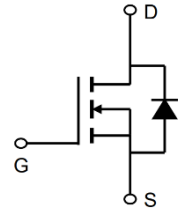


## 100V N-Channel Enhancement Mode MOSFET

### Description

The APG40N10D uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.



### General Features

$V_{DS} = 100V$   $I_D = 40A$

$R_{DS(ON)} < 20m\Omega$  @  $V_{GS}=10V$



### Application

Consumer electronic power supply  
 Motor control  
 Synchronous-rectification  
 Isolated DC



### Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
APG40N10D	TO-252-3L	APG40N10D XXX YYYY	2500

### Absolute Maximum Ratings ( $T_C=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Rating	Units
V <sub>DS</sub>	Drain source voltage	100	V
V <sub>GS</sub>	Gate source voltage	±20	V
I <sub>D</sub>	Continuous drain current <sup>1)</sup> , $T_C=25^\circ\text{C}$	40	A
I <sub>D, pulse</sub>	Pulsed drain current <sup>2)</sup> , $T_C=25^\circ\text{C}$	120	A
P <sub>D</sub>	Power dissipation <sup>3)</sup> , $T_C=25^\circ\text{C}$	71	W
EAS	Single pulsed avalanche energy <sup>5)</sup>	57	mJ
T <sub>stg</sub> , T <sub>j</sub>	Operation and storage temperature	-55 to 150	°C
R <sub>θJC</sub>	Thermal resistance, junction-case	1.76	°C/W
R <sub>θJA</sub>	Thermal resistance, junction-ambient <sup>4)</sup>	62	°C/W



## 100V N-Channel Enhancement Mode MOSFET

### Electrical Characteristics (T<sub>c</sub>=25°C unless otherwise noted)

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
BVDSS	Drain-source breakdown voltage	V <sub>GS</sub> =0 V, I <sub>D</sub> =250 μA	100	107		V
VGS(th)	Gate threshold voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250 μA	1.2	1.5	2.5	V
RDS(ON)	Drain-source on-state resistance	V <sub>GS</sub> =10 V, I <sub>D</sub> =10 A		13.8	20.0	mΩ
RDS(ON)	Drain-source on-state resistance	V <sub>GS</sub> =4.5 V, I <sub>D</sub> =7 A		17.4	26.0	mΩ
IGSS	Gate-source leakage current	V <sub>GS</sub> =±20 V			±100	nA
IDSS	Drain-source leakage current	V <sub>DS</sub> =100 V, V <sub>GS</sub> =0 V			1	uA
Ciss	Input capacitance	V <sub>GS</sub> =0 V, V <sub>DS</sub> =50 V, f=100 kHz		1003.9		pF
Coss	Output capacitance			185.4		pF
Crss	Reverse transfer capacitance			9.8		pF
td(on)	Turn-on delay time	V <sub>GS</sub> =10 V, V <sub>DS</sub> =50 V, R <sub>G</sub> =10 Ω, I <sub>D</sub> =5 A		16.6		ns
t <sub>r</sub>	Rise time			3.8		ns
td(off)	Turn-off delay time			75.5		ns
t <sub>f</sub>	Fall time			46		ns
Q <sub>g</sub>	Total gate charge	I <sub>D</sub> =5 A, V <sub>DS</sub> =50V, V <sub>GS</sub> =10V		16.2		nc
Q <sub>gs</sub>	Gate-source charge			2.8		nc
Q <sub>gd</sub>	Gate-drain charge			4.1		nc
Vplateau	Gate plateau voltage			3		V
I <sub>s</sub>	Diode forward current	V <sub>GS</sub> <V <sub>th</sub>		30		A
ISP	Pulsed source current			90		A
t <sub>rr</sub>	Reverse recovery time	I <sub>S</sub> =1A, di/dt=100 A/μs	49			ns
Q <sub>rr</sub>	Reverse recovery charge		61.8			nc
I <sub>rrm</sub>	Peak reverse recovery current		2.4			A

#### Note :

- 1、 Calculated continuous current based on maximum allowable junction temperature.
- 2、 Repetitive rating; pulse width limited by max. junction temperature.
- 3、 Pd is based on max. junction temperature, using junction-case thermal resistance.
- 4、 The value of R<sub>θja</sub> is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with T<sub>a</sub>=25 °C.
- 5、 V<sub>DD</sub>=50 V, R<sub>G</sub>=25 Ω, L=0.3 mH, starting T<sub>J</sub>=25 °C.

