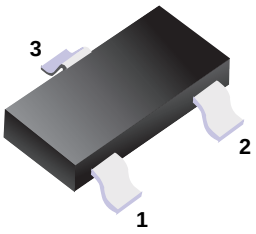
FDV301N

N-Channel MOSFET

■ Features

- 0.22 A, 25 V. $R_{DS(ON)}$ = 4 Ω @ V_{GS} = 4.5 V
  $R_{DS(ON)}$ = 5Ω @ 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.



1. Gate
2. Source
3. Drain

■ Simplified outline(SOT-23)

■ Absolute Maximum Ratings Ta = 25℃

Parameter	Symbol	Rating	Unit
Drain-Source Voltage, Power Supply Voltage	V_{DSS},V_{CC}	25	V
Gate-Source Voltage, VIN	V_{GSS},V_I	8	V
Drain/Output Current - Continuous - pulse	I_D	0.22 0.5	A 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	℃/W
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-55 to +150	℃

■ Inverter Electrical Characteristics T_A = 25℃ 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 μA			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

■ Electrical Characteristics Ta = 25℃ unless otherwise noted

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

Note: Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2.0%.

■ Typical Characterisitics

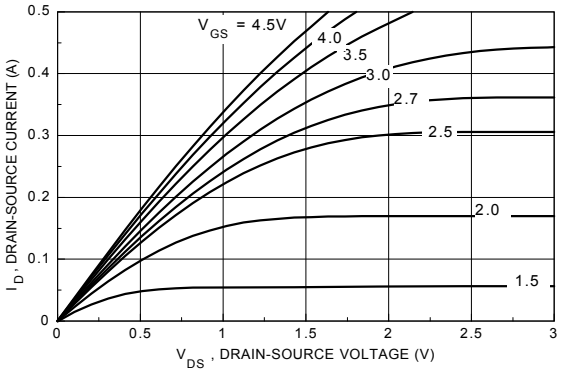


Figure 1. On-Region Characteristics.

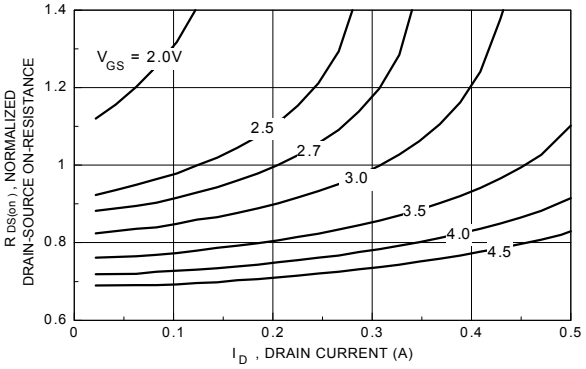


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage.

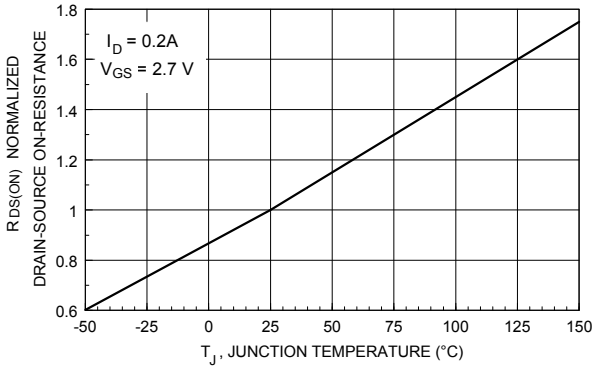


Figure 3. On-Resistance Variation with Temperature.

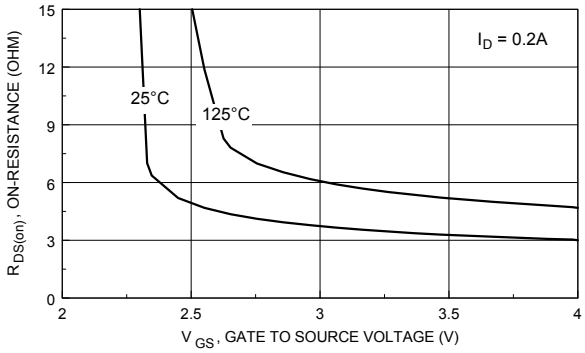


Figure 4. On Resistance Variation with Gate-To-Source Voltage.

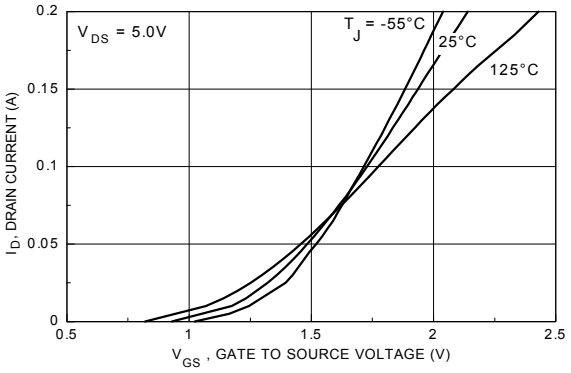


Figure 5. Transfer Characteristics.

