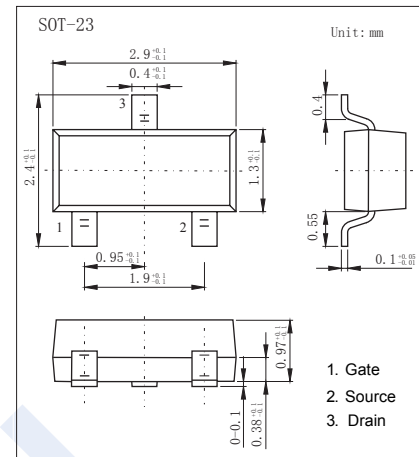


N-Channel MOSFET FDV301N

■ Features

- 0.22 A, 25 V. $R_{DS(ON)} = 4 \Omega @ V_{GS} = 4.5 V$
 $R_{DS(ON)} = 5 \Omega @ V_{GS} = 2.7 V.$
- Very low level gate drive requirements allowing direct operation in 3V circuits. $V_{GS(th)} < 1.5V.$
- Gate-Source Zener for ESD ruggedness.
>6kV Human Body Model
- Replace multiple NPN digital transistors with one DMOSFET.



■ Absolute Maximum Ratings $T_a = 25^\circ C$

Parameter	Symbol	Rating	Unit
Drain-Source Voltage, Power Supply Voltage	V_{DS}, V_{CC}	25	V
Gate-Source Voltage, V_{IN}	V_{GS}, V_I	8	V
Drain/Output Current - Continuous	I_D	0.22	A
- pulse		0.5	A
Maximum Power Dissipation	P_D	0.35	W
Electrostatic Discharge Rating MIL-STD-883D Human Body Model (100pf / 1500 Ohm)	ESD	6	kV
Thermal Resistance, Junction-to- Ambient	$R_{\theta JA}$	357	$^\circ C/W$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-55 to +150	$^\circ C$

■ Inverter Electrical Characteristics $T_A = 25^\circ C$ unless otherwise noted

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Zero Input Voltage Output Current	$I_O (off)$	$V_{CC} = 20 V, V_I = 0 V$			1.0	μA
Input Voltage	$V_I (off)$	$V_{CC} = 5 V, I_O = 10 \mu A$			0.5	V
	$V_I (on)$	$V_O = 0.3 V, I_O = 5 mA$	1.0			V
Output to Ground Resistance	$R_O (on)$	$V_I = 2.7 V, I_O = 0.2 A$			5.0	Ω

