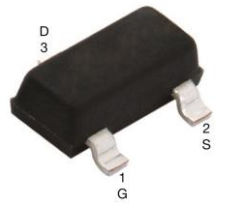
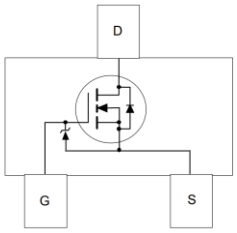
APFDV303N
25V N-Channel Enhancement Mode MOSFET

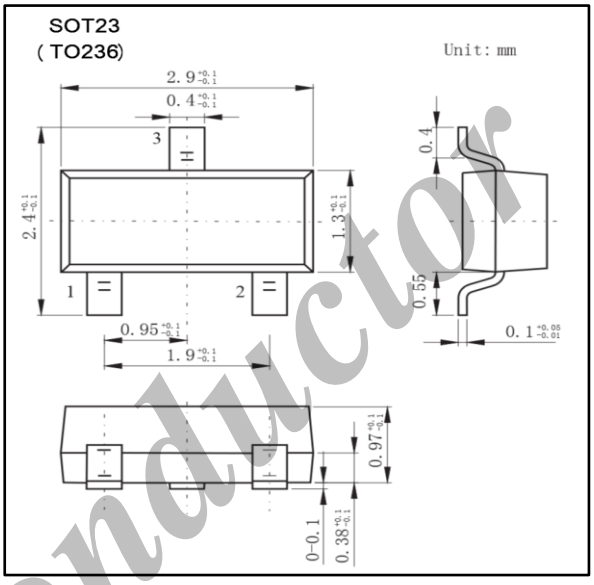
- **General Description**

APFDV303N combines advanced MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$. This device is designed especially for application in battery circuits using either one lithium or three cadmium or NMH cells. It can be used as an inverter or for high-efficiency miniature discrete DC/DC conversion in compact portable electronic devices like cellular phones or pagers. This device has excellent on-state resistance even at gate drive voltage as low as 2.5 volts.

Top View







- **Applications**

- DC-DC converter for portable devices
- Load switch

- ***Product Summary***

V_{DS}	25V
I_D (at V_{GS} = 4.5V)	0.68A
$R_{DS(ON)}$ (at V_{GS} = 4.5V)	< 450mΩ
$R_{DS(ON)}$ (at V_{GS} = 2.7V)	< 600mΩ

- **Absolute Maximum Ratings Ta = 25℃**

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	25	V
Gate-Source Voltage	V_{GS}	±8	V
Electrostatic Discharge Rating MIL-STD-883D Human Body Model (100pf / 1500 Ohm)	ESD	6	kV
Continuous Drain Current	I_D	0.68	A
Pulsed Drain Current	I_{DM}	2	
Power Dissipation	P_D	0.35	W
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	℃
Thermal Characteristics			
Thermal Resistance. Junction-to-Ambient	$R_{\theta JA}$	357	℃/W

• Electrical Characteristics Ta = 25°C

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static Parameters						
Drain-Source Breakdown Voltage	V_{DSS}	I_D=250μA, V_{GS}=0V	25			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=20V, V_{GS}=0V			1	μA
		V_{DS}=20V, V_{GS}=0V, T_J=55°C			10	
Gate-Source Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS}=±8V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	0.65		1.5	V
On-State Drain Current	$I_{D(ON)}$	V_{GS}=2.7V , V_{DS}=5V	0.5			A
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=0.5A			450	mΩ
		V_{GS}=4.5V, I_D=0.5A, T_J=125°C			800	
		V_{GS}=2.7V, I_D=0.2A			600	
Forward Transconductance	g_{FS}	V_{DS}=5V, I_D=0.5A		1.45		S
Diode Forward Voltage	V_{SD}	I_S=0.5A, V_{GS}=0V			1.2	V
Maximum Body-Diode Continuous Current	I_S				0.3	A
Dynamic Parameters						
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=10V, f=1MHz		50		pF
Output Capacitance	C_{oss}			28		
Reverse Transfer Capacitance	C_{rss}			9		
Switching Parameters						
Total Gate Charge	Q_g	V_{GS}=4.5V, V_{DS}=5V, I_D=0.5A		1.64	2.3	nC
Gate Source Charge	Q_{gs}			0.38		
Gate Drain Charge	Q_{gd}			0.45		
Turn-On Delay Time	$t_{D(on)}$	V_{GS}=4.5V, V_{DS}=6V, I_D=0.5A, R_{GEN}=50Ω		3	6	ns
Turn-On Rise Time	t_r			8.5	18	
Turn-Off Delay Time	$t_{D(off)}$			17	30	
Turn-Off Fall Time	t_f			13	25	

