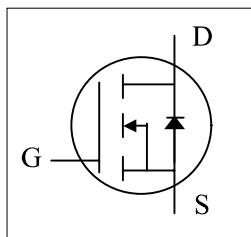


N-Channel Power MOSFET

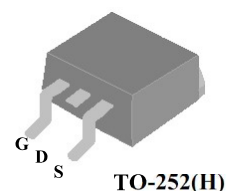
- ▼ Capable of 2.5V Gate Drive
- ▼ Small Size & Ultra_Low $R_{DS(ON)}$
- ▼ RoHS Compliant & Halogen-Free



BV_{DSS}	20V
$R_{DS(ON)}$	4.2m Ω
I_D^3	80A

Description

AP2045K series are from Advanced Power innovated design and silicon process technology to achieve the lowest possible on-resistance and fast switching performance. It provides the designer with an extreme efficient device for use in a wide range of power applications.

Absolute Maximum Ratings@ $T_J=25^\circ\text{C}$ (unless otherwise specified)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	± 12	V
$I_D@T_A=25^\circ\text{C}$	Drain Current, $V_{GS} @ 4.5V^3$	80	A
$I_D@T_A=70^\circ\text{C}$	Drain Current, $V_{GS} @ 4.5V^3$	65	A
I_{DM}	Pulsed Drain Current ¹	60	A
$P_D@T_A=25^\circ\text{C}$	Total Power Dissipation	3.13	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

Thermal Data

Symbol	Parameter	Value	Unit
R_{thj-c}	Maximum Thermal Resistance, Junction-case	5	$^\circ\text{C}/\text{W}$
R_{thj-a}	Maximum Thermal Resistance, Junction-ambient ³	40	$^\circ\text{C}/\text{W}$

N-Channel Power MOSFET

Electrical Characteristics@T_j=25°C(unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	20	-	-	V
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =4.5V, I _D =20A	-	4.2	5.5	mΩ
		V _{GS} =2.5V, I _D =12A	-	-	7	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =1mA	0.6	-	0.9	V
g _{fs}	Forward Transconductance	V _{DS} =5V, I _D =20A	-	130	-	S
I _{DSS}	Drain-Source Leakage Current	V _{DS} =16V, V _{GS} =0V	-	-	10	uA
I _{GSS}	Gate-Source Leakage	V _{GS} =±12V, V _{DS} =0V	-	-	±100	nA
Q _g	Total Gate Charge	I _D =20A	-	62	99.2	nC
Q _{gs}	Gate-Source Charge	V _{DS} =10V	-	4	-	nC
Q _{gd}	Gate-Drain ("Miller") Charge	V _{GS} =4.5V	-	21	-	nC
t _{d(on)}	Turn-on Delay Time	V _{DS} =10V	-	12	-	ns
t _r	Rise Time	I _D =1A	-	20	-	ns
t _{d(off)}	Turn-off Delay Time	R _G =3.3Ω	-	100	-	ns
t _f	Fall Time	V _{GS} =5V	-	80	-	ns
C _{iss}	Input Capacitance	V _{GS} =0V	-	3600	4400	pF
C _{oss}	Output Capacitance	V _{DS} =10V	-	500	-	pF
C _{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	400	-	pF
R _g	Gate Resistance	f=1.0MHz	-	1.4	2.8	Ω

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V _{SD}	Forward On Voltage ²	I _S =2.5A, V _{GS} =0V	-	-	1.2	V
t _{rr}	Reverse Recovery Time	I _S =20A, V _{GS} =0V,	-	43	-	ns
Q _{rr}	Reverse Recovery Charge	dl/dt=100A/μs	-	26	-	nC

Notes:

- 1.Pulse width limited by Max. junction temperature.
- 2.Pulse test
- 3.Surface mounted on 1 in² 2oz copper pad of FR4 board, t ≤10sec; 135°C/W when mounted on min. copper pad.
- 4.Maximum current limited by package.

