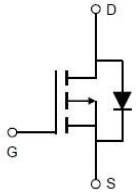
APG52P10K

P-Channel Enhancement Mosfet

DATA SHEET

Features

- -100V, -35A
  $R_{DS(ON)}$ <52mΩ @V_{GS}=-10V TYP:40mΩ
  $R_{DS(ON)}$ <62mΩ @V_{GS}=-4.5V TYP:44mΩ
- Advanced Split Gate Trench Technology
- Excellent RDS(ON) and Low Gate Charge
- Lead free product is acquired



Schematic Diagram

Marking and pin assignment

Applications

- Load Switch
- PWM Application
- Power management

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
G52P10K	APG52P10K	TO-252	13inch	-	2500

ABSOLUTE MAXIMUM RATINGS (T_a=25℃ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	-100	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current (T_C =25℃)	I_D	-35	A
Continuous Drain Current (T_C =100℃)	I_D	-23	A
Pulsed Drain Current (1)	I_{DM}	-140	A
Single Pulsed Avalanche Energy (2)	E_{AS}	87	mJ
Drain Power Dissipation	P_D	140	W
Thermal Resistance from Junction to Case(2)	$R_{\theta JC}$	1.1	℃/W
Junction Temperature	T_J	150	℃
Storage Temperature	T_{STG}	-55~ +150	℃

MOSFET ELECTRICAL CHARACTERISTICS(T_a=25℃ 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	-100	-	-	V
Zero gate voltage drain current	I_{DSS}	V_{DS} =-100V, 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	-1.6	-2.5	V
Drain-source on-resistance(3)	$R_{DS(on)}$	V_{GS} =-10V, I_D =-20A	-	40	52	mΩ
		V_{GS} =-4.5V, I_D =-10A		44	62	
Dynamic characteristics						
Input Capacitance	C_{iss}	V_{DS} =-50V, V_{GS} =0V, f =1.0MHz	-	2120	-	pF
Output Capacitance	C_{oss}		-	194	-	
Reverse Transfer Capacitance	C_{rss}		-	13	-	
Switching characteristics						
Turn-on delay time	$t_{d(on)}$	V_{DD}=-50V, I_D=-5A, R_G=6Ω, V_G=-10V	-	13	-	ns
Turn-on rise time	t_r		-	39	-	
Turn-off delay time	$t_{d(off)}$		-	100.1	-	
Turn-off fall time	t_f		-	105.3	-	
Total Gate Charge	Qg	V_{DS}=-50V, I_D=-5A, V_{GS}=-10V	-	40	-	nC
Gate-Source Charge	Qgs		-	7.8	-	
Gate-Drain Charge	Qgd		-	8.6	-	
Source-Drain Diode characteristics						
Diode Forward voltage(a)	V_{SD}	T_J=25℃, V_{GS} =0V, I_S=-30A	-	-	-1.2	V
Diode Forward current	I_S	T_C=25℃	-	-	-35	A
Body Diode Reverse Recovery Time	trr	T_J=25℃， IF=-5A,di/dt=100A/us		104		ns
Body Diode Reverse Recovery Charge	Qrr	T_J=25℃， IF=-5A,di/dt=100A/us		280		uc

Notes:

a) Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

b) EAS condition: TJ=25℃, VDD=-50V, VG=-10V, RG=25Ω, L=0.5mH, IAS=-18.7A

c) Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

Typical Performance Characteristics

Figure1: Output Characteristics

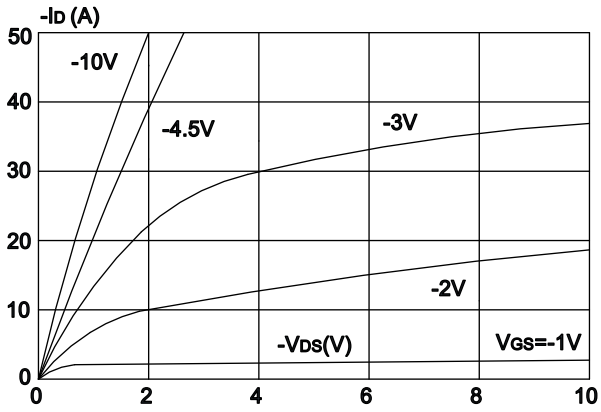


Figure 2: Typical Transfer Characteristics

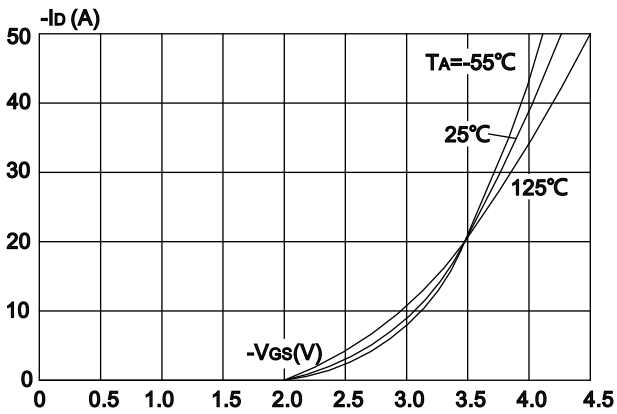


Figure 3: On-resistance vs. Drain Current

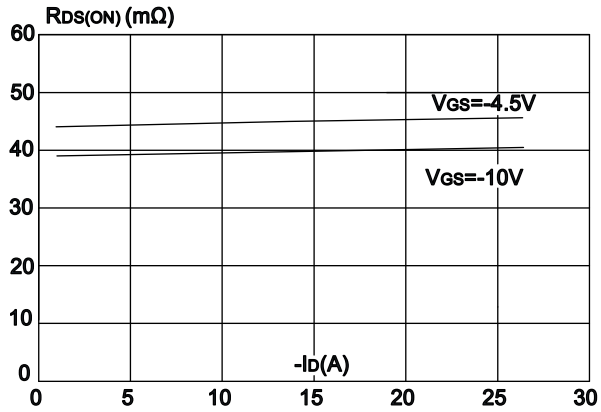


Figure 4: Body Diode Characteristics

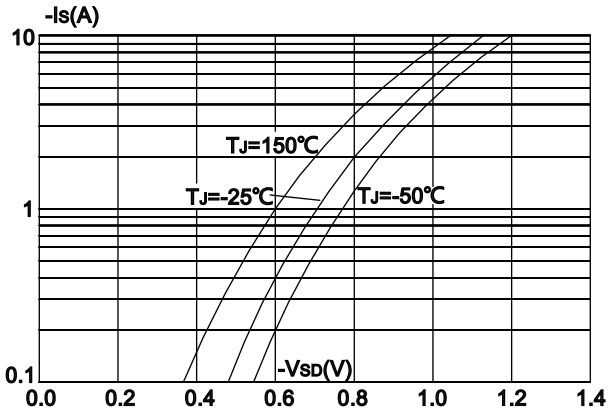