• Ordering Information

Ordering Part Number	Package	MOQ
APFDV303N	SOT23 (TO236)	3,000 pcs / reel

- **Typical Electrical and Thermal Characteristics**

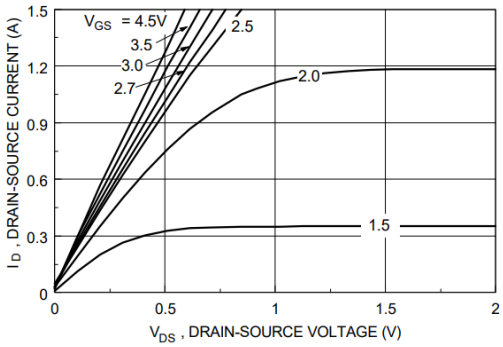


Figure 1. On-Region Characteristics.

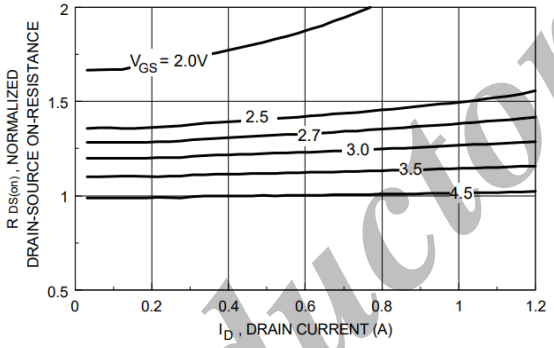


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage.

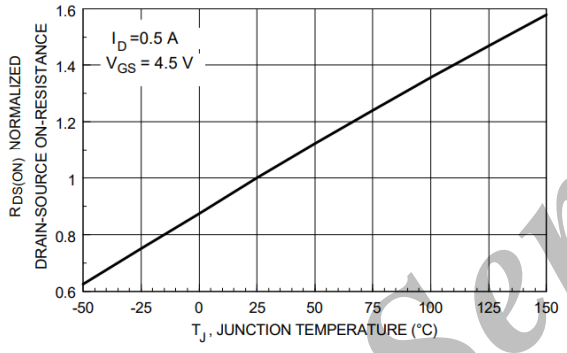


Figure 3. On-Resistance Variation with Temperature.

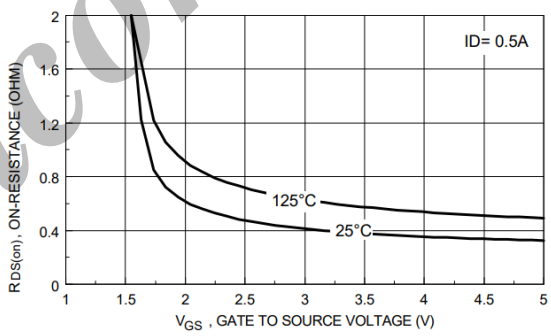


Figure 4. On Resistance Variation with Gate-To- Source Voltage.

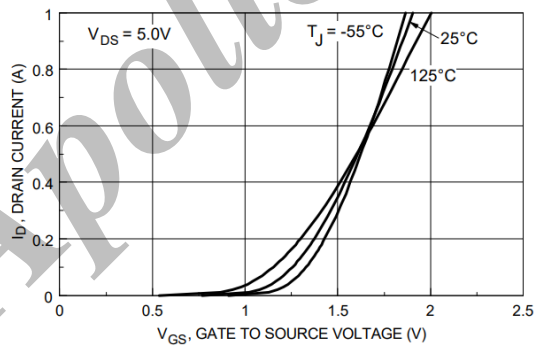


Figure 5. Transfer Characteristics.

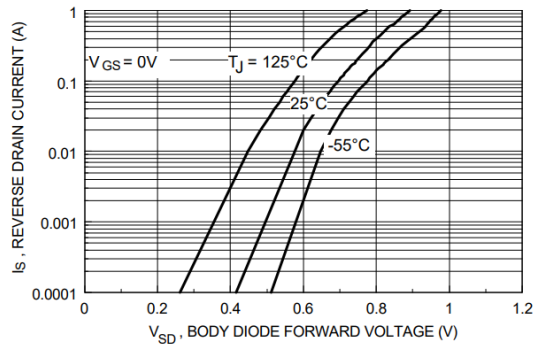


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature.

