

APG4018D

N-Channel Enhancement Mosfet

AIPOWER

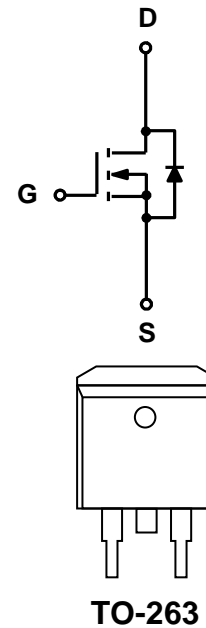
DATA SHEET

Features

- 40V,140A
 $R_{DS(ON)} < 3.0m\ \Omega @ V_{GS}=10V$ TYP:2.5m Ω
 $R_{DS(ON)} < 4.0m\ \Omega @ V_{GS}=4.5V$ TYP:3.2m Ω
- Advanced Split Gate Trench Technology
- Excellent RDS(ON) and Low Gate Charge
- Lead free product

Applications

- Load Switch
- PWM Application
- Power management



Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
G4018D	APG4018D	TO-263	-	-	800

ABSOLUTE MAXIMUM RATINGS ($T_a=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_C=25^\circ\text{C}$)	I_D	140	A
Continuous Drain Current ($T_C=100^\circ\text{C}$)	I_D	91	A
Pulsed Drain Current ⁽¹⁾	I_{DM}	560	A
Single Pulsed Avalanche Energy ⁽²⁾	E_{AS}	125	mJ
Drain Power Dissipation	P_D	100	W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	1.25	$^\circ\text{C}/\text{W}$
Thermal Resistance- Junction to Ambient	$R_{\theta JA}$	40	$^\circ\text{C}/\text{W}$
Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55~ +150	$^\circ\text{C}$

MOSFET ELECTRICAL CHARACTERISTICS(T_a=25°C unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D =250μA	40	-	-	V
Zero gate voltage drain current	I _{DSS}	V _{DS} =40V, V _{GS} = 0V	-	-	1	μA
Gate-body leakage current	I _{GSS}	V _{GS} = ±20V, V _{DS} = 0V	-	-	±100	nA
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1.0	-	2.5	V
Drain-source on-resistance ⁽³⁾	R _{DS(on)}	V _{GS} =10V, I _D =30A	-	2.5	3.0	mΩ
		V _{GS} =4.5V, I _D =20A		3.2	4.0	mΩ
Dynamic characteristics						
Input Capacitance	C _{iss}	V _{DS} =20V, V _{GS} =0V, f =1.0MHz	-	3162	-	pF
Output Capacitance	C _{oss}		-	1099	-	
Reverse Transfer Capacitance	C _{rss}		-	157	-	
Switching characteristics						
Turn-on delay time	t _{d(on)}	V _{DD} =20V, I _D =75A, R _G =1.6Ω, R _L =0.4Ω, V _G =10V	-	12.5	-	ns
Turn-on rise time	t _r		-	7	-	
Turn-off delay time	t _{d(off)}		-	50	-	
Turn-off fall time	t _f		-	8.5	-	
Total Gate Charge	Q _g	V _{DS} =20V, I _D =75A, V _{GS} =10V	-	95	-	nC
Gate-Source Charge	Q _{gs}		-	15	-	
Gate-Drain Charge	Q _{gd}		-	11	-	
Source-Drain Diode characteristics						
Diode Forward voltage ^(a)	V _{SD}	T _C =25°C, V _{GS} =0V, I _S =30A	-	-	1.2	V
Diode Forward current	I _S	T _C =25°C	-	-	140	A
Body Diode Reverse Recovery Time	t _{rr}	T _C =25°C, I _F =140A, di/dt=100A/us		31		ns
Body Diode Reverse Recovery Charge	Q _{rr}	T _C =25°C, I _F =140A, di/dt=100A/us		110		nc

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. EAS condition: T_J=25°C, V_{DD}=20V, V_G=10V, R_G=25Ω, L=0.5mH, I_{AS}=22.4A
3. Pulse Test: Pulse Width≤300μs, Duty Cycles≤0.5%

