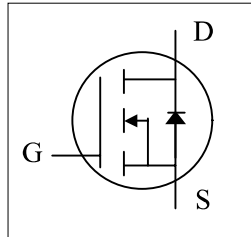


# AP2055K

## N-Channel Power MOSFET

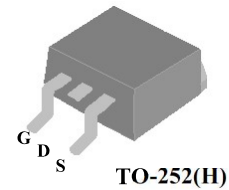
- ▼ Capable of 2.5V Gate Drive
- ▼ Small Size & Ultra\_Low  $R_{DS(ON)}$
- ▼ RoHS Compliant & Halogen-Free



$BV_{DSS}$	20V
$R_{DS(ON)}$	4.8m $\Omega$
$I_D^3$	60A

### Description

AP2055K 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	$\pm 12$	V
$I_D@T_A=25^\circ\text{C}$	Drain Current, $V_{GS} @ 4.5V^3$	60	A
$I_D@T_A=70^\circ\text{C}$	Drain Current, $V_{GS} @ 4.5V^3$	40	A
$I_{DM}$	Pulsed Drain Current <sup>1</sup>	180	A
EAS	Single pulse avalanche energy	190	mJ
$P_D@T_A=25^\circ\text{C}$	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
Rthj-c	Maximum Thermal Resistance, Junction-case	5	$^\circ\text{C}/\text{W}$
Rthj-a	Maximum Thermal Resistance, Junction-ambient <sup>3</sup>	40	$^\circ\text{C}/\text{W}$

**AP2055K**
**N-Channel Power MOSFET**
**Electrical Characteristics@T<sub>j</sub>=25°C(unless otherwise specified)**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	20	-	-	V
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance <sup>2</sup>	V <sub>GS</sub> =4.5V, I <sub>D</sub> =20A	-	4.8	5.5	mΩ
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =12A	-	-	7	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =1mA	0.5	-	0.9	V
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =5V, I <sub>D</sub> =20A	-	30	-	S
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =16V, V <sub>GS</sub> =0V	-	-	10	uA
I <sub>GSS</sub>	Gate-Source Leakage	V <sub>GS</sub> =±12V, V <sub>DS</sub> =0V	-	-	±100	nA
Q <sub>g</sub>	Total Gate Charge	I <sub>D</sub> =20A	-	32	59.2	nC
Q <sub>gs</sub>	Gate-Source Charge	V <sub>DS</sub> =10V	-	6	-	nC
Q <sub>gd</sub>	Gate-Drain ("Miller") Charge	V <sub>GS</sub> =4.5V	-	6.5	-	nC
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DS</sub> =10V	-	10	-	ns
t <sub>r</sub>	Rise Time	I <sub>D</sub> =1A	-	18	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time	R <sub>G</sub> =3.3Ω	-	30	-	ns
t <sub>f</sub>	Fall Time	V <sub>GS</sub> =5V	-	18	-	ns
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V	-	2200	4400	pF
C <sub>oss</sub>	Output Capacitance	V <sub>DS</sub> =10V	-	500	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance	f=1.0MHz	-	200	-	pF
R <sub>g</sub>	Gate Resistance	f=1.0MHz	-	1.4	2.8	Ω

**Source-Drain Diode**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V <sub>SD</sub>	Forward On Voltage <sup>2</sup>	I <sub>S</sub> =2.5A, V <sub>GS</sub> =0V	-	-	1.2	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>S</sub> =20A, V <sub>GS</sub> =0V,	-	30	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge	di/dt=100A/μs	-	26	-	nC

