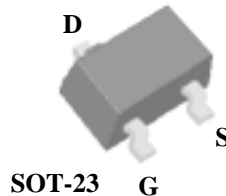




- ▼ Simple Drive Requirement
- ▼ Small Package Outline
- ▼ Surface Mount Device

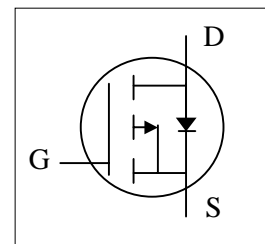


$BV_{DSS}$	-20V
$R_{DS(ON)}$	130m $\Omega$
$I_D$	- 2.6A

**Description**

The Advanced Power MOSFETs from APEC provide the designer with the best combination of fast switching, low on-resistance and cost-effectiveness.

The SOT-23 package is universally preferred for all commercial-industrial surface mount applications and suited for low voltage applications such as DC/DC converters.



**Absolute Maximum Ratings**

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	- 20	V
$V_{GS}$	Gate-Source Voltage	$\pm 12$	V
$I_D @ T_A=25^\circ C$	Continuous Drain Current <sup>3</sup>	-2.6	A
$I_D @ T_A=70^\circ C$	Continuous Drain Current <sup>3</sup>	-2.1	A
$I_{DM}$	Pulsed Drain Current <sup>1,2</sup>	-10	A
$P_D @ T_A=25^\circ C$	Total Power Dissipation	1.38	W
	Linear Derating Factor	0.01	W/ $^\circ C$
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ C$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ C$

**Thermal Data**

Symbol	Parameter	Value	Unit
Rthj-a	Thermal Resistance Junction-ambient <sup>3</sup>	Max. 90	$^\circ C/W$



# AP2301N

## Electrical Characteristics @T<sub>j</sub>=25°C(unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =-250uA	-20	-	-	V
ΔBV <sub>DSS</sub> /ΔT <sub>j</sub>	Breakdown Voltage Temperature Coefficient	Reference to 25°C, I <sub>D</sub> =-1mA	-	-0.1	-	V/°C
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance <sup>2</sup>	V <sub>GS</sub> =-5V, I <sub>D</sub> =-2.8A	-	-	130	mΩ
		V <sub>GS</sub> =-2.8V, I <sub>D</sub> =-2.0A	-	-	190	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250uA	-0.5	-	-	V
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =-5V, I <sub>D</sub> =-2.8A	-	4.4	-	S
I <sub>DSS</sub>	Drain-Source Leakage Current (T <sub>j</sub> =25°C)	V <sub>DS</sub> =-20V, V <sub>GS</sub> =0V	-	-	-1	uA
	Drain-Source Leakage Current (T <sub>j</sub> =70°C)	V <sub>DS</sub> =-16V, V <sub>GS</sub> =0V	-	-	-10	uA
I <sub>GSS</sub>	Gate-Source Leakage	V <sub>GS</sub> =±12V	-	-	±100	nA
Q <sub>g</sub>	Total Gate Charge <sup>2</sup>	I <sub>D</sub> =-2.8A	-	5.2	10	nC
Q <sub>gs</sub>	Gate-Source Charge	V <sub>DS</sub> =-6V	-	1.36	-	nC
Q <sub>gd</sub>	Gate-Drain ("Miller") Charge	V <sub>GS</sub> =-5V	-	0.6	-	nC
t <sub>d(on)</sub>	Turn-on Delay Time <sup>2</sup>	V <sub>DS</sub> =-15V	-	5.2	-	ns
t <sub>r</sub>	Rise Time	I <sub>D</sub> =-1A	-	9.7	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time	R <sub>G</sub> =6Ω, V <sub>GS</sub> =-10V	-	19	-	ns
t <sub>f</sub>	Fall Time	R <sub>D</sub> =15Ω	-	29	-	ns
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V	-	295	-	pF
C <sub>oss</sub>	Output Capacitance	V <sub>DS</sub> =-6V	-	170	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance	f=1.0MHz	-	65	-	pF

## Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
I <sub>S</sub>	Continuous Source Current ( Body Diode )	V <sub>D</sub> =V <sub>G</sub> =0V, V <sub>S</sub> =-1.2V	-	-	-1	A
I <sub>SM</sub>	Pulsed Source Current ( Body Diode ) <sup>1</sup>		-	-	-10	A
V <sub>SD</sub>	Forward On Voltage <sup>2</sup>	T <sub>j</sub> =25°C, I <sub>S</sub> =-1.6A, V <sub>GS</sub> =0V	-	-	-1.2	V

### Notes:

- 1.Pulse width limited by Max. junction temperature.
- 2.Pulse width ≤300us, duty cycle ≤2%.
- 3.Surface mounted on 1 in<sup>2</sup> copper pad of FR4 board; 270°C/W when mounted on min. copper pad.