- **Typical Electrical and Thermal Characteristics**

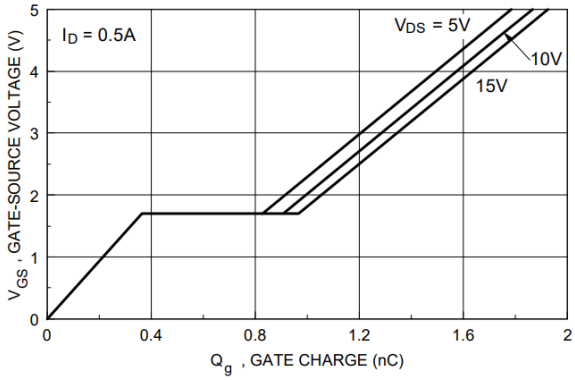


Figure 7. Gate Charge Characteristics.

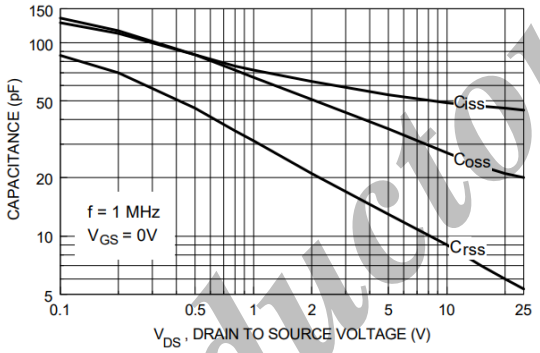


Figure 8. Capacitance Characteristics.

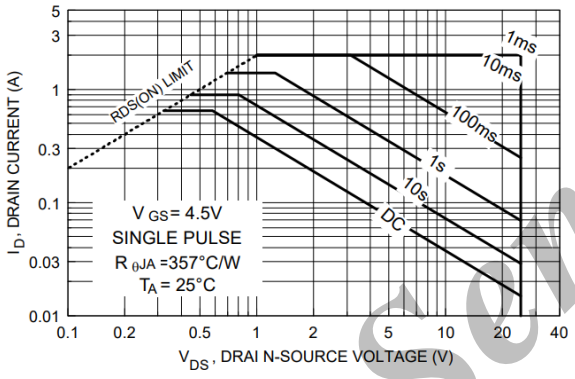


Figure 9. Maximum Safe Operating Area.

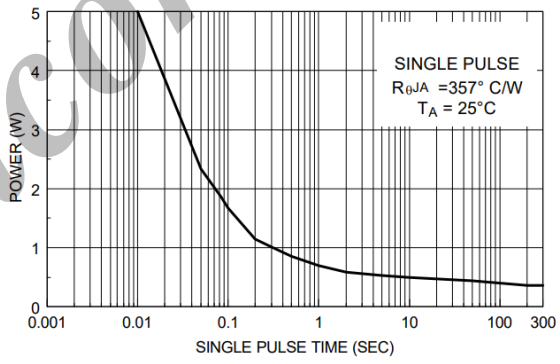


Figure 10. Single Pulse Maximum Power Dissipation.

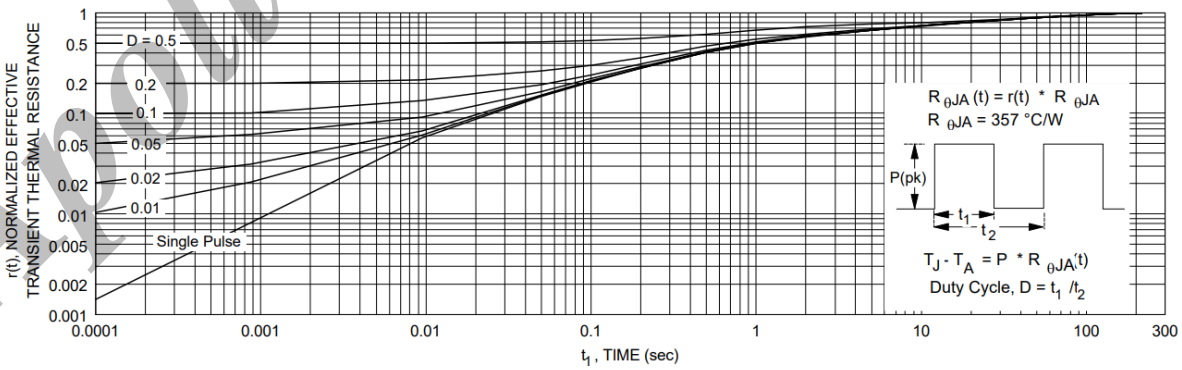


Figure 11. Transient Thermal Response Curve.

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