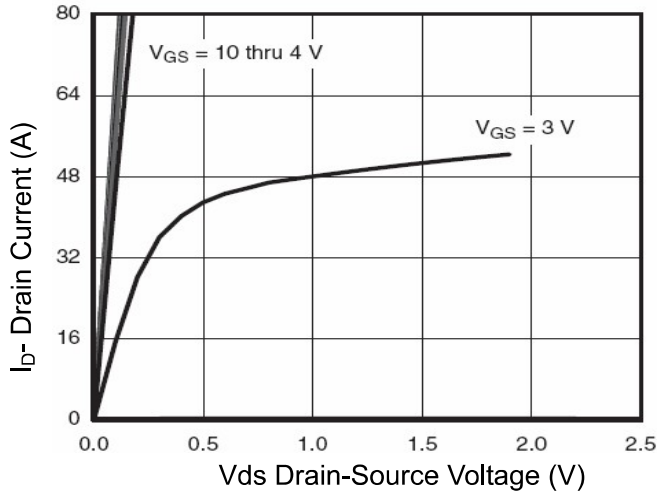
**Notes:**

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

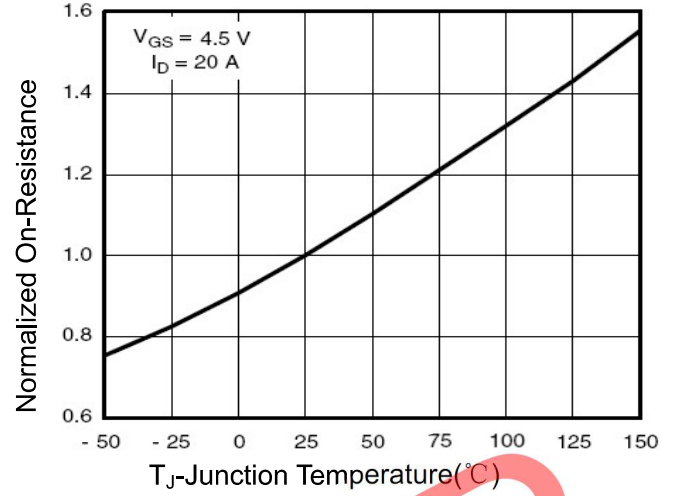
**AP2055K**

**N-Channel Power MOSFET**

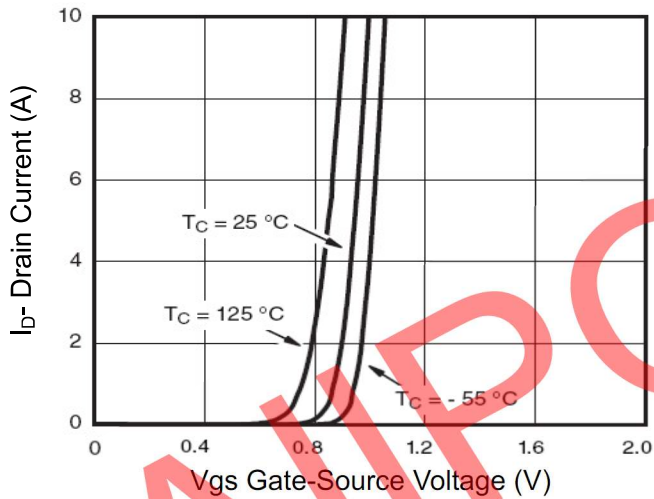
**Typical Electrical and Thermal Characteristics (Curves)**