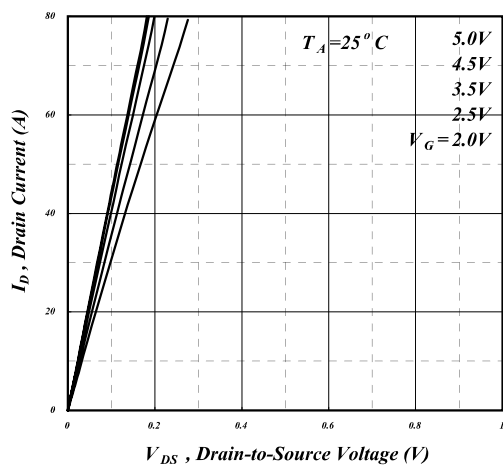


Fig 1. Typical Output Characteristics

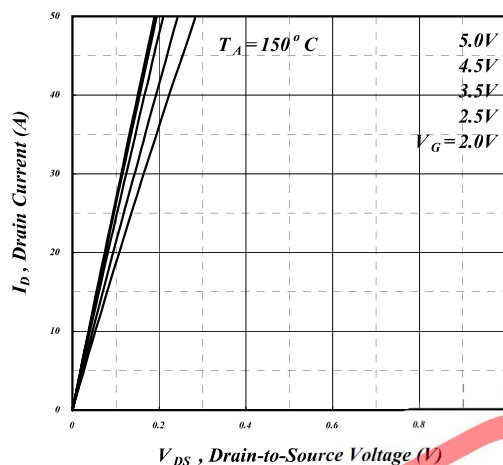


Fig 2. Typical Output Characteristics

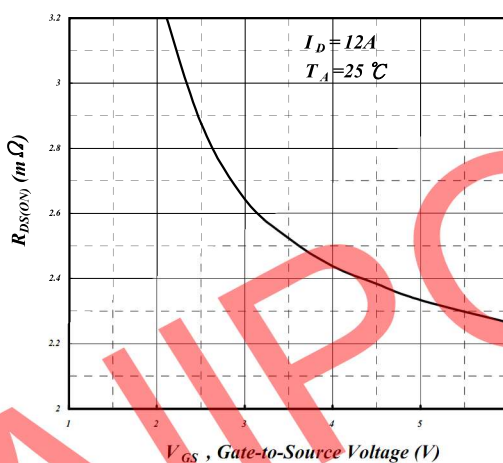
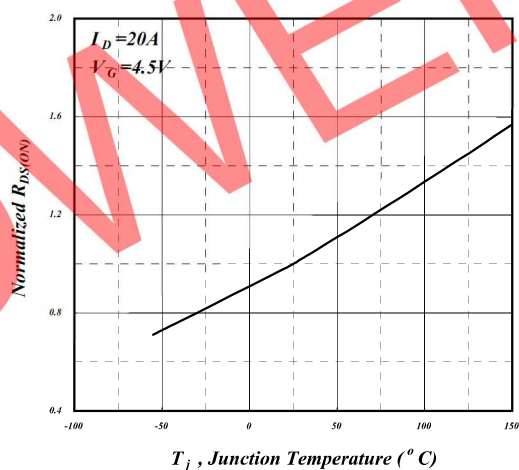
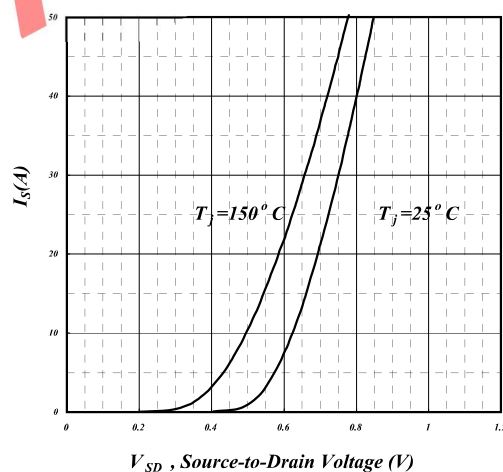


