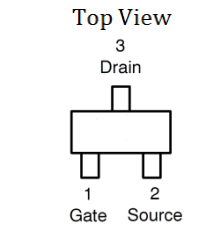
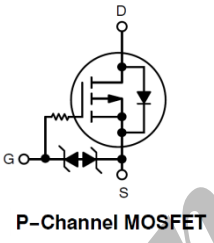
AP4151

20V P-Channel Enhancement Mode MOSFET (ESD Protected Gate)

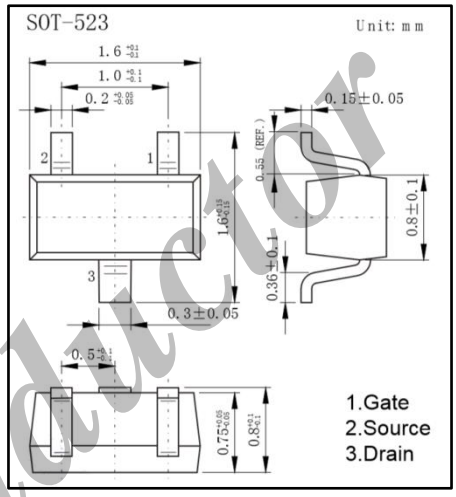
- **General Description**

- AP4151 combines advanced MOSFET technology with a low resistance package to provide excellent $R_{DS(ON)}$ and low gate charge.
- ESD Protected Gate





P-Channel MOSFET



- **Applications**

- Synchronous DC–DC conversion circuits
- High Side Load Switch
- Small Drive Circuit
- Battery Operated Systems such as Smart Phone

- **Product Summary**

V_{DS}	-20V
I_D (at V_{GS} = -4.5V)	-760mA
$R_{DS(ON)}$ (at V_{GS} = -4.5V)	< 260mΩ
$R_{DS(ON)}$ (at V_{GS} = -2.5V)	< 350mΩ
$R_{DS(ON)}$ (at V_{GS} = -1.8V)	< 490mΩ

Pb-Free

RoHS COMPLIANT

- **Absolute Maximum Ratings Ta = 25°C**

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	±6	V
Continuous Drain Current	I_D	-760	mA
Pulsed Drain Current @ tp = 10μs	I_{DM}	-1000	
Gate-to-Source RSD Rating (Human Body Model, Method 3015)	ESD	1800	V
Power Dissipation (Steady State)	P_D	301	mW
Thermal Characteristics			
Thermal Resistance, Junction-to-Ambient (Steady State)	$R_{\theta JA}$	415	°C/W
Lead Temperature for Soldering Purposes (1/8 in from case for 10s)	T_L	260	°C
Operating Junction Temperature Range	T_J	-55 to 150	
Storage Temperature Range	T_{STG}		

• Electrical Characteristics Ta = 25℃

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static Parameters						
Drain-Source Breakdown Voltage	V_{DSS}	I_D=-250μA, V_{GS}=0V	-20			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-16V, V_{GS}=0V			-100	nA
Gate-Body Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS}=±4.5V			±10	μA
Gate Threshold Voltage (Note 1)	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-250μA	-0.45		-1.2	V
Static Drain-Source On-Resistance (Note 1)	$R_{DS(ON)}$	V_{GS}=-4.5V, I_D=-350mA		260	360	mΩ
		V_{GS}=-2.5V, I_D=-300mA		350	450	
		V_{GS}=-1.8V, I_D=-150mA		490	1000	
Forward Transconductance (Note 1)	g_{FS}	V_{DS}=-10V, I_D=-250mA		0.4		S
Diode Forward Voltage	V_{SD}	I_S=-250mA, V_{GS}=0V			-1.1	V
Maximum Body-Diode Continuous Current	I_S				-250	mA
Dynamic Parameters						
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=-5V, f=1MHz		156		pF
Output Capacitance	C_{oss}			28		
Reverse Transfer Capacitance	C_{rss}			18		
Switching Parameters						
Total Gate Charge	Q_g	V_{GS}=-4.5V, V_{DS}=-10V, I_D=-0.3A		2.1		nC
Threshold Gate Charge	Q_{gth}			0.125		
Gate Source Charge	Q_{gs}			0.325		
Gate Drain Charge	Q_{gd}			0.5		
Turn-On Delay Time	$t_{D(on)}$	V_{GS}=-4.5V, V_{DS}=-10V, I_D=-200mA, R_G=10Ω		8		ns
Turn-On Rise Time	t_r			8.2		
Turn-Off Delay Time	$t_{D(off)}$			29		
Turn-Off Fall Time	t_f			20.4		