N-Channel MOSFET

FDV301N

■ Electrical Characteristics $T_a = 25^\circ\text{C}$ unless otherwise noted

Parameter	Symbol	Testconditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	25			V
Breakdown Voltage Temp. Coefficient	$\Delta V_{DS}/\Delta T_J$	$I_D = 250\ \mu\text{A}$, Referenced to 25°C		25		mV/ $^\circ\text{C}$
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 20\text{ V}, V_{GS} = 0\text{ V}$			1	μA
		$V_{DS} = 20\text{ V}, V_{GS} = 0\text{ V}, T_J = 55^\circ\text{C}$			10	μA
Gate-Body Leakage Current, Forward	I_{GSSF}	$V_{GS} = 8\text{ V}, V_{DS} = 0\text{ V}$			100	nA
Gate-Body Leakage Current, Reverse	I_{GSSR}	$V_{GS} = -8\text{ V}, V_{DS} = 0\text{ V}$			-100	nA
Gate Threshold Voltage (Note)	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	0.65	0.8	1.5	V
Gate Threshold Voltage Temp. Coefficient (Note)	$\Delta V_{GS(th)}/T_J$	$I_D = 250\ \mu\text{A}$, Referenced to 25°C		-2.1		mV/ $^\circ\text{C}$
Static Drain-Source On-Resistance(Note)	$R_{DS(on)}$	$V_{GS} = 4.5\text{ V}, I_D = 0.4\text{ A}$			4.0	Ω
		$V_{GS} = 2.7\text{ V}, I_D = 0.2\text{ A}$			5.0	
On-State Drain Current (Note)	$I_{D(on)}$	$V_{GS} = 2.7\text{ V}, V_{DS} = 5\text{ V}$	0.2			A
Forward Transconductance	g_{FS}	$V_{DS} = 5\text{ V}, I_D = 0.4\text{ A}$		0.2		S
Input Capacitance	C_{iss}	$V_{DS} = 10\text{ V}, V_{GS} = 0\text{ V}, f = 1.0\text{ MHz}$		9.5		pF
Output Capacitance	C_{oss}			6.0		
Reverse Transfer Capacitance	C_{rss}			1.3		
Turn-On Delay Time (Note)	$t_{d(on)}$			3.2	8	
Turn-On Rise Time (Note)	t_r	$V_{DD} = 6\text{ V}, I_D = 0.5\text{ A},$		6	15	
Turn-Off Delay Time (Note)	$t_{d(off)}$	$V_{GS} = 4.5\text{ V}, R_{GEN} = 50\Omega$		3.5	8	
Turn-Off Fall Time (Note)	t_f			3.5	8	
Total Gate Charge (Note)	Q_g			0.49	0.7	nC
Gate-Source Charge (Note)	Q_{gs}	$V_{DS} = 5\text{ V}, I_D = 0.2\text{ A}, V_{GS} = 4.5\text{ V},$		0.22		
Gate-Drain Charge (Note)	Q_{gd}			0.07		
Maximum Continuous Drain-Source Diode Forward Current	I_S				0.29	A
Drain-Source Diode Forward Voltage(Note)	V_{SD}	$V_{GS} = 0\text{ V}, I_S = 0.29\text{ A}$			1.2	V

Note: Pulse Test: Pulse Width $\leq 300\ \mu\text{s}$, Duty Cycle $\leq 2.0\%$.

■ Marking

Marking	301
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N-Channel MOSFET FDV301N

Typical Characteristics

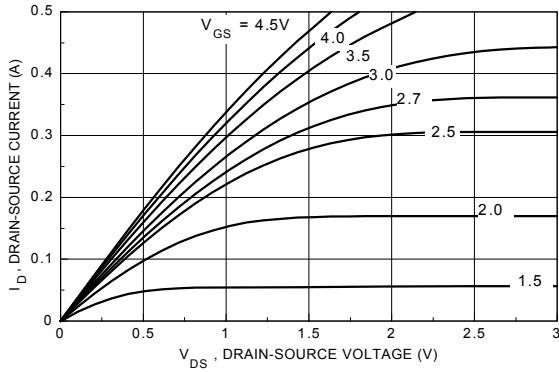


Figure 1. On-Region Characteristics.

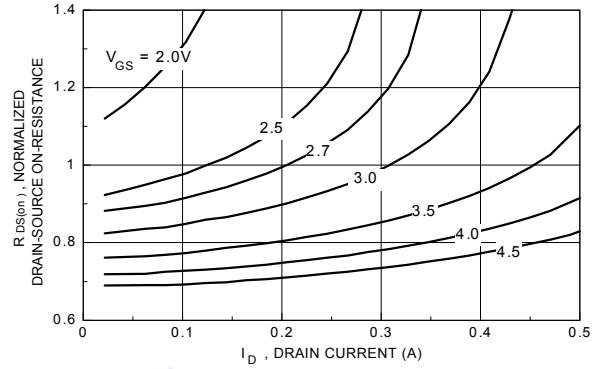


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage.