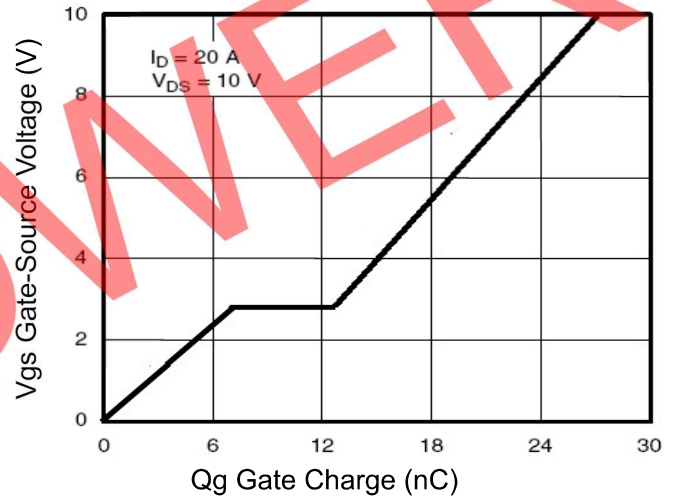
**Figure 1 Output Characteristics**



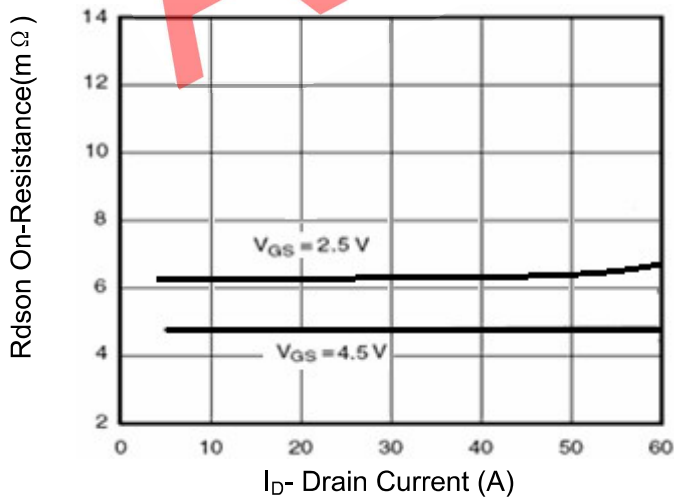
**Figure 4 Rdson-Junction Temperature**



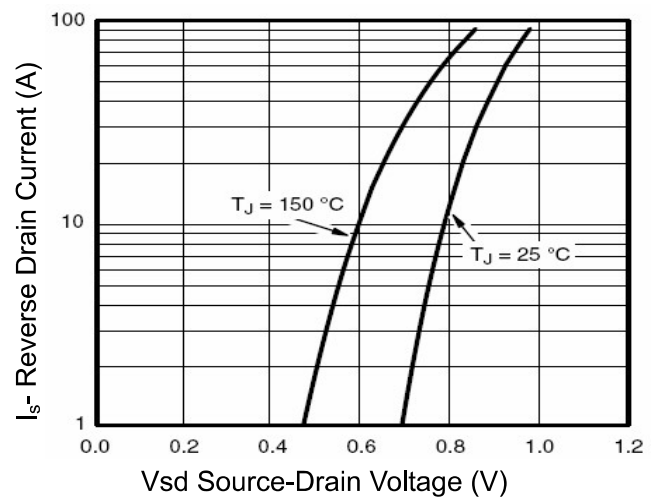
**Figure 2 Transfer Characteristics**



**Figure 5 Gate Charge**



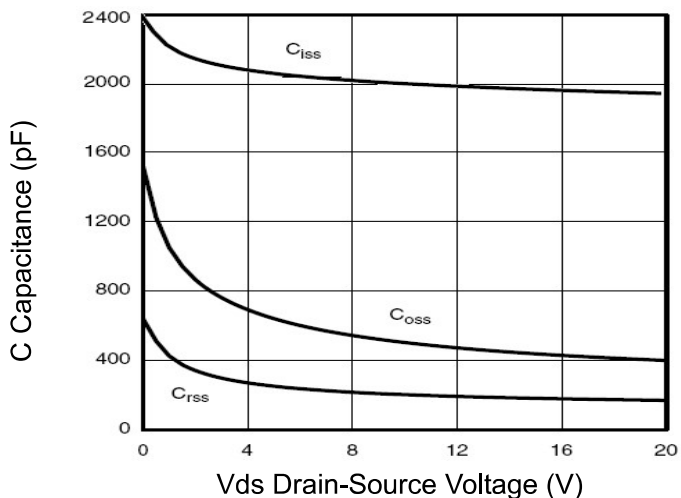
**Figure 3 Rdson- Drain Current**



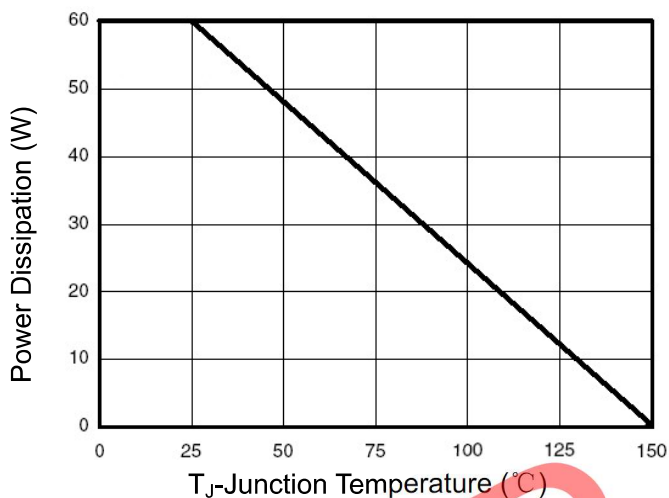
**Figure 6 Source- Drain Diode Forward**