Note 1 - Pulse Test: pulse width ≤ 300μs, duty cycle ≤ 2%

• Ordering Information

Ordering Part Number	Package	MOQ
AP4151	SOT-523	3,000 pcs / reel

- **Typical Electrical and Thermal Characteristics**

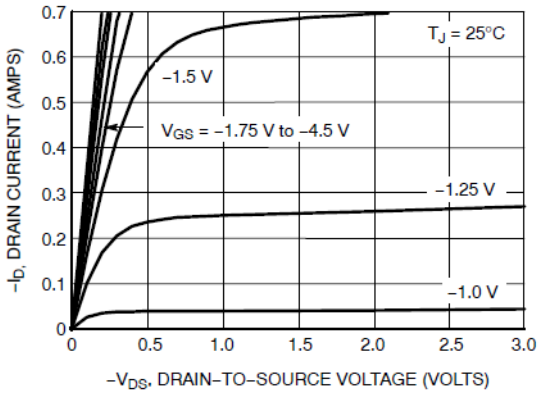


Figure 1. On−Region Characteristics

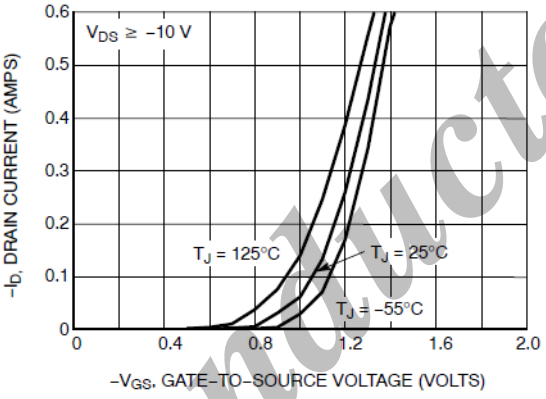


Figure 2. Transfer Characteristics

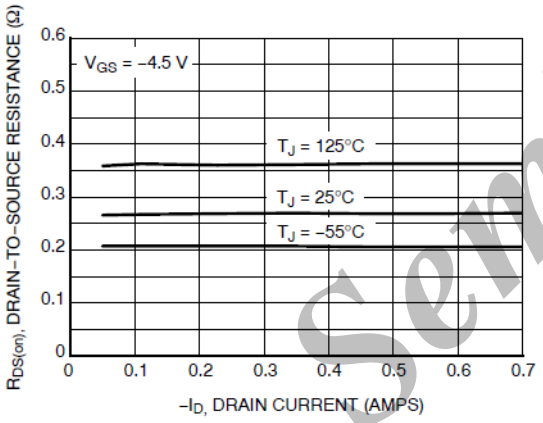


Figure 3. On−Resistance vs. Drain Current and Temperature

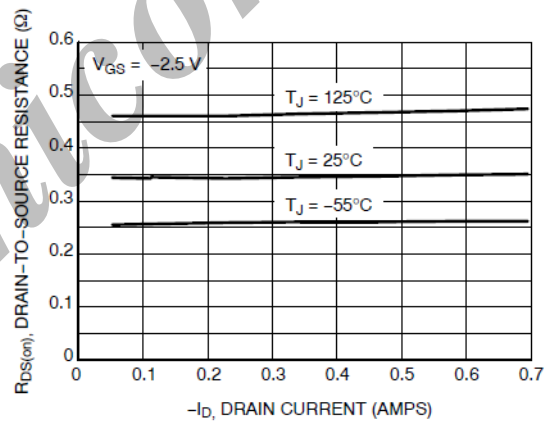


Figure 4. On−Resistance vs. Drain Current and Temperature

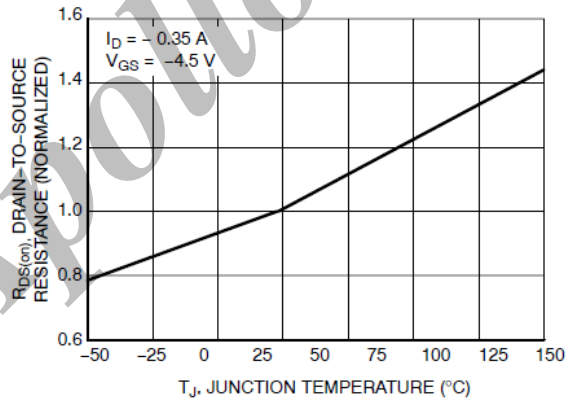


Figure 5. On−Resistance Variation with Temperature

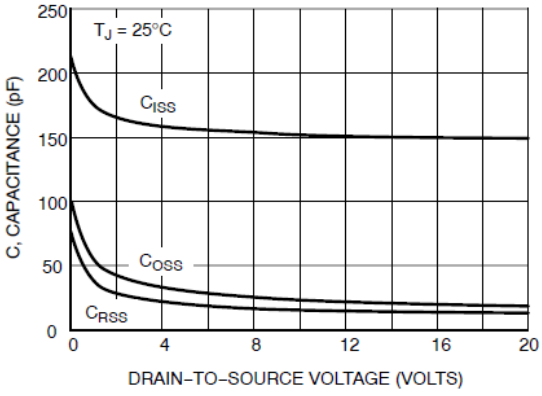


Figure 6. Capacitance Variation

- **Typical Electrical and Thermal Characteristics**

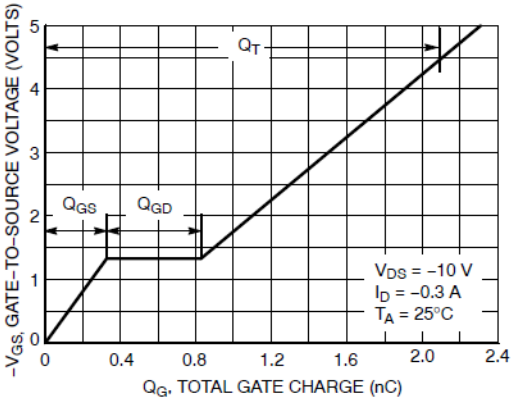


Figure 7. Gate–to–Source Voltage vs. Total Gate Charge

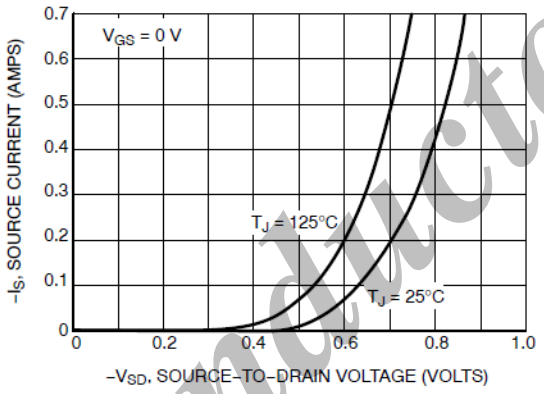


Figure 8. Diode Forward Voltage vs. Current