**Typical Characteristics**

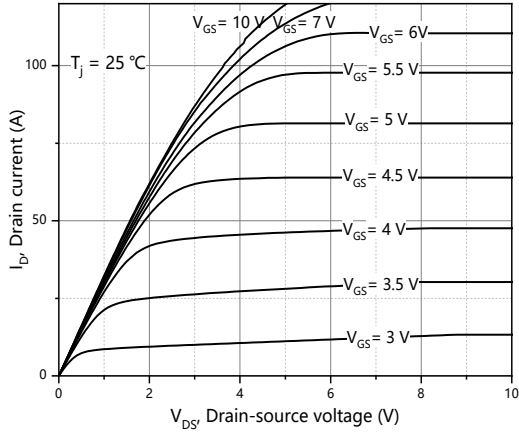


Figure 1, Typ. output characteristics

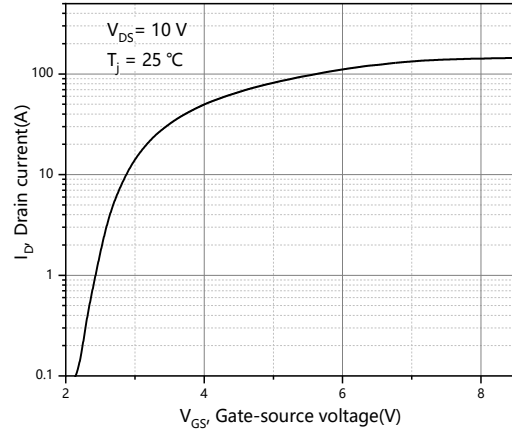


Figure 2, Typ. transfer characteristics

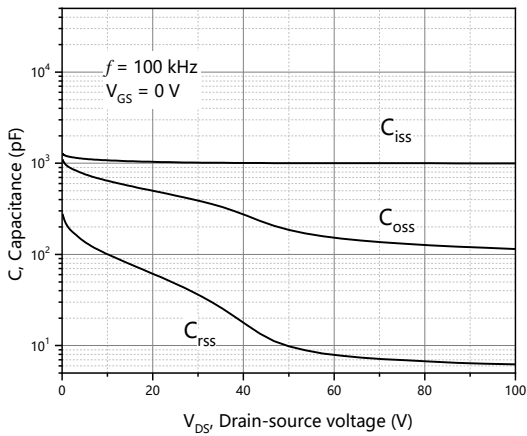


Figure 3, Typ. capacitances

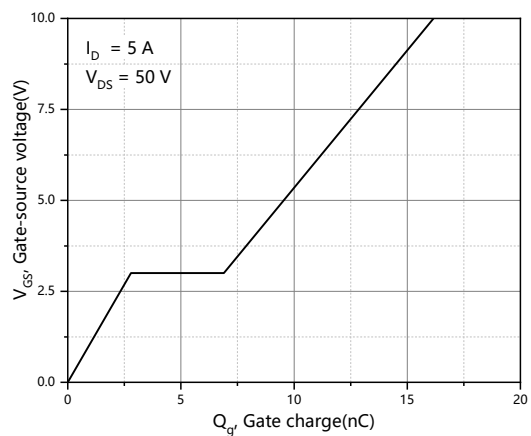


Figure 4, Typ. gate charge

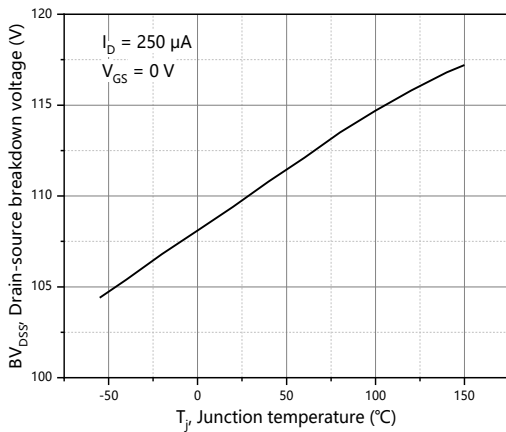


Figure 5, Drain-source breakdown voltage

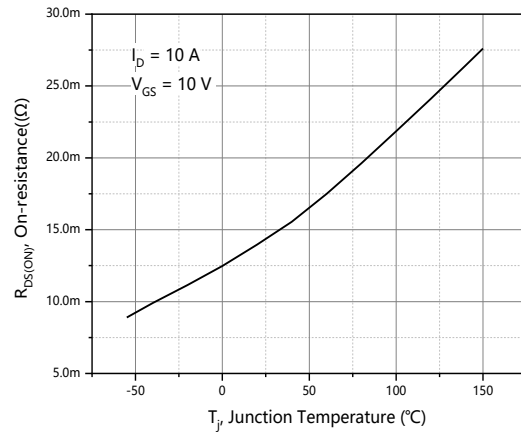