Figure 5: Gate Charge Characteristics

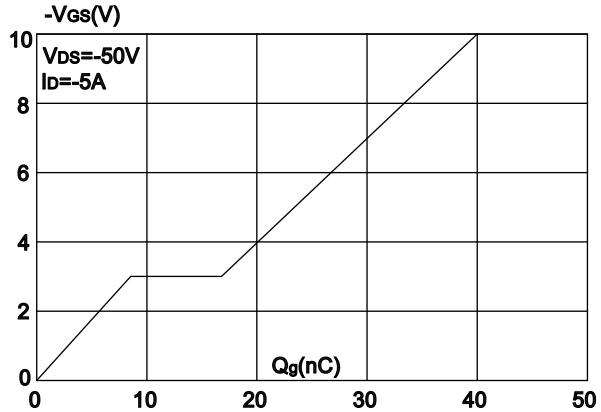


Figure 6: Capacitance Characteristics

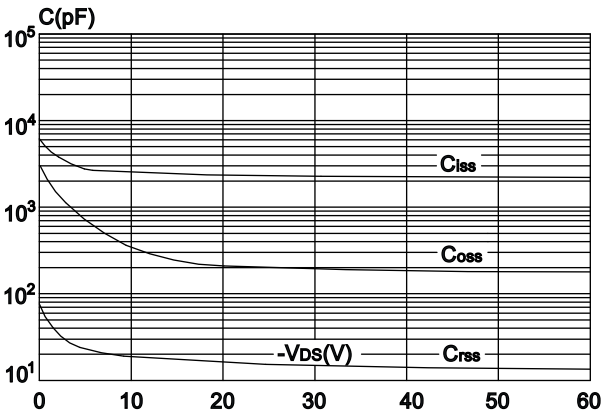


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

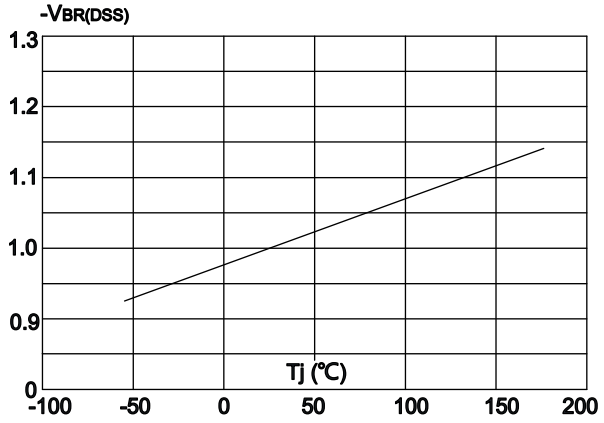


Figure 8: Normalized on Resistance vs. Junction Temperature

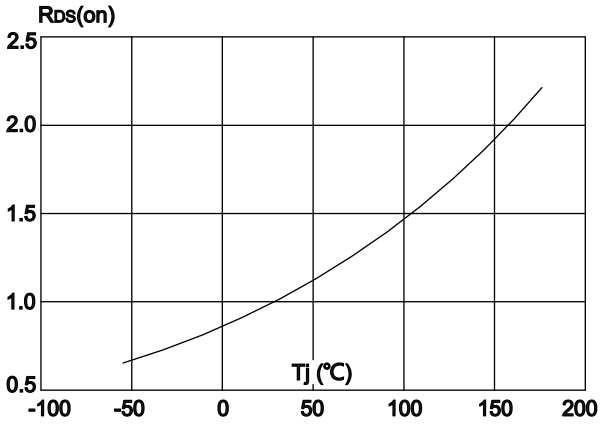


Figure 9: Maximum Safe Operating Area

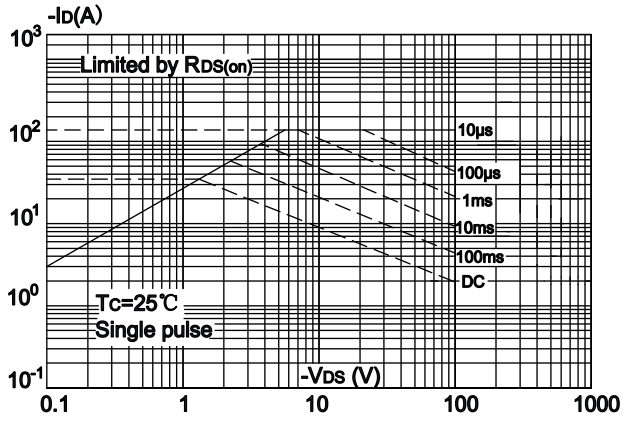


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

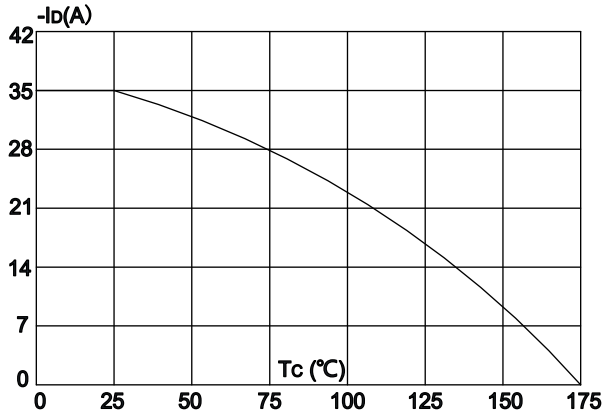
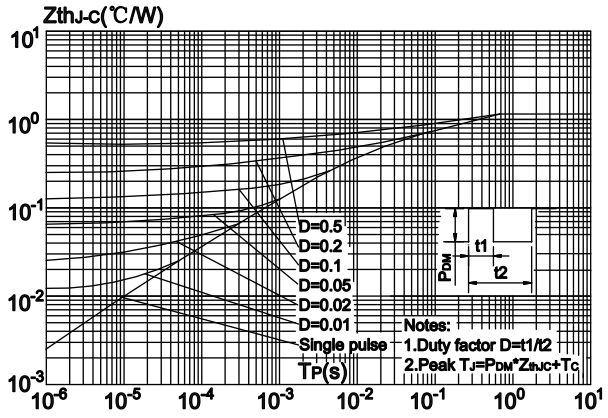