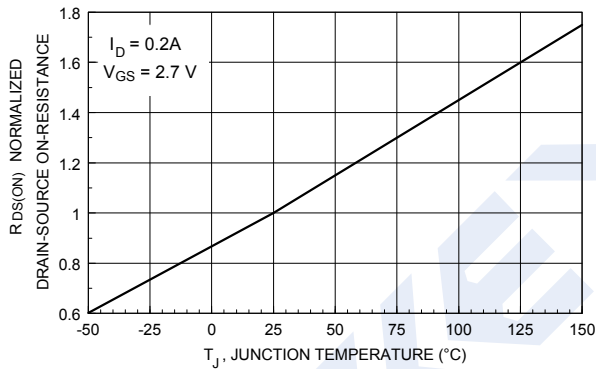


Figure 3. On-Resistance Variation with Temperature.

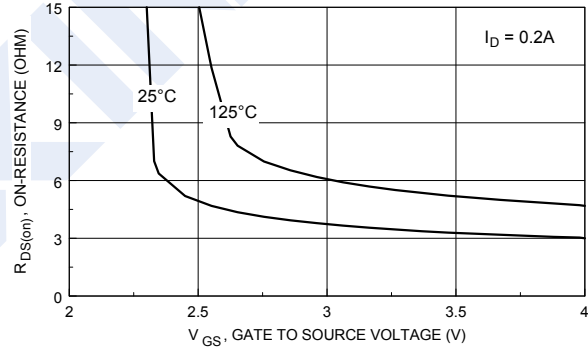


Figure 4. On-Resistance Variation with Gate-To-Source Voltage.

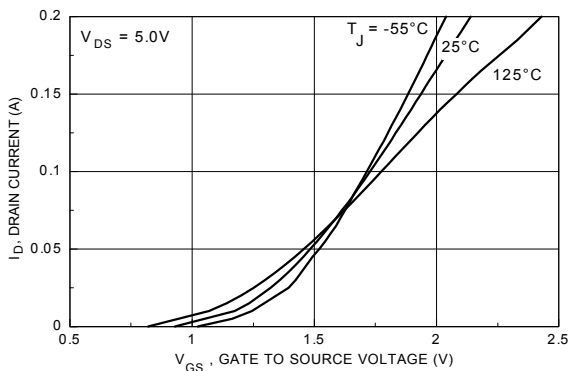


Figure 5. Transfer Characteristics.

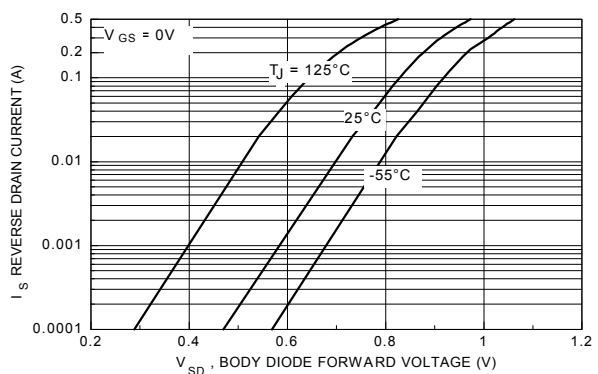


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature.

N-Channel MOSFET FDV301N

■ Typical Characteristics

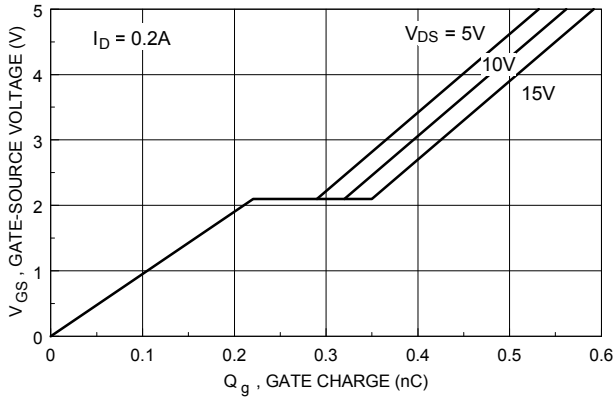


Figure 7. Gate Charge Characteristics.