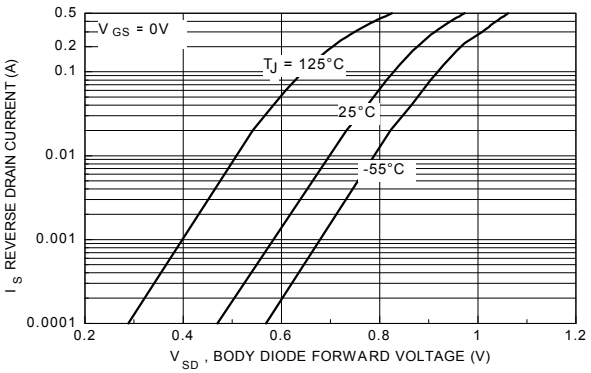


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature.

■ Typical Characterisitics

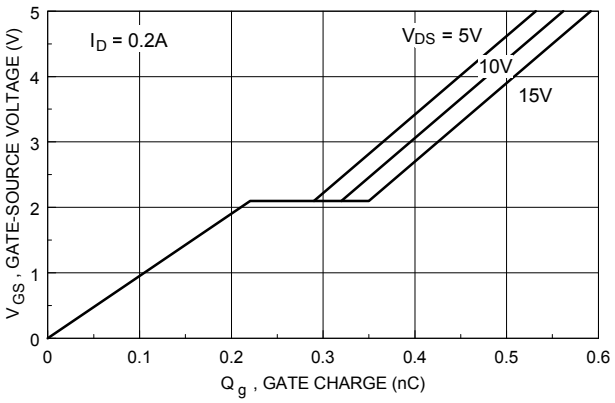


Figure 7. Gate Charge Characteristics.

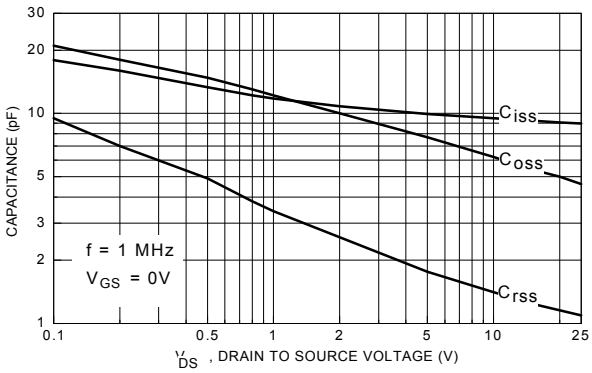


Figure 8. Capacitance Characteristics.

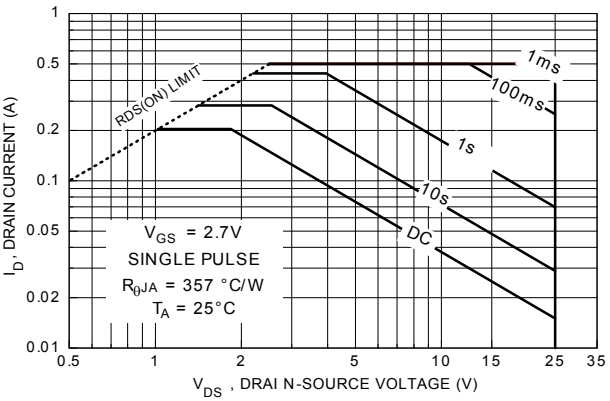


Figure 9. Maximum Safe Operating Area.

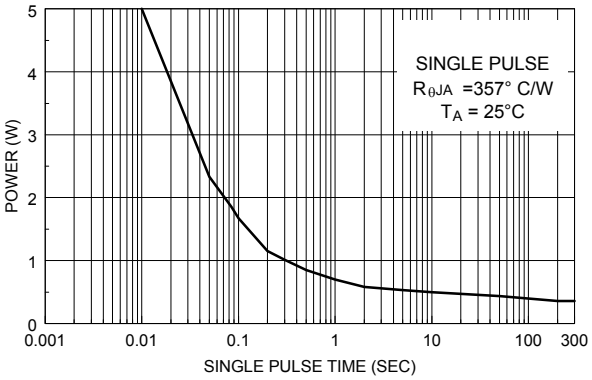


Figure 10 . Single Pulse Maximum Power Dissipation.

