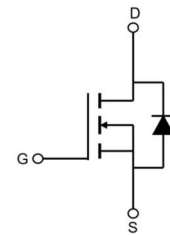
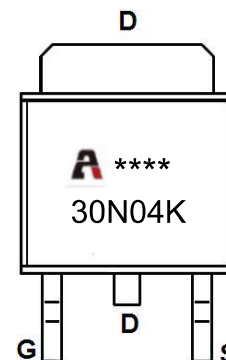


## Feature

- 40V,30A  
 $R_{DS(on)} < 22m\Omega @ V_{GS}=10V$   
 $R_{DS(on)} < 30m\Omega @ V_{GS}=4.5V$
- Trench DMOS Power MOSFET
- Fast Switching
- Exceptional on-resistance and maximum DC current capability



Schematic Diagram



Marking and pin assignment

## Application

- DC/DC Converter
- Load Switch for Portable Devices
- Battery Switch

## Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
30N04K	AP30N04K	TO-252	13 inch	-	2500

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

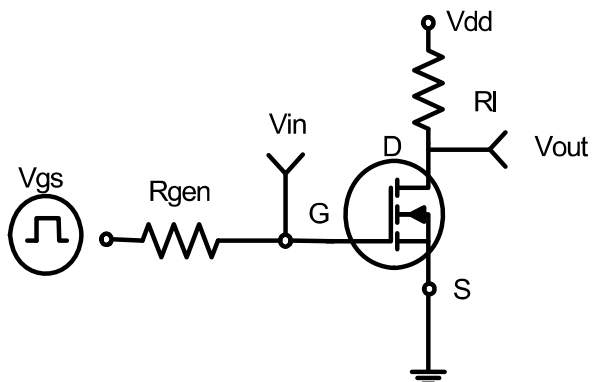
Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	40	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current ( $T_a=25^{\circ}C$ )	$I_D$	30	A
Continuous Drain Current ( $T_a=100^{\circ}C$ )	$I_D$	24	A
Pulsed Drain Current <sup>(1)</sup>	$I_{DM}$	65	A
Power Dissipation	$P_D$	35	W
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	3.6	$^{\circ}C/W$
Junction Temperature	$T_J$	150	$^{\circ}C$
Storage Temperature	$T_{STG}$	-55~ +150	$^{\circ}C$

**MOSFET ELECTRICAL CHARACTERISTICS(T<sub>a</sub>=25°C unless otherwise noted)**

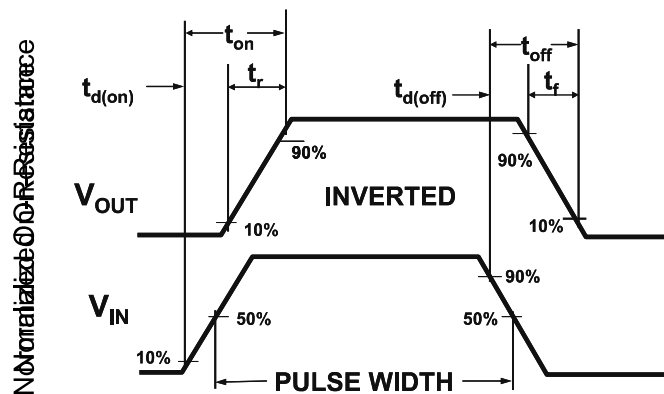
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> =250μA	40	-	-	V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> =40V, V <sub>GS</sub> = 0V	-	-	1	μA
Gate-body leakage current	I <sub>GSS</sub>	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V	-	-	±100	nA
Gate threshold voltage <sup>(2)</sup>	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1	1.6	2.5	V
Drain-source on-resistance <sup>(2)</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =12A	-	17	22	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =8A	-	22	30	
<b>Dynamic characteristics</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =20V, V <sub>GS</sub> =0V, f =1MHz	-	1050	-	pF
Output Capacitance	C <sub>oss</sub>		-	84	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	72	-	
<b>Switching characteristics</b>						
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DD</sub> =20V, R <sub>L</sub> =1.5Ω V <sub>GS</sub> =10V, R <sub>G</sub> =3Ω	-	11	-	ns
Turn-on rise time	t <sub>r</sub>		-	13	-	
Turn-off delay time	t <sub>d(off)</sub>		-	36	-	
Turn-off fall time	t <sub>f</sub>		-	9	-	
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =20V, I <sub>D</sub> =5A, V <sub>GS</sub> =10V	-	11	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	1.9	-	
Gate-Drain Charge	Q <sub>gd</sub>		-	2.2	-	
<b>Source-Drain Diode characteristics</b>						
Diode Forward voltage <sup>(2)</sup>	V <sub>DS</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =10A	-	-	1.2	V
Diode Forward current <sup>(3)</sup>	I <sub>S</sub>		-	-	30	A

