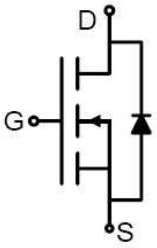
AP2045K

N-Channel Enhancement Mosfet

DATA SHEET

Feature

- 20V,80A
  $R_{DS(ON)}$ <6mΩ @V_{GS}=4.5V
  $R_{DS(ON)}$ <10mΩ @V_{GS}=2.5V
- Advanced Trench Technology
- Lead free product is acquired
- Excellent $R_{DS(ON)}$ and Low Gate Charge



Schematic Diagram

Application

- PWM applications
- Load Switch
- Power management



Marking and pin assignment

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
2045K	AP2045K	TO-252	-	-	2500

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	±12	V
Continuous Drain Current (T_C=25℃)	I_D	80	A
Continuous Drain Current (T_C=100℃)	I_D	51	A
Pulsed Drain Currenr (1)	I_{DM}	300	A
Singel Pulsed Avalanche Energy (2)	E_{AS}	57	mJ
Power Dissipation	P_D	57	W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	2.63	℃/W
Junction Temperature	T_J	150	℃
Storage Temperature	T_{STG}	-55~ +150	℃

MOSFET ELECTRICAL CHARACTERISTICS(T_J=25℃ unless otherwise noted)

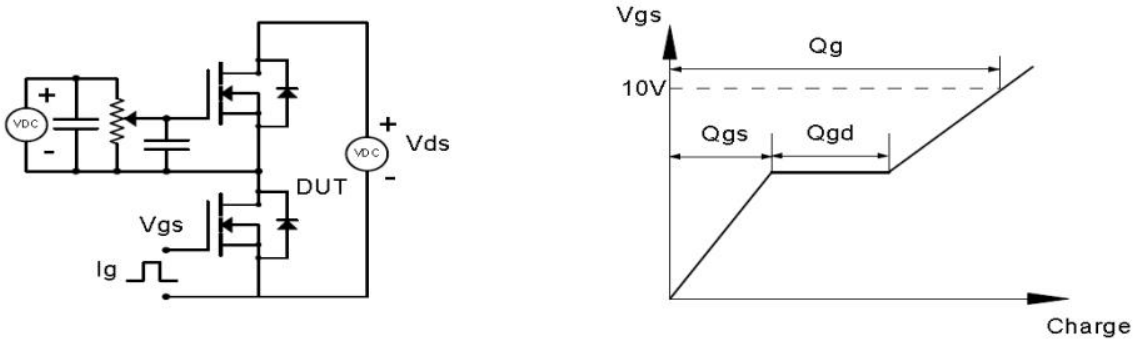
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D =250μA	20	-	-	V
Zero gate voltage drain current	I_{DSS}	V_{DS} =20V, V_{GS} = 0V	-	-	1	μA
Gate-body leakage current	I_{GSS}	V_{GS} =±12V, V_{DS} = 0V	-	-	±100	nA
Gate threshold voltage(3)	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =250μA	0.4	0.7	1.2	V
Drain-source on-resistance(3)	$R_{DS(on)}$	V_{GS} =4.5V, I_D =30A	-	4.0	6	mΩ
		V_{GS} =2.5V, I_D =20A	-	6.5	10	
Dynamic characteristics						
Input Capacitance	C_{iss}	V_{DS} =10V, V_{GS} =0V, f =1MHz	-	2500	-	pF
Output Capacitance	C_{oss}		-	407	-	
Reverse Transfer Capacitance	C_{rss}		-	386	-	
Switching characteristics						
Turn-on delay time	$t_{d(on)}$	V_{DD}=10V, I_D=30A, R_L=3Ω V_{GS}=4.5V, R_G=3Ω	-	17	-	ns
Turn-on rise time	t_r		-	49	-	
Turn-off delay time	$t_{d(off)}$		-	74	-	
Turn-off fall time	t_f		-	26	-	
Total Gate Charge	Qg	VDS=10V, ID=30A, VGS=4.5V	-	32	-	nC
Gate-Source Charge	Qgs		-	3	-	
Gate-Drain Charge	Qgd		-	11	-	
Source-Drain Diode characteristics						
Diode Forward voltage(3)	V_{DS}	V_{GS} =0V, I_S=30A	-	-	1.2	V
Diode Forward current(4)	I_S		-	-	80	A

Notes:

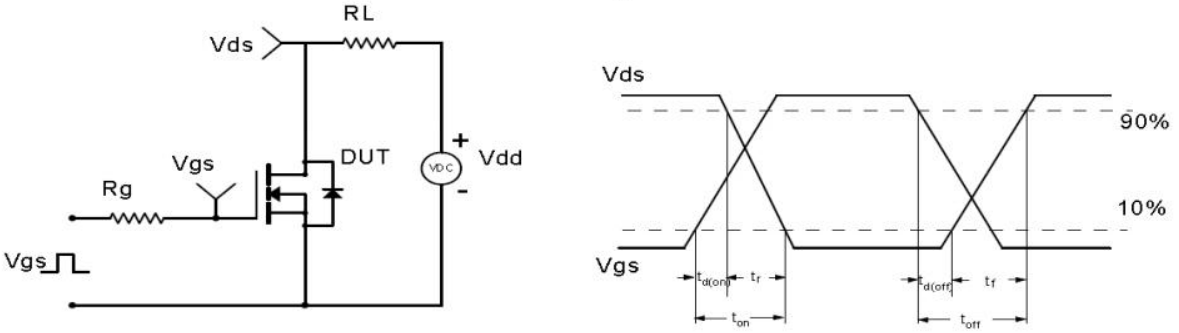
1. Repetitive Rating: pulse width limited by maximum junction temperature
2. EAS Condition:T_J=25℃,V_{DD}=10V,R_G=25Ω,L=0.5mH
3. Pulse Test: pulse width≤300μs, duty cycle≤2%
4. Surface Mounted on FR4 Board,t≤10 sec

Test Circuit & Waveform

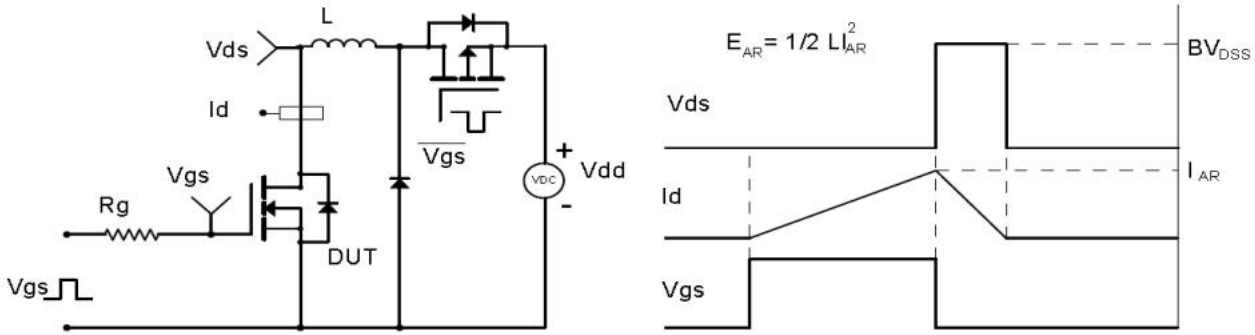
Gate Charge Test Circuit & Waveform



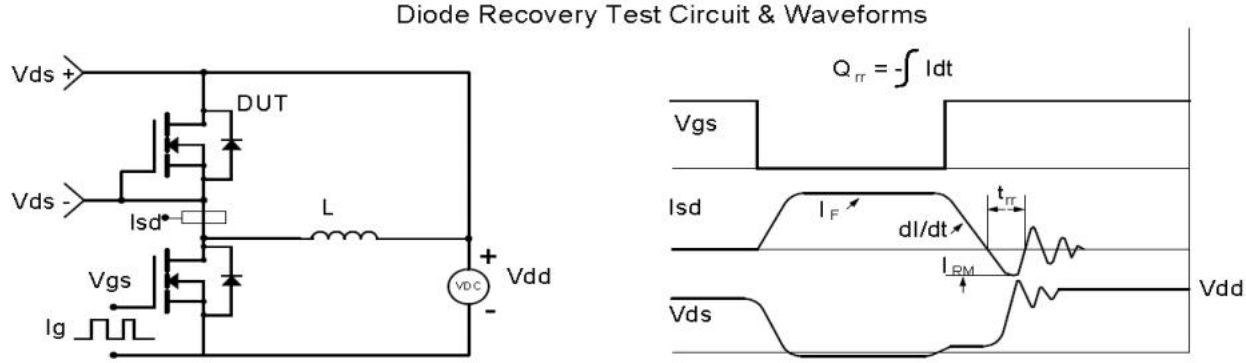
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Typical Performance Characteristics