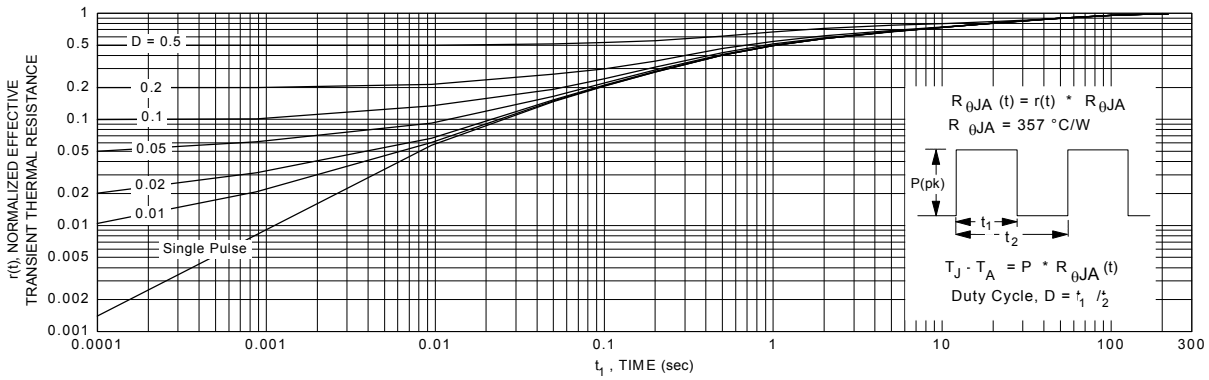
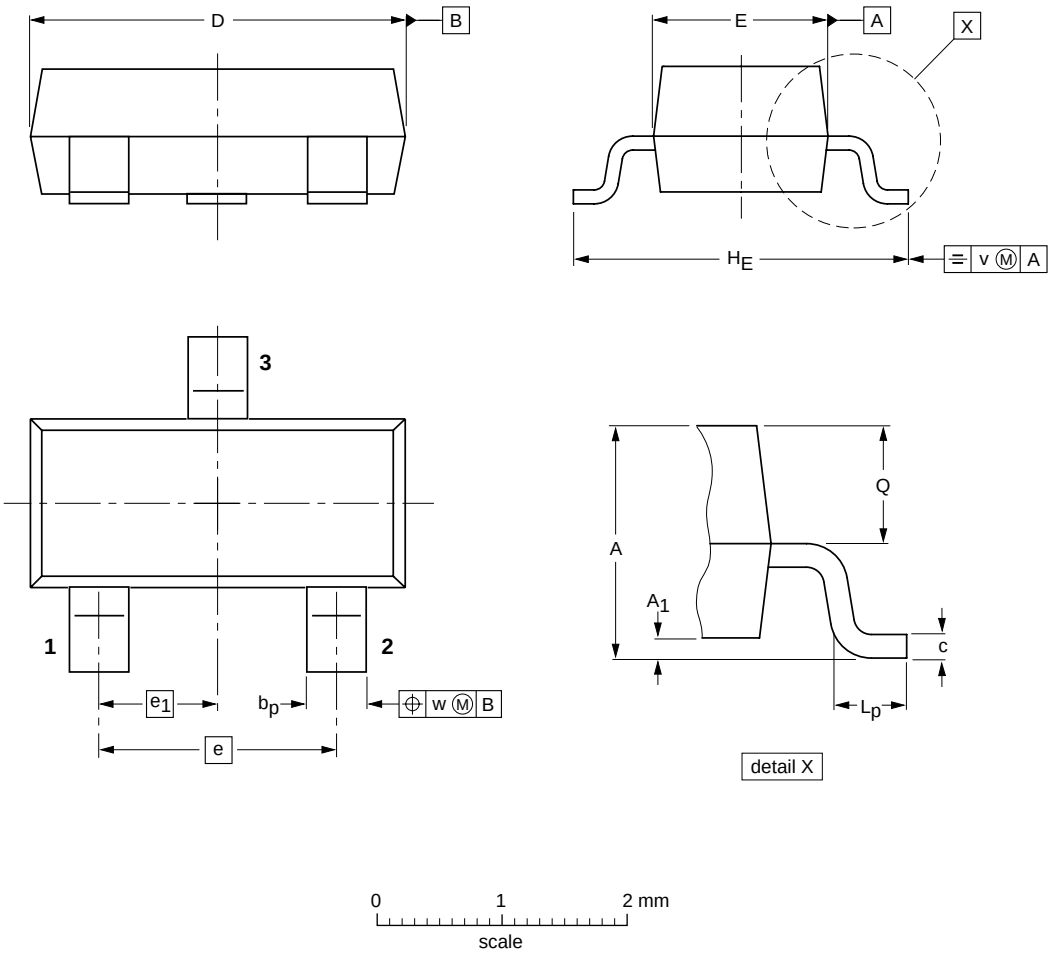


Figure 11 . Transient Thermal Response Curve .

■ SOT-23



DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1 max.	b_p	c	D	E	e	e_1	H_E	L_p	Q	v	w
mm	1.1 0.9	0.1	0.48 0.38	0.15 0.09	3.0 2.8	1.4 1.2	1.9	0.95	2.5 2.1	0.45 0.15	0.55 0.45	0.2	0.1