**Notes:**

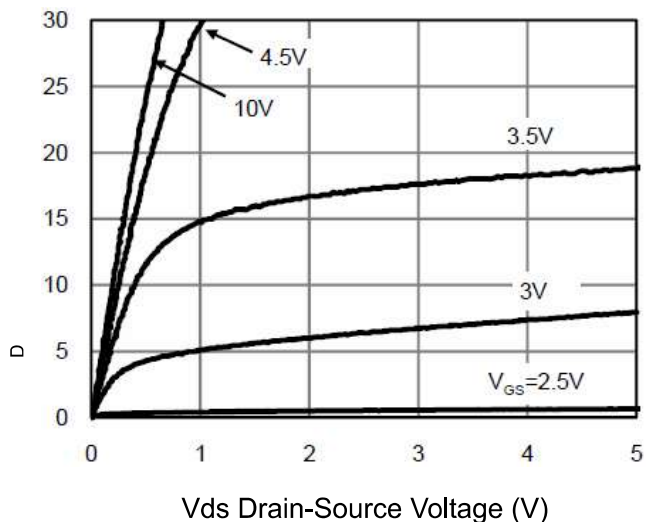
1. Repetitive Rating: pulse width limited by maximum junction temperature
2. Pulse Test: pulse width≤300μs, duty cycle≤2%
3. Surface Mounted on FR4 Board,t≤10 sec