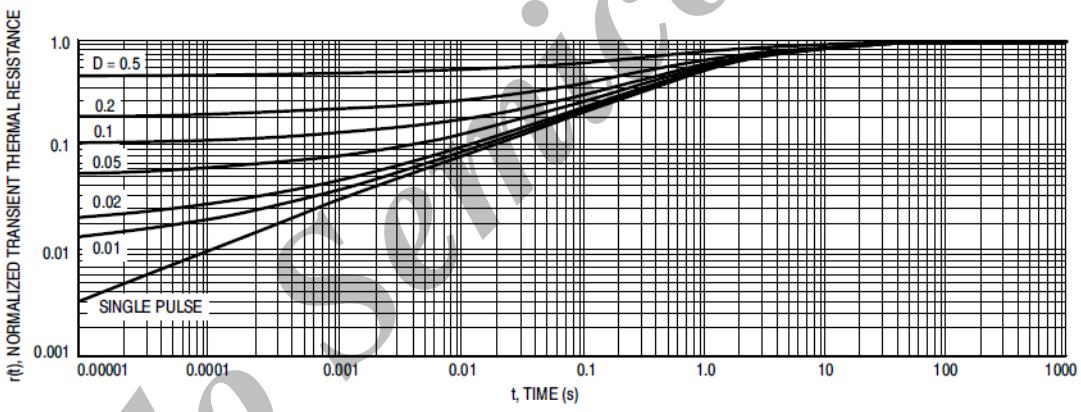


Figure 9. Normalized Thermal Response

Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Apollo Semiconductor Ltd., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Apollo"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Apollo makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Apollo disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Apollo's knowledge of typical requirements that are often placed on Apollo products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Apollo's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Apollo products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Apollo product could result in personal injury or death. Customers using or selling Apollo products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Apollo personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Apollo. Product names and markings noted herein may be trademarks of their respective owners.