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case



Test Circuit

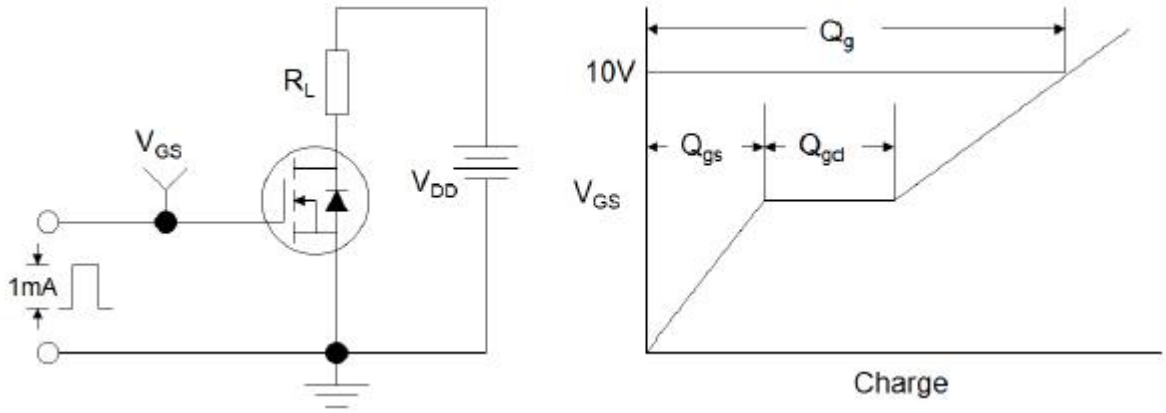


Figure1:Gate Charge Test Circuit & Waveform

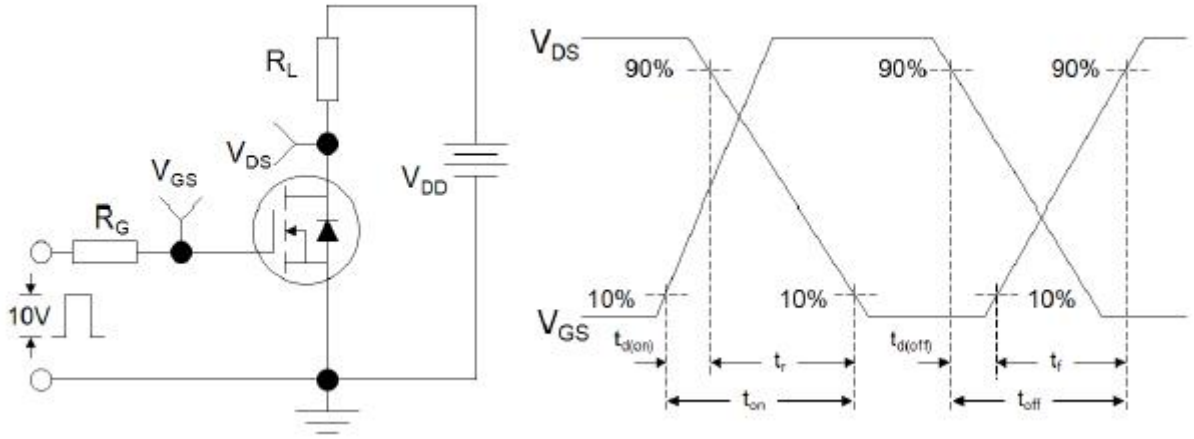


Figure 2: Resistive Switching Test Circuit & Waveforms

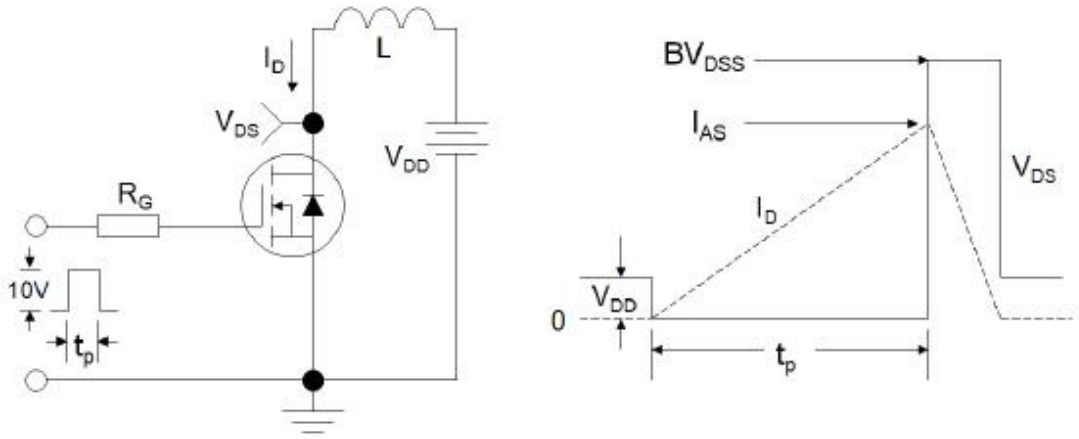
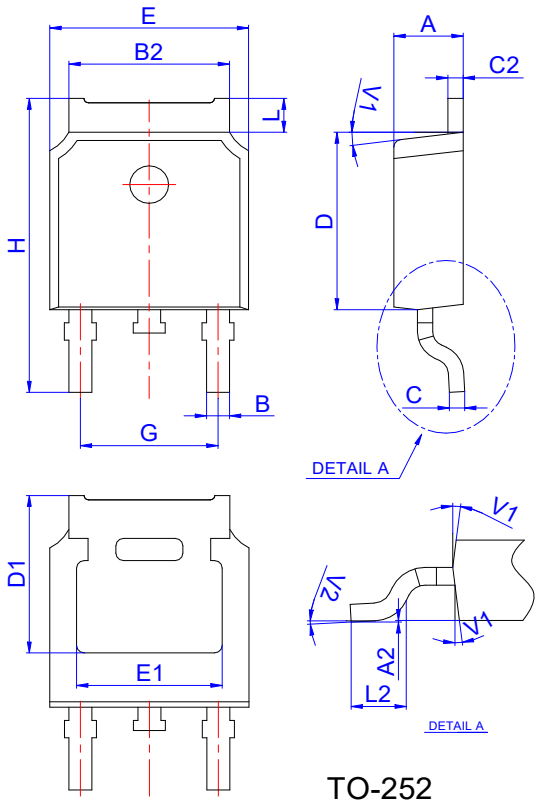


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

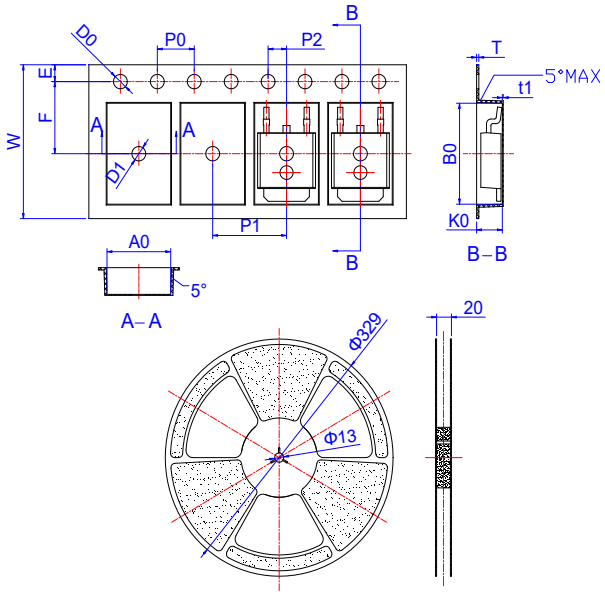
Package Mechanical Data-TO-252



TO-252

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

Reel Spectification-TO-252



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
W	15.90	16.00	16.10	0.626	0.630	0.634
E	1.65	1.75	1.85	0.065	0.069	0.073
F	7.40	7.50	7.60	0.291	0.295	0.299
D0	1.40	1.50	1.60	0.055	0.059	0.063
D1	1.40	1.50	1.60	0.055	0.059	0.063
P0	3.90	4.00	4.10	0.154	0.157	0.161
P1	7.90	8.00	8.10	0.311	0.315	0.319
P2	1.90	2.00	2.10	0.075	0.079	0.083
A0	6.85	6.90	7.00	0.270	0.271	0.276
B0	10.45	10.50	10.60	0.411	0.413	0.417
K0	2.68	2.78	2.88	0.105	0.109	0.113
T	0.24		0.27	0.009		0.011
t1	0.10			0.004		
10P0	39.80	40.00	40.20	1.567	1.575	1.583