**AP2055K**

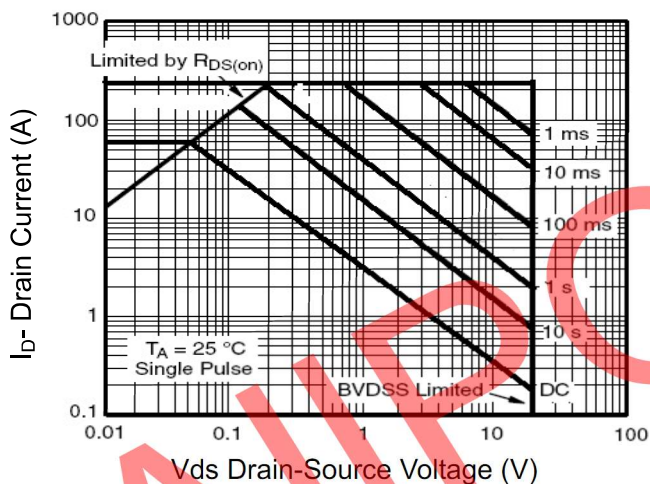
**N-Channel Power MOSFET**



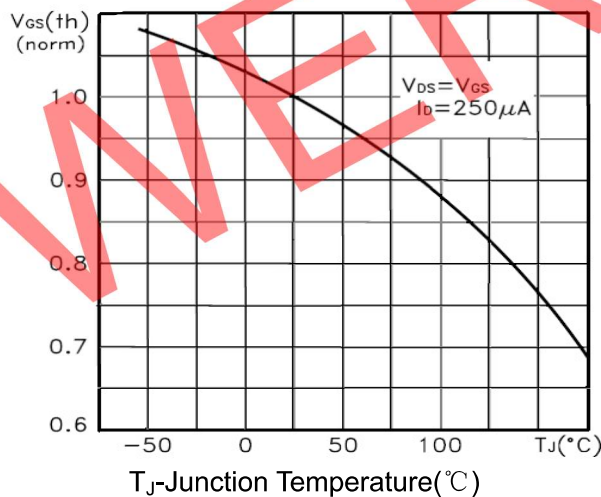
**Figure 7 Capacitance vs Vds**



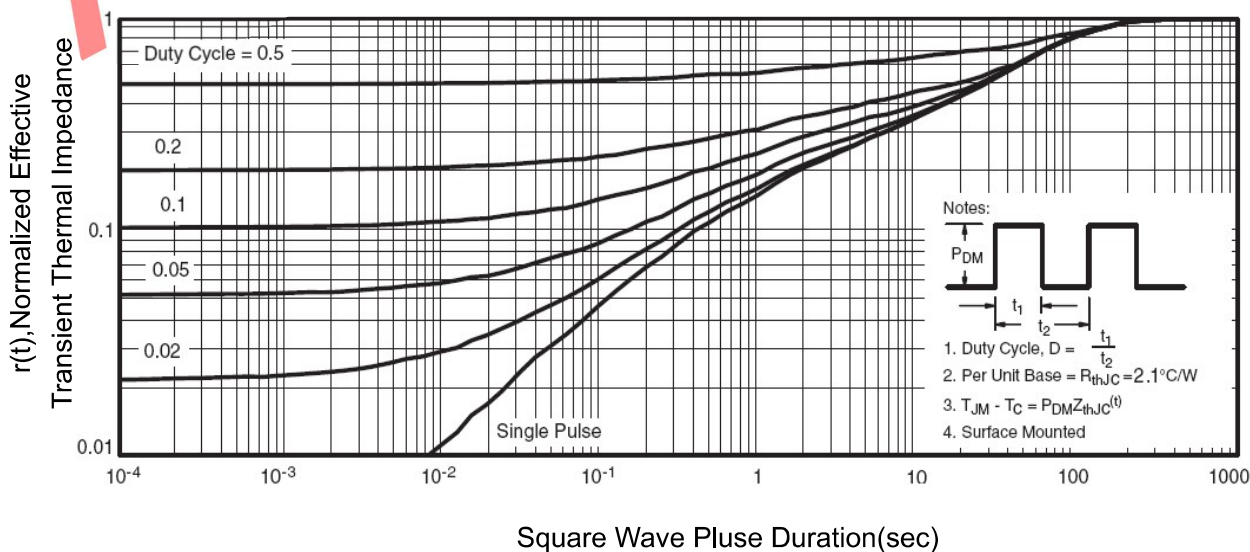
**Figure 9 Power De-rating**



**Figure 8 Safe Operation Area**



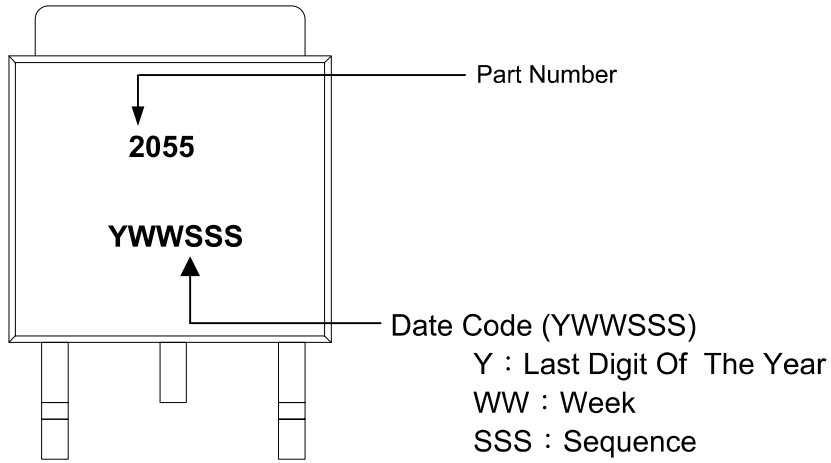
**Figure 10 VGS(th) vs Junction Temperature**

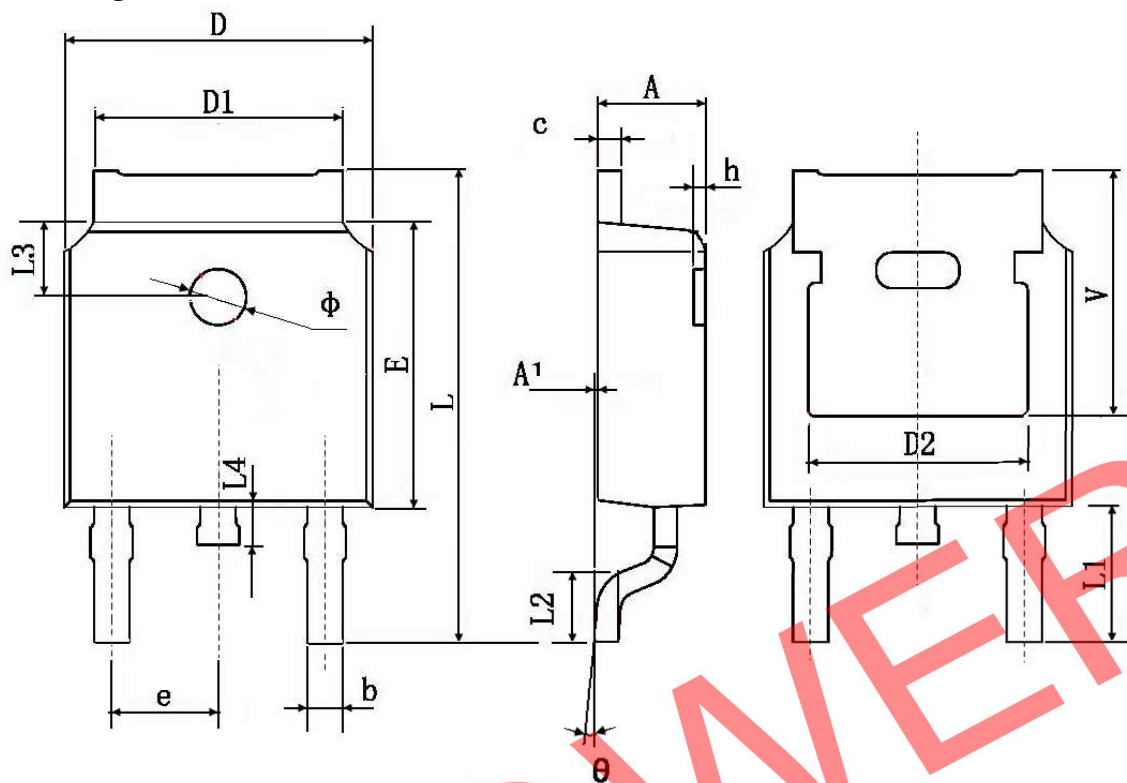


**Figure 11 Normalized Maximum Transient Thermal Impedance**

**AP2055K****N-Channel Power MOSFET**

TO-252

**AIPOWER**

**AP2055K**
**N-Channel Power MOSFET**
**TO-252 Package Information**


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
L4	0.600	1.000	0.024	0.039
φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 TYP.		0.211 TYP.	