Typical Performance Characteristics

Figure 1: Output Characteristics

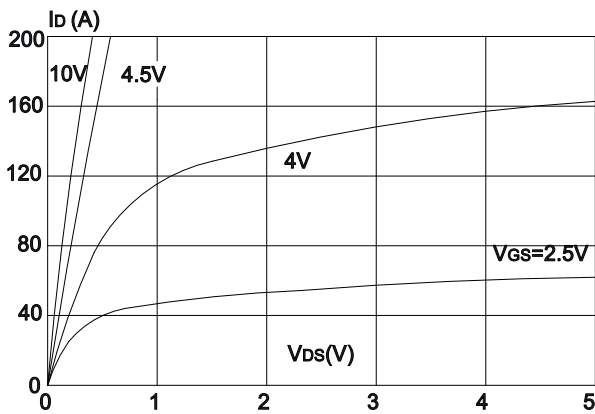


Figure 2: Typical Transfer Characteristics

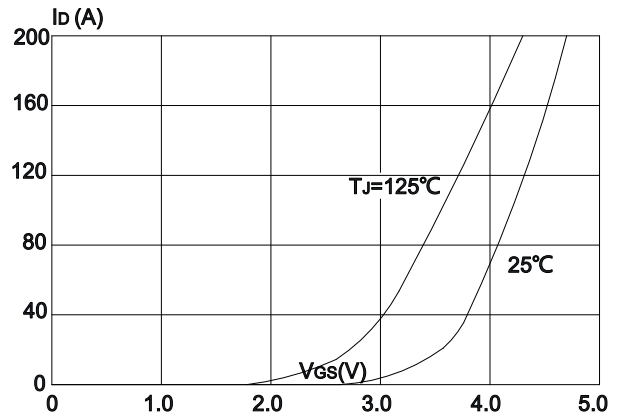


Figure 3: On-resistance vs. Drain Current

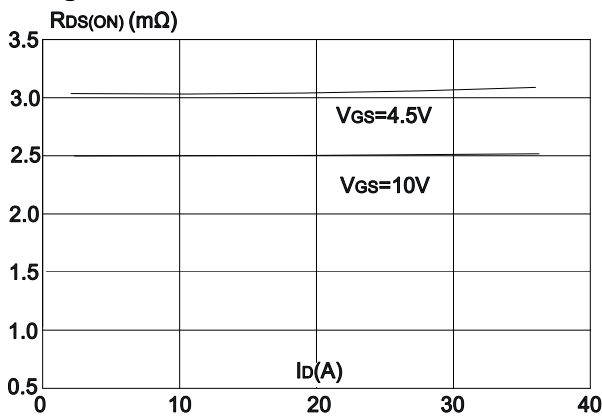


Figure 4: Body Diode Characteristics

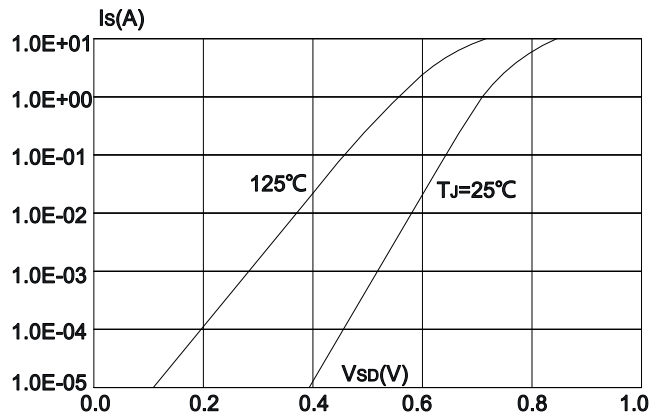


Figure 5: Gate Charge Characteristics

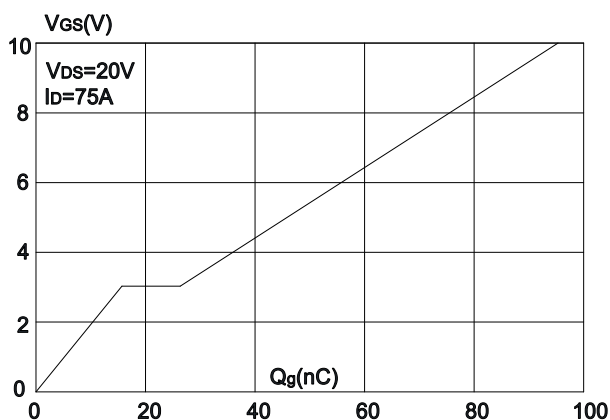


Figure 6: Capacitance Characteristics