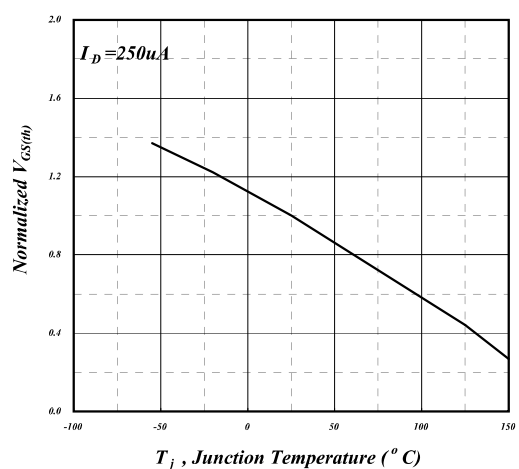
Fig 3. On-Resistance v.s. Gate Voltage



**Fig 4. Normalized On-Resistance
v.s. Junction Temperature**



**Fig 5. Forward Characteristic of
Reverse Diode**



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

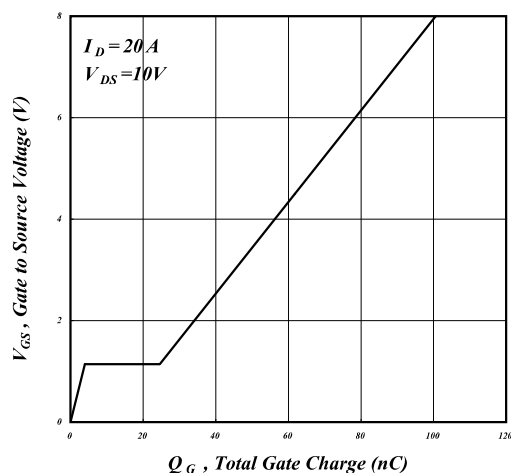


Fig 7. Gate Charge Characteristics

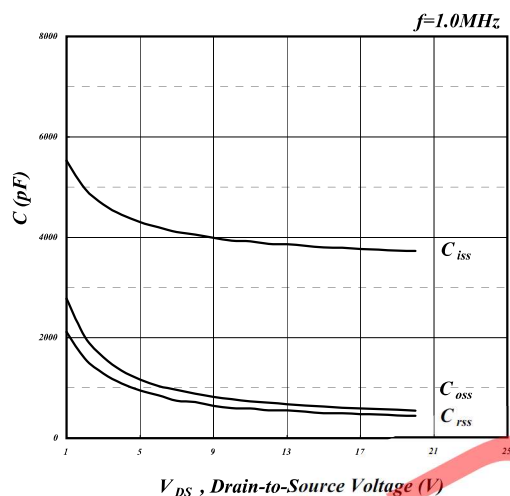


Fig 8. Typical Capacitance Characteristics

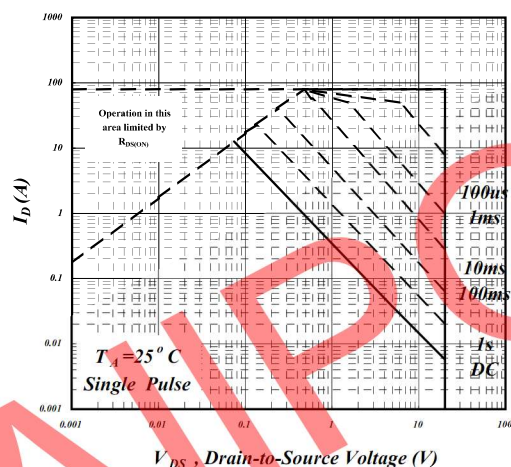


Fig 9. Maximum Safe Operating Area

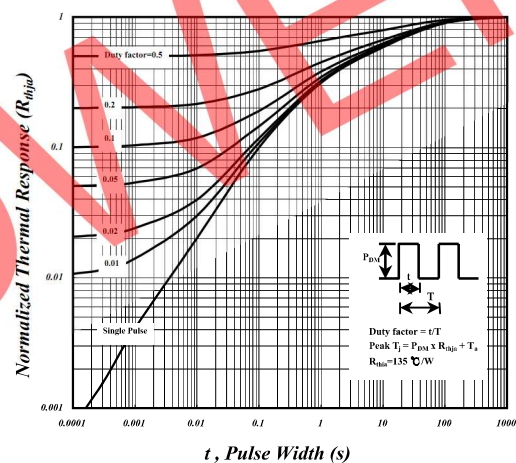