Figure1: Output Characteristics

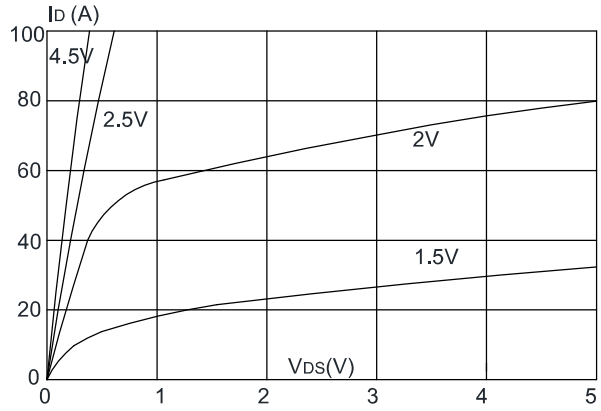


Figure 2: Typical Transfer Characteristics

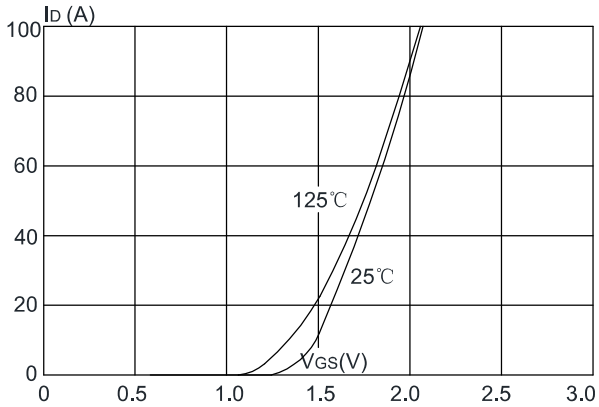


Figure 3: On-resistance vs. Drain Current

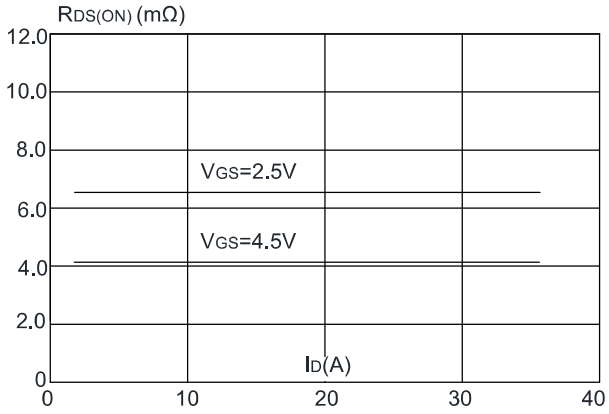


Figure 4: Body Diode Characteristics

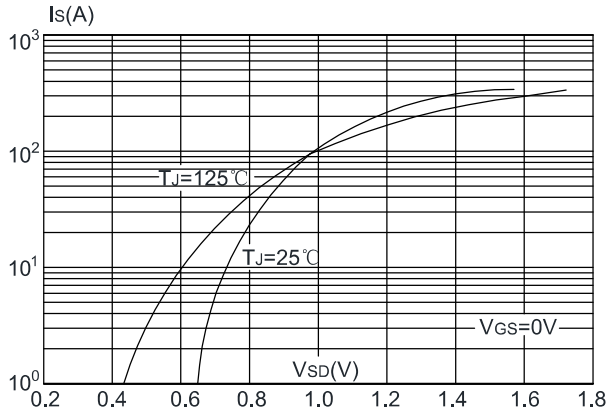


Figure 5: Gate Charge Characteristics

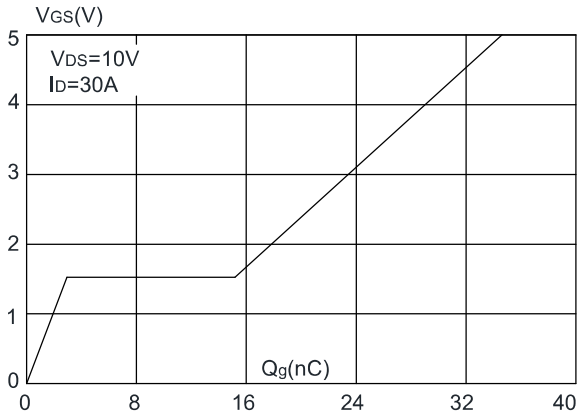


Figure 6: Capacitance Characteristics

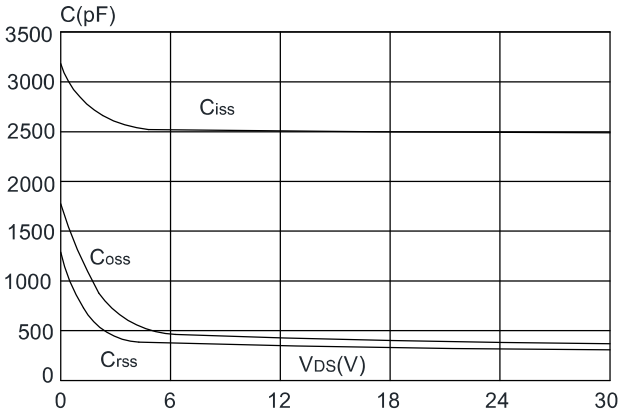


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

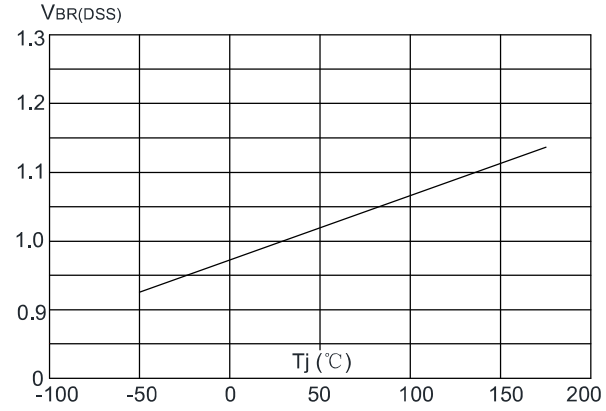


Figure 8: Normalized on Resistance vs. Junction Temperature

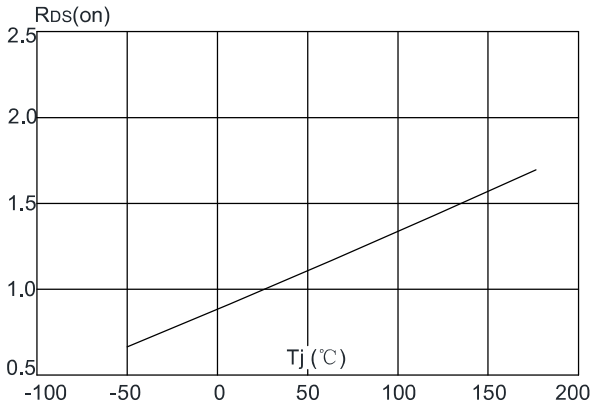


Figure 9: Maximum Safe Operating Area

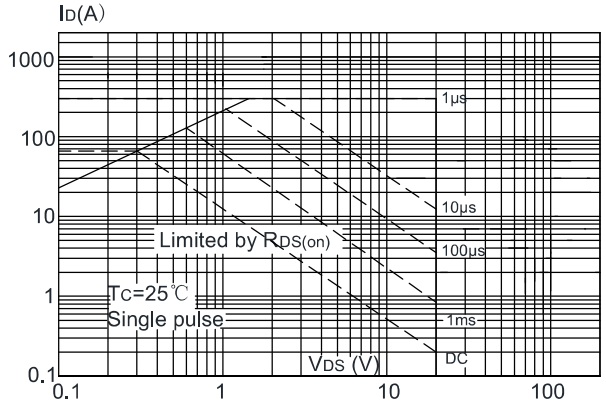


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

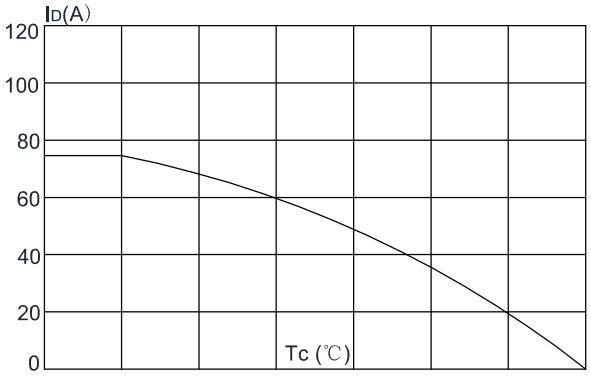
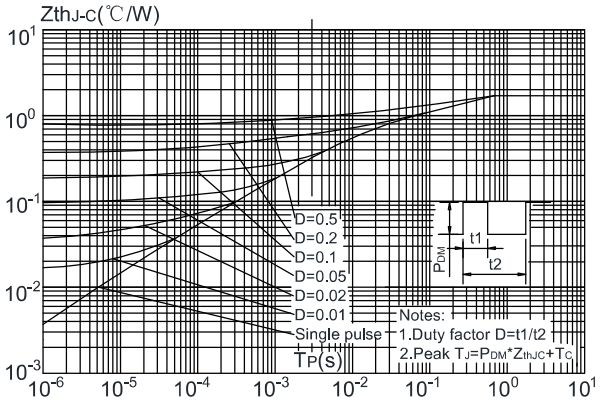
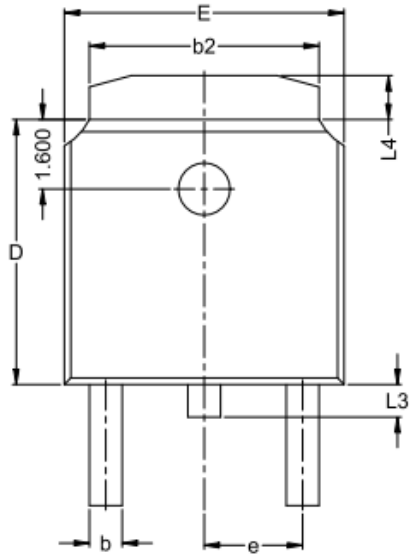