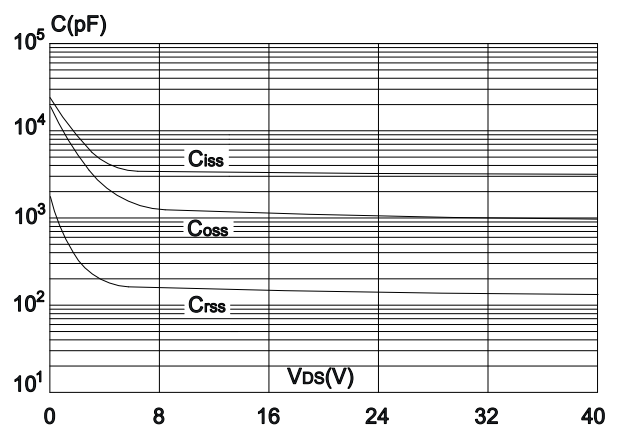


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

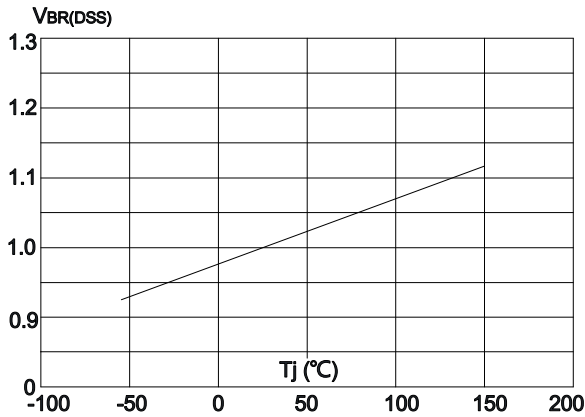


Figure 8: Normalized on Resistance vs. Junction Temperature

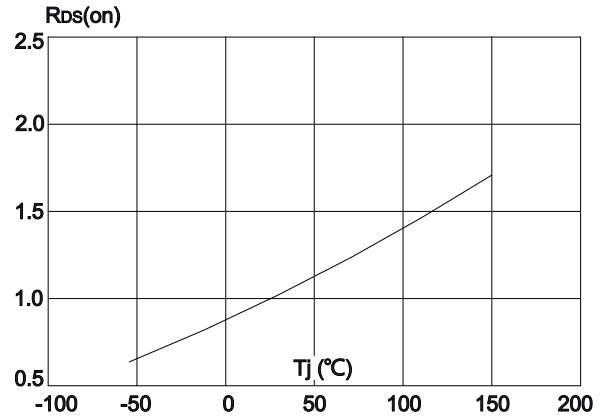


Figure 9: Maximum Safe Operating Area

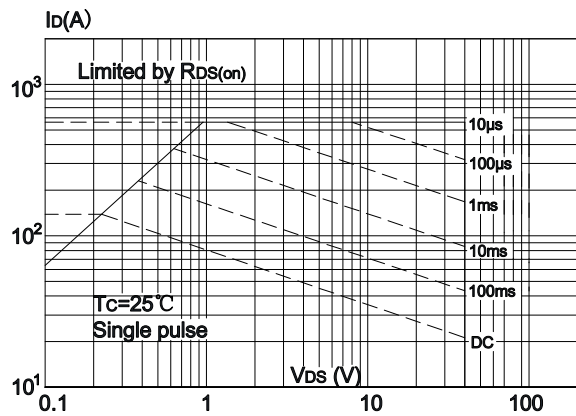


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

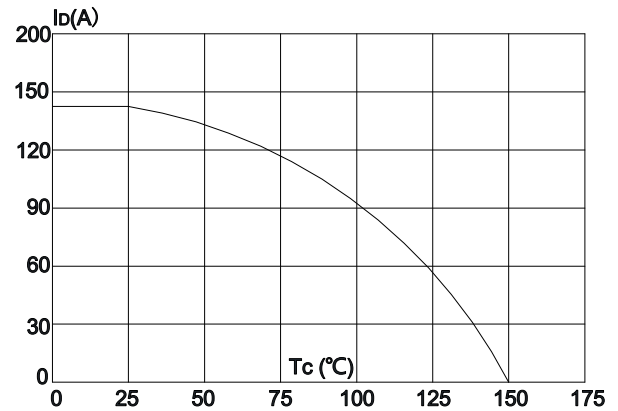
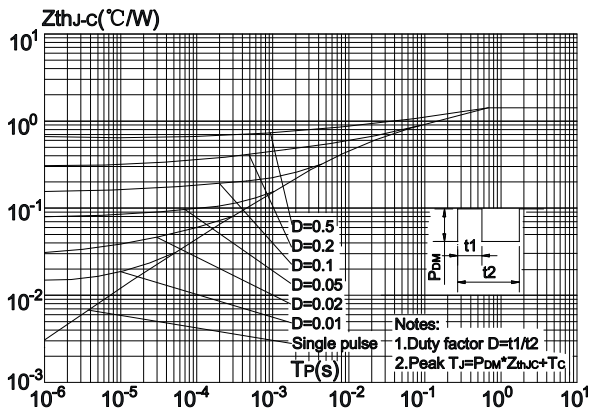


