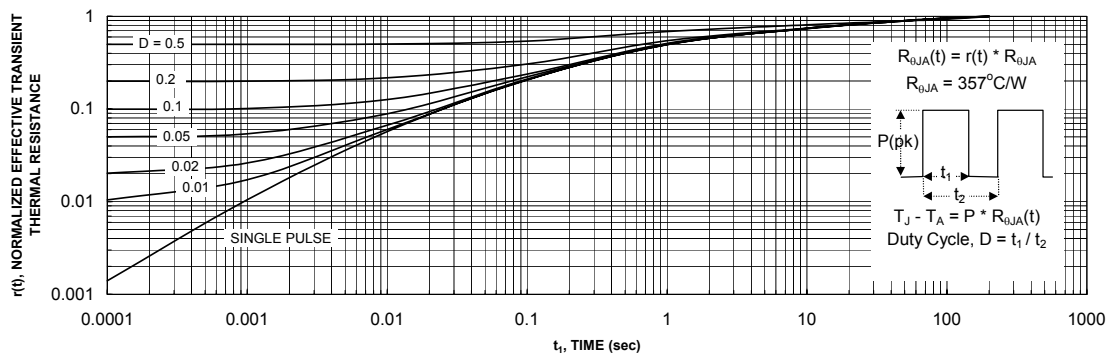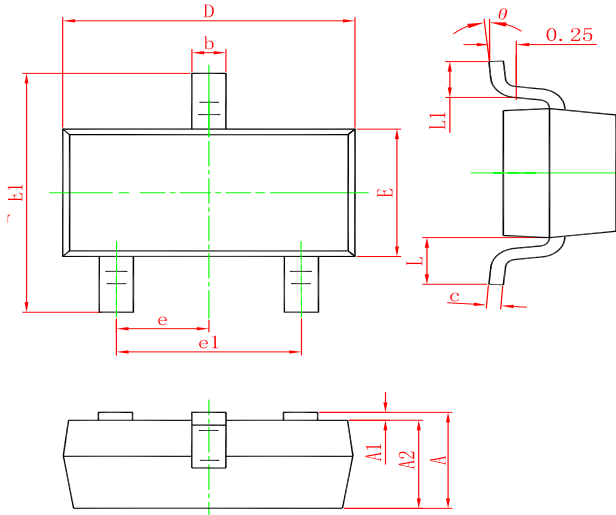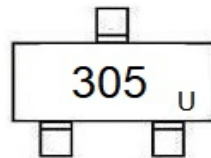

Figure 10. Single Pulse Maximum Power Dissipation.

Figure 11. Transient Thermal Response Curve.

$$R_{\theta JA}(t) = r(t) * R_{\theta JA}$$
$$R_{\theta JA} = 357^{\circ}C/W$$
$$T_J - T_A = P * R_{\theta JA}(t)$$
Duty Cycle, $D = t_1 / t_2$

SOT-23 PACKAGE OUTLINE DIMENSIONS

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP.		0.037 TYP.	
e1	1.800	2.000	0.071	0.079
L	0.550 REF.		0.022 REF.	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

Marking

Ordering information

Order code	Package	Baseqty	Deliverymode
FDV305N	SOT-23	3000	Tape and reel