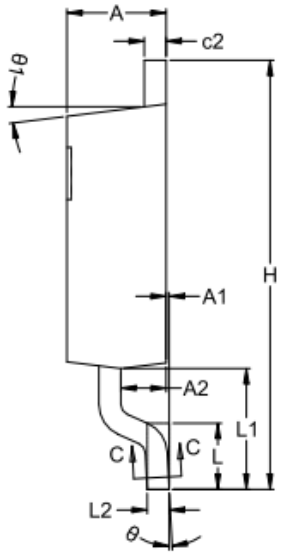
Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case



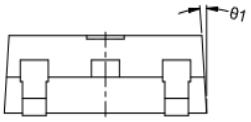
TO-252 Package Information



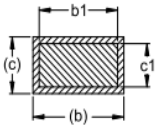
TOP VIEW



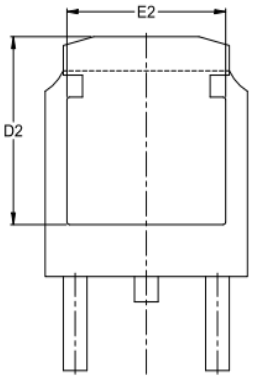
SIDE VIEW(Right)



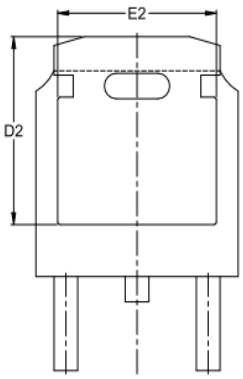
SIDE VIEW(Front)



SECTION:C-C



OPTION 1
BOTTOM VIEW



OPTION 2
BOTTOM VIEW

DIM / SYMBOL	MIN.	NOM.	MAX.
A	2.200	2.300	2.400
A1	0.000	0.070	0.130
A2	0.950	1.050	1.150
b	0.700	0.800	0.900
b1	0.660	0.760	0.860
b2	5.134	5.334	5.534
c	0.448	0.548	0.648
c1	0.458	0.508	0.558
c2	0.448	0.548	0.648
D	6.000	6.100	6.200
D2	5.372	5.572	5.772
E	6.400	6.500	6.600
E2	4.900	5.100	5.300
e	2.286 BSC.		
H	9.700	9.900	10.100
L	1.380	1.525	1.725
L1	2.588	2.788	2.988
L2	0.508 BSC.		
L3	0.600	0.750	0.950
L4	0.812	1.012	1.212
θ	1°	3°	5°
θ1	6°	7°	8°

Revision History

Revision	Release	Remark
V1.0	2024/05/18	Initial Release

Disclaimer

The information given in this document describes the independent performance of the product,but similar performance is not guaranteed under other working conditions,and cannot be guaranteed when installed with other products or equipment.To achieve the required performance of the product in actual scenarios,the customer should conduct a complete application test to assess the functionality of the product.

Allpower assumes no responsibility for equipment failures result from using products at values that exceed the ratings,operating conditions,or other parameters listed in the product specifications.

The product described in this specification is not applicable for aerospace or other applications which
requires high reliability.Customers using or selling these products for use in medical,life-saving,or life-sustaining applications do so at their own risk and agree to fully indemnify.

Due to product or technical improvements,the information described or contained herein may be changed without prior notice.