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case



Test Circuit

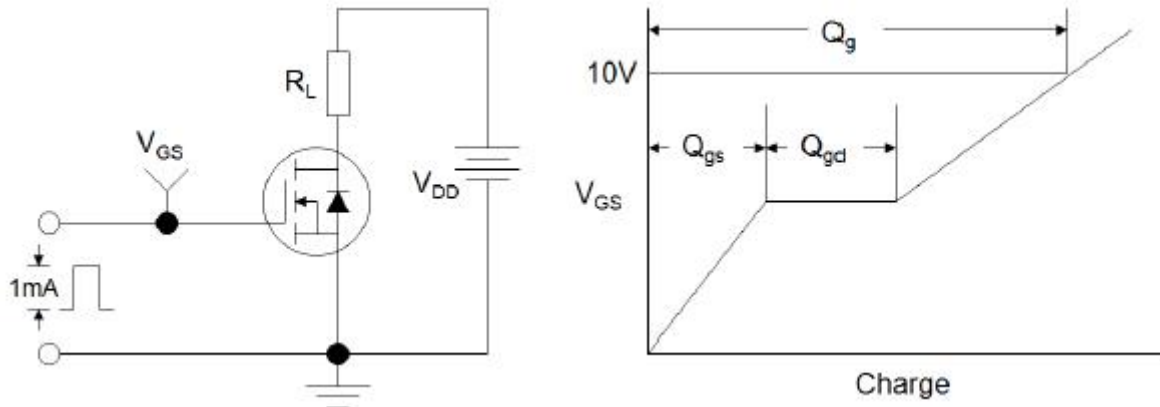


Figure1:Gate Charge Test Circuit & Waveform

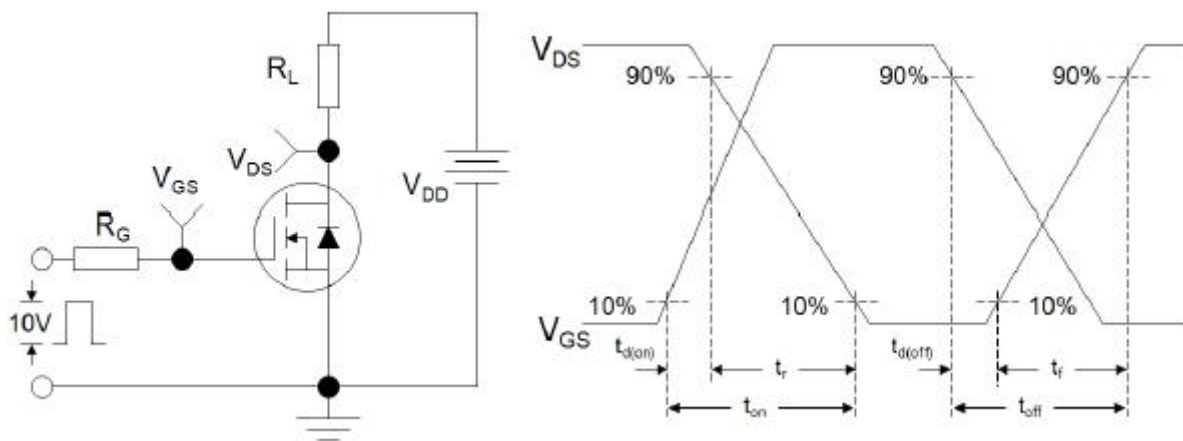


Figure 2: Resistive Switching Test Circuit & Waveforms

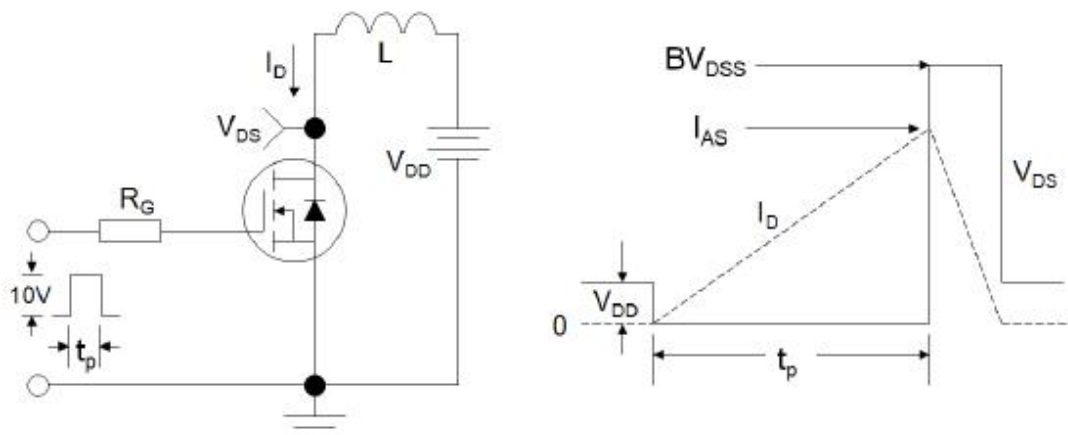
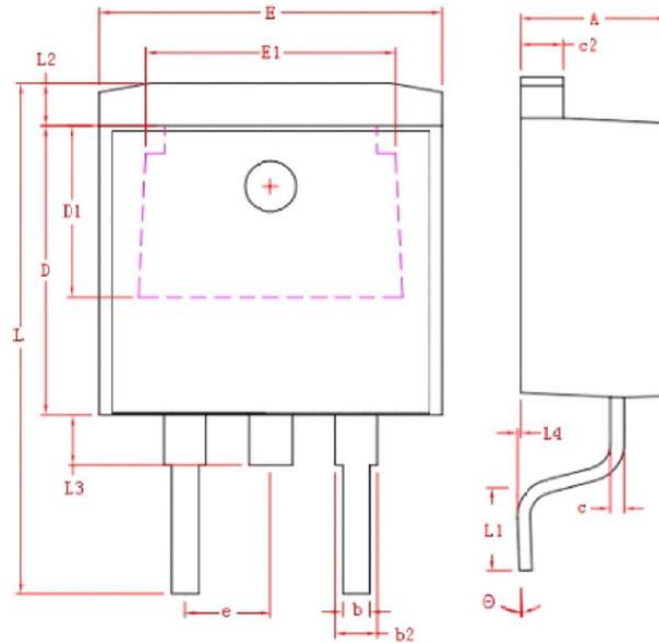


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

Package Dimensions

TO-263



Symbol	Dimensions In Millimeters	
	MIN.	MAX.
A	4.40	4.80
b	0.76	1.00
L4	0.00	0.25
C	0.36	0.50
L3	1.50 REF	
L1	2.29	2.79
E	9.80	10.40
E1	7.40 REF	
c2	1.25	1.45
b2	1.17	1.47
D	8.60	9.00
D1	5.10 REF	
e	2.54 REF	
L	14.6	15.8
θ	0° ± 3°	
L2	1.27 REF	