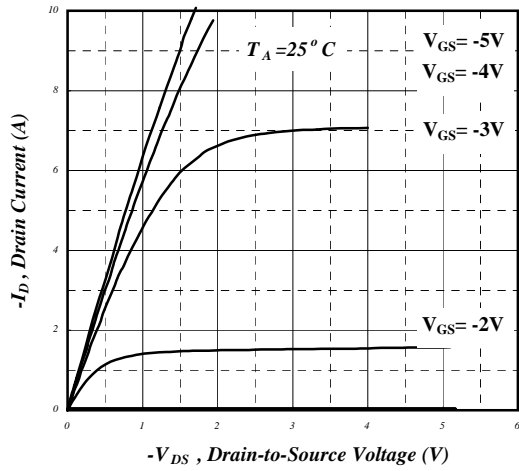


Fig 1. Typical Output Characteristics

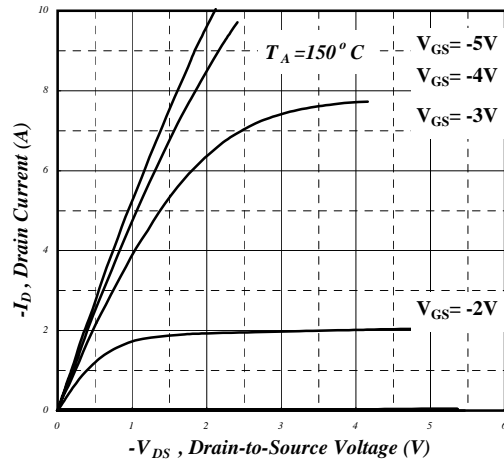


Fig 2. Typical Output Characteristics

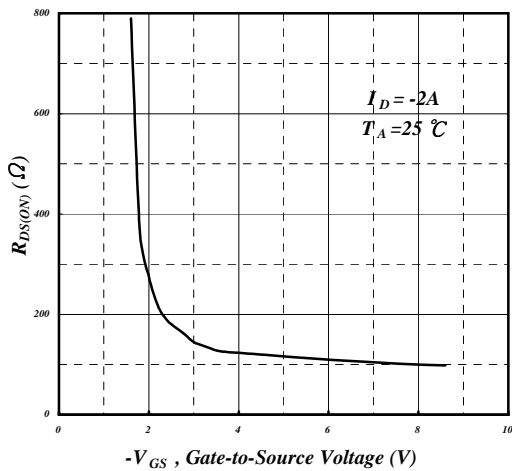


Fig 3. On-Resistance v.s. Gate Voltage

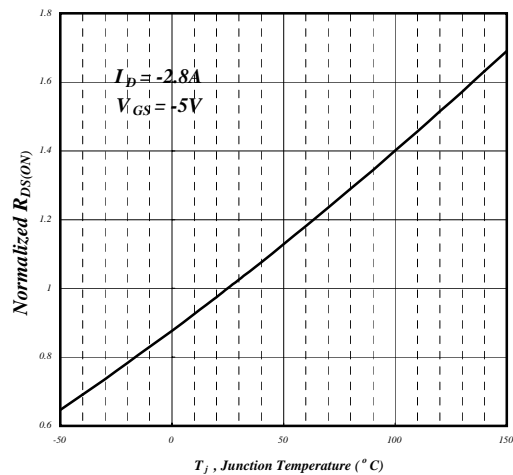


Fig 4. Normalized On-Resistance

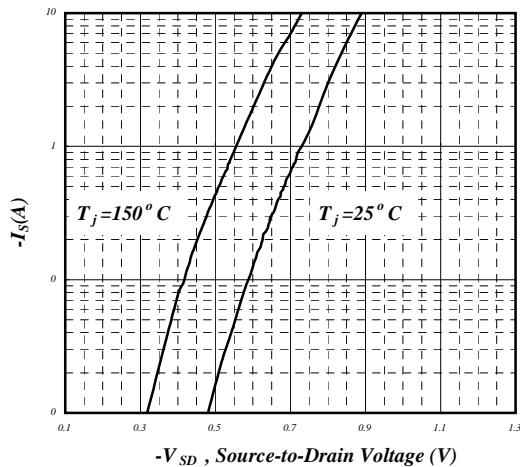


Fig 5. Forward Characteristic of Reverse Diode

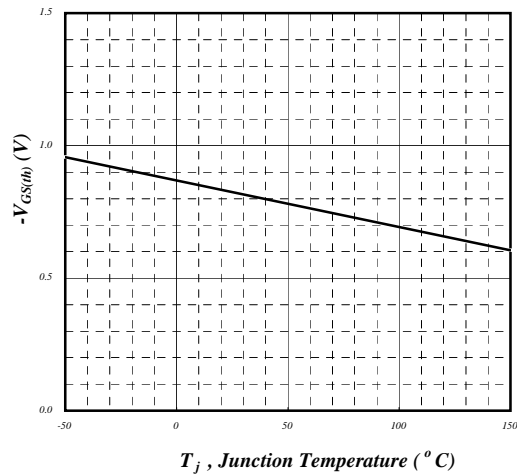


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