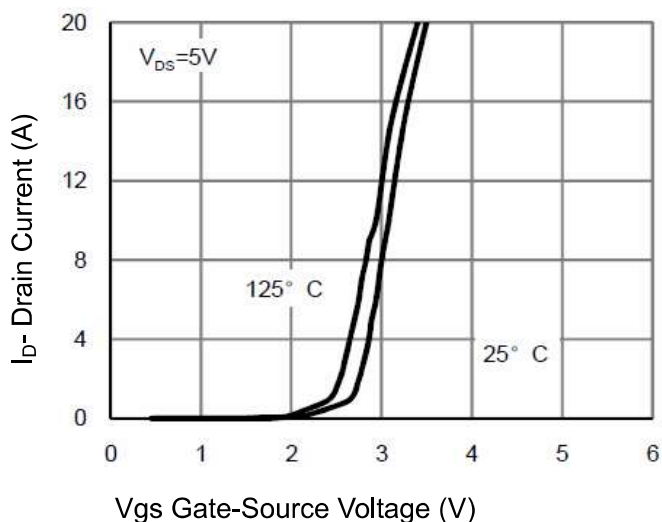
**Figure 1: Switching Test Circuit**



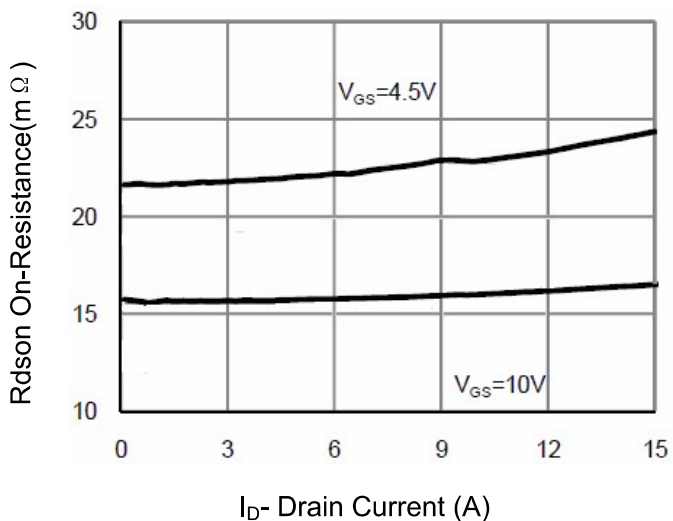
**Figure 2: Switching Waveforms**



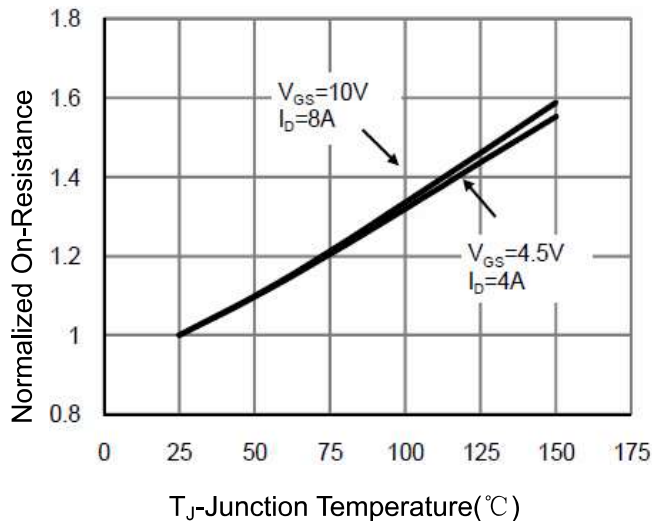
**Figure 3 Output Characteristics**



**Figure 4 Transfer Characteristics**

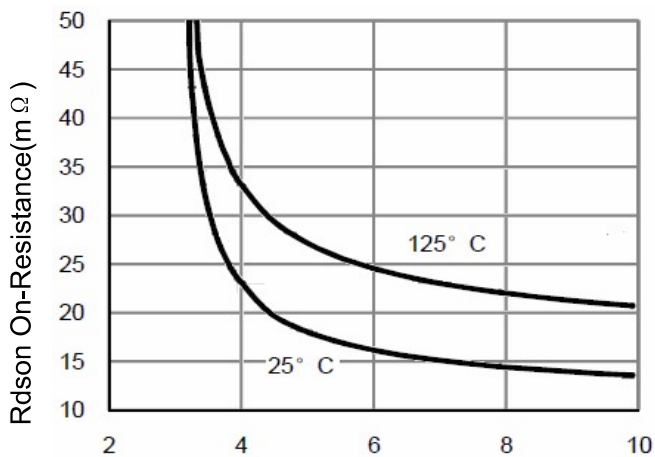


**Figure 5 Drain-Source On-Resistance**

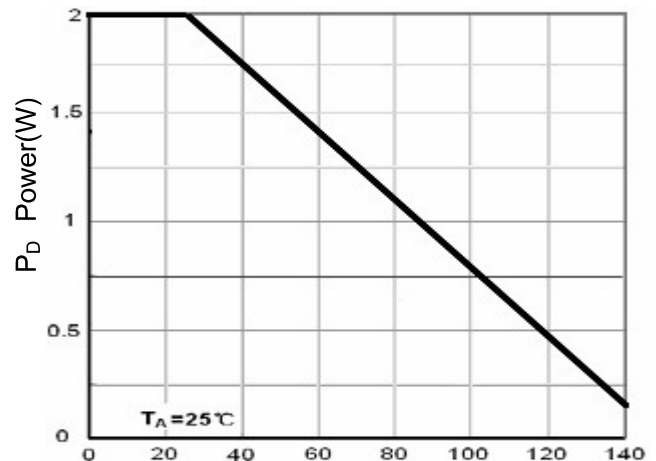