Fig 10. Effective Transient Thermal Impedance

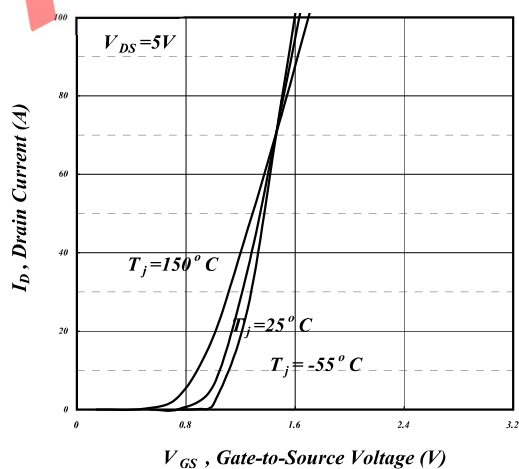


Fig 11. Transfer Characteristics

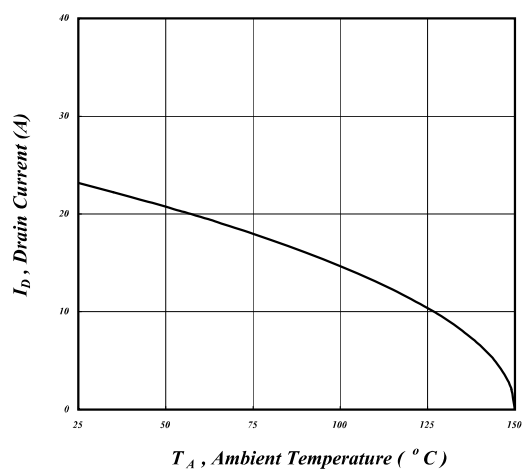


Fig 12. Drain Current v.s. Ambient Temperature

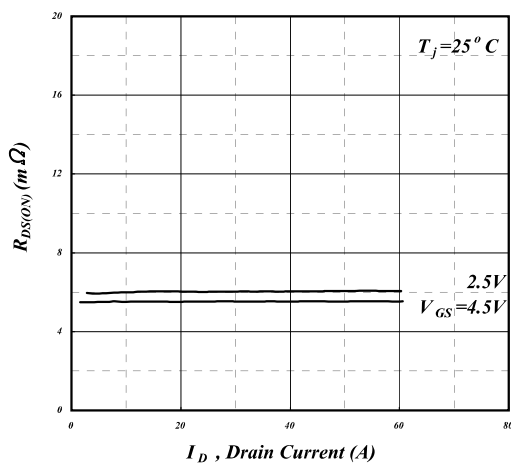


Fig 13. Typ. Drain-Source on State Resistance

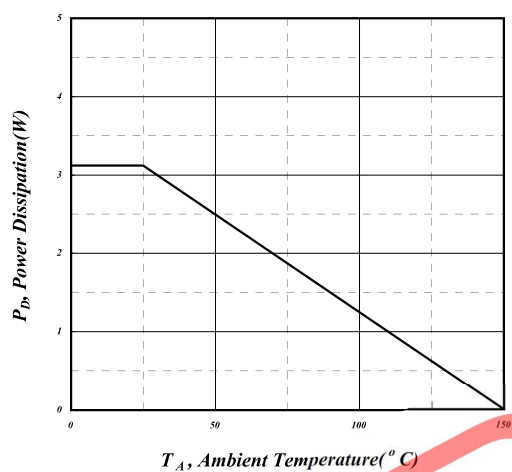
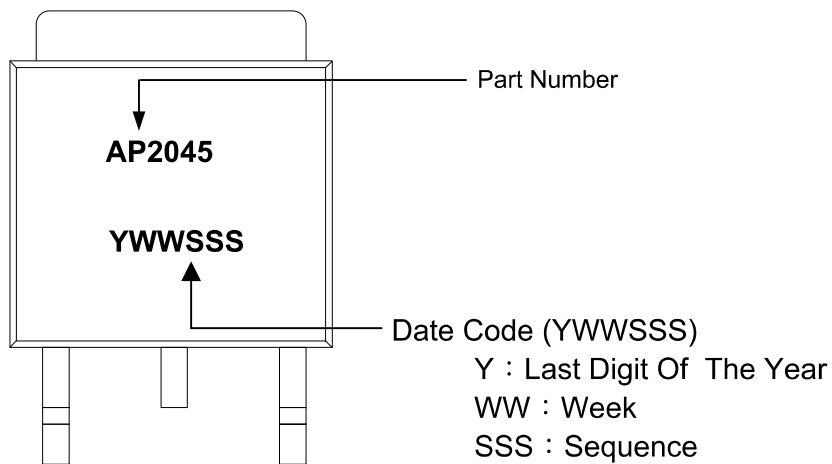


Fig 14. Total Power Dissipation

AP2045K

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TO-252



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