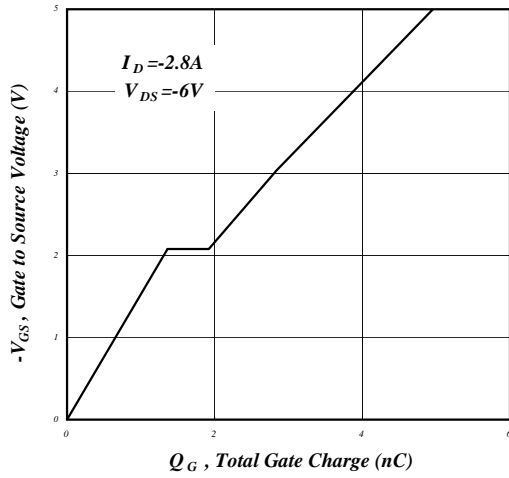


Fig 7. Gate Charge Characteristics

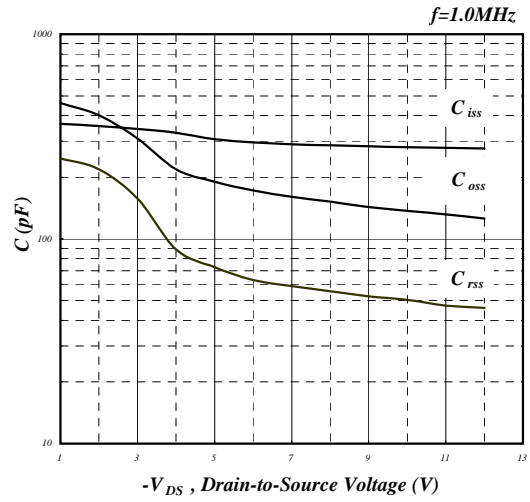


Fig 8. Typical Capacitance Characteristics

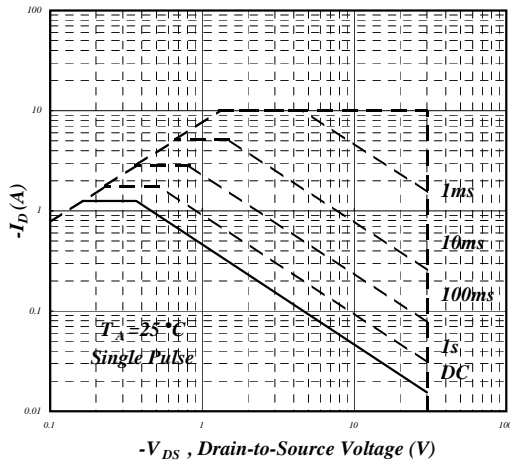


Fig 9. Maximum Safe Operating Area

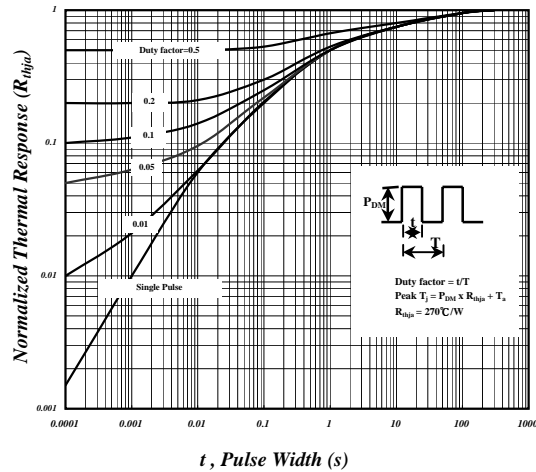


Fig 10. Effective Transient Thermal Impedance

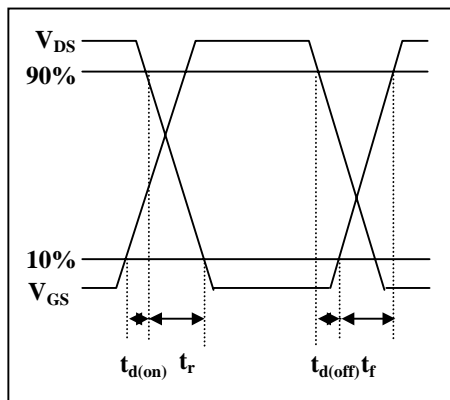


Fig 11. Switching Time Waveform

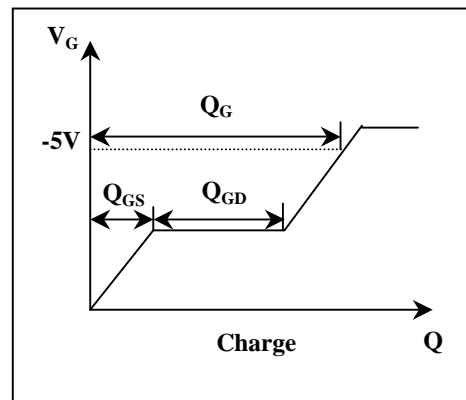


Fig 12. Gate Charge Waveform