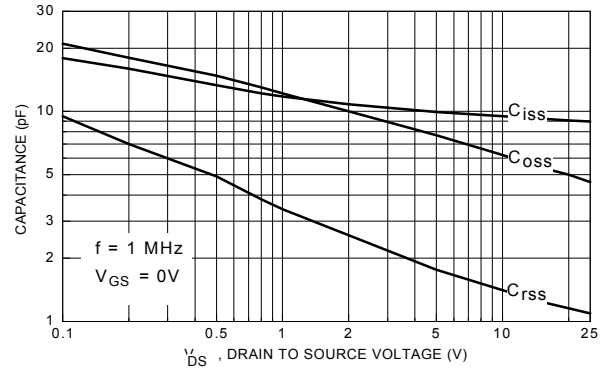


Figure 8. Capacitance Characteristics.

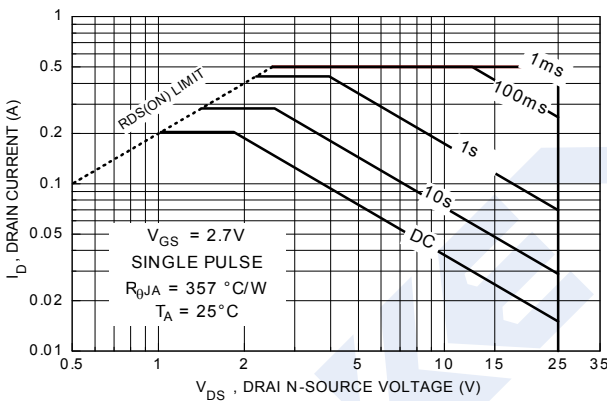


Figure 9. Maximum Safe Operating Area.

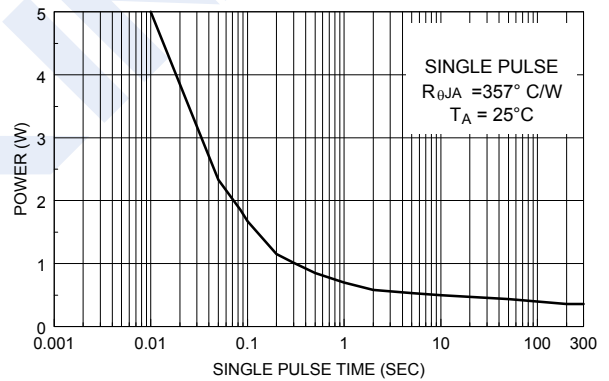


Figure 10. Single Pulse Maximum Power Dissipation.

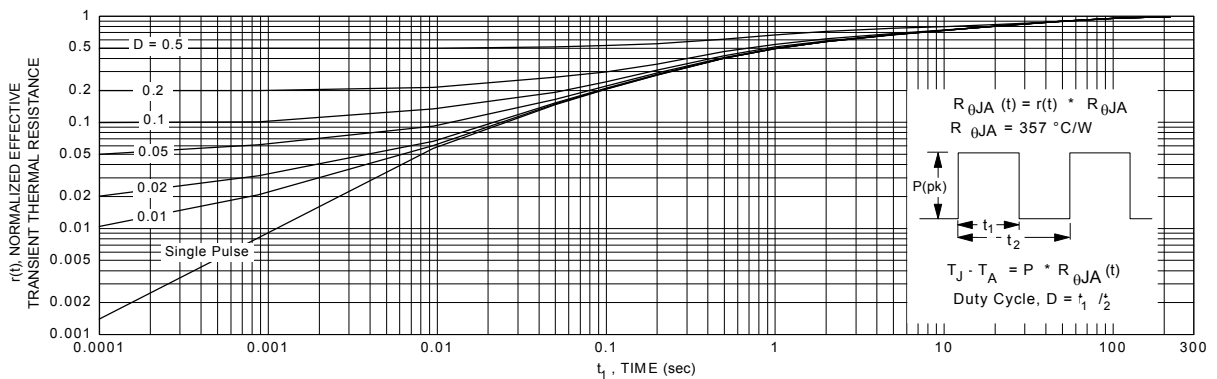


Figure 11. Transient Thermal Response Curve .