**Figure 6 Drain-Source On-Resistance**

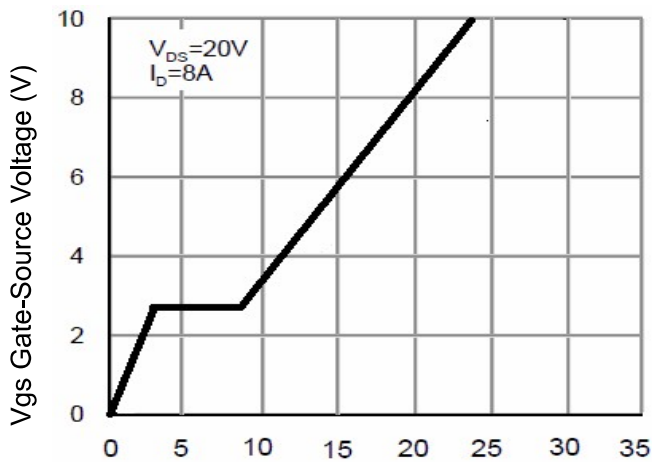
**AP30N04K**  
N-Channel Power Mosfet



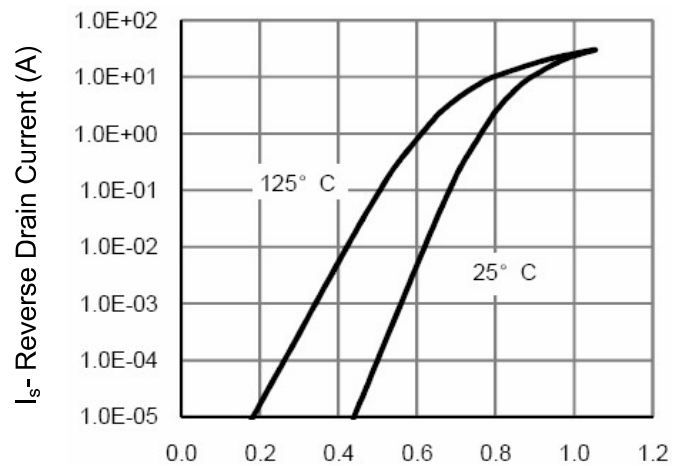
Vgs Gate-Source Voltage (V)  
**Figure 7 Rdson vs Vgs**



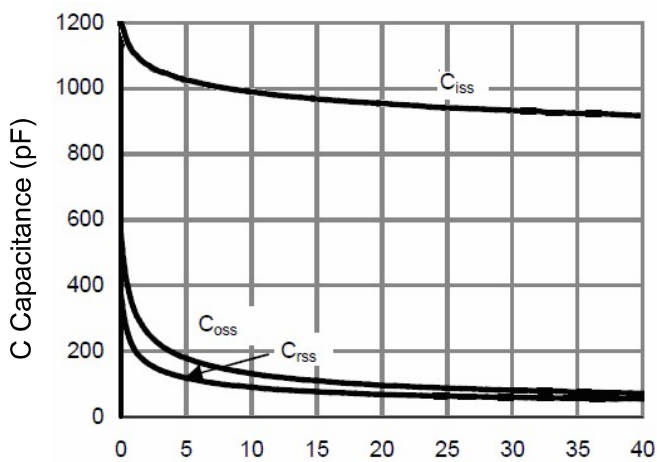
T<sub>J</sub>-Junction Temperature(°C)  
**Figure 8 Power Dissipation**



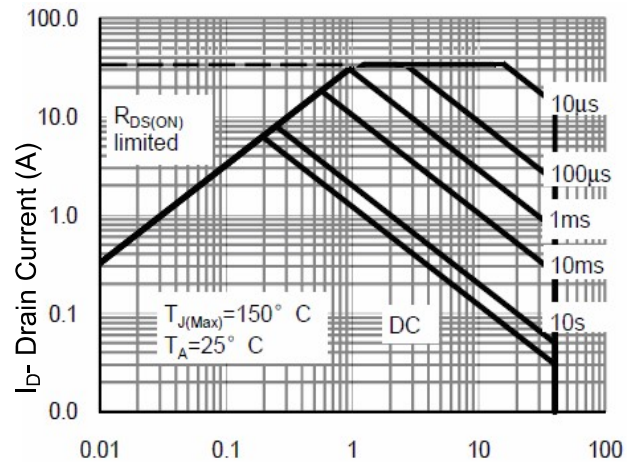
Qg Gate Charge (nC)  
**Figure 9 Gate Charge**



Vds Drain-Source Voltage (V)  
**Figure 10 Source- Drain Diode Forward**

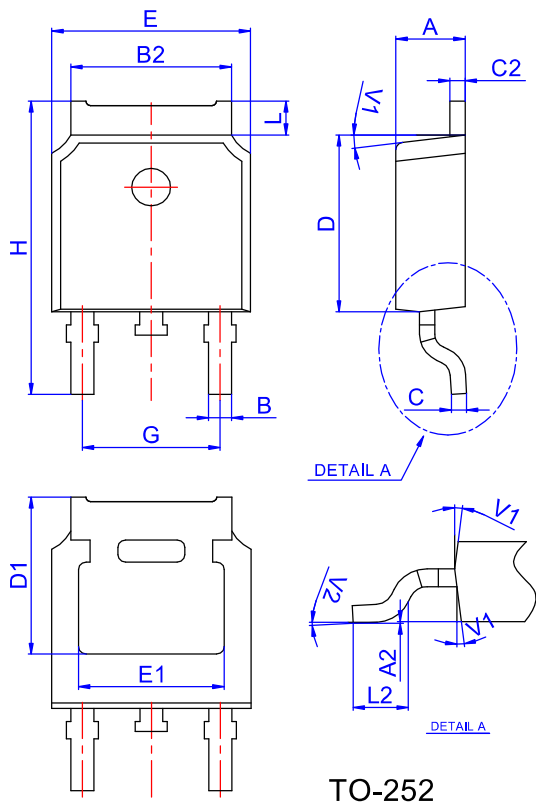


Vds Drain-Source Voltage (V)  
**Figure 11 Capacitance vs Vds**



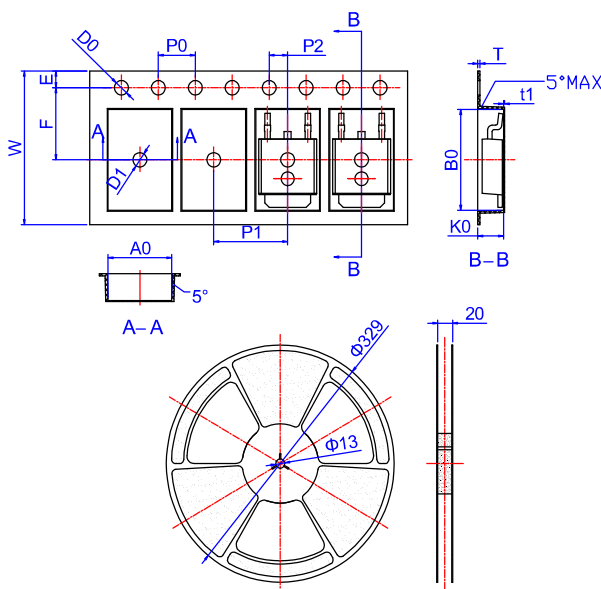
Vds Drain-Source Voltage (V)  
**Figure 12 Safe Operation Area**

**TO-252 Package Information**



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 Specification-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