Figure 6, Drain-source on-state resistance

**100V N-Channel Enhancement Mode MOSFET**

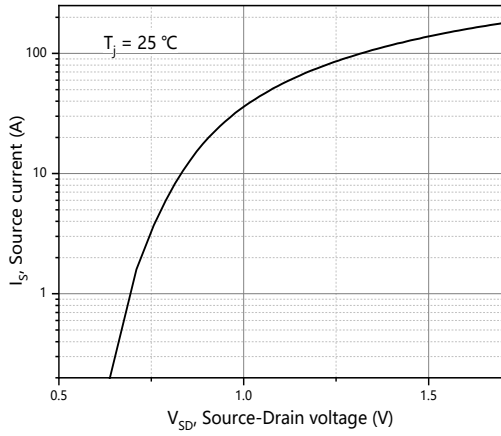


Figure 7, Forward characteristic of body diode

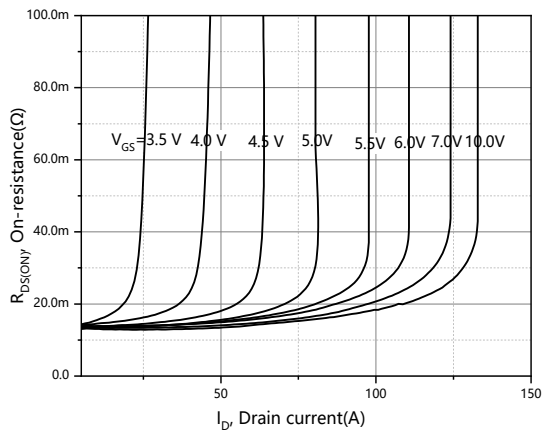


Figure 8, Drain-source on-state resistance

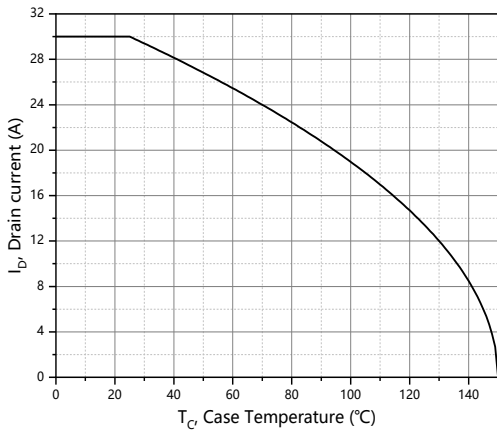


Figure 9, Drain current

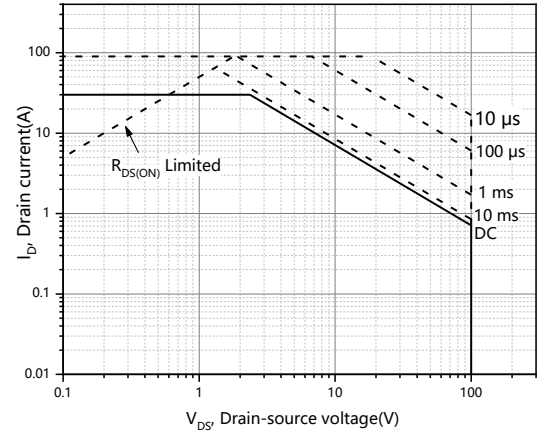


Figure 10, Safe operation area  $T_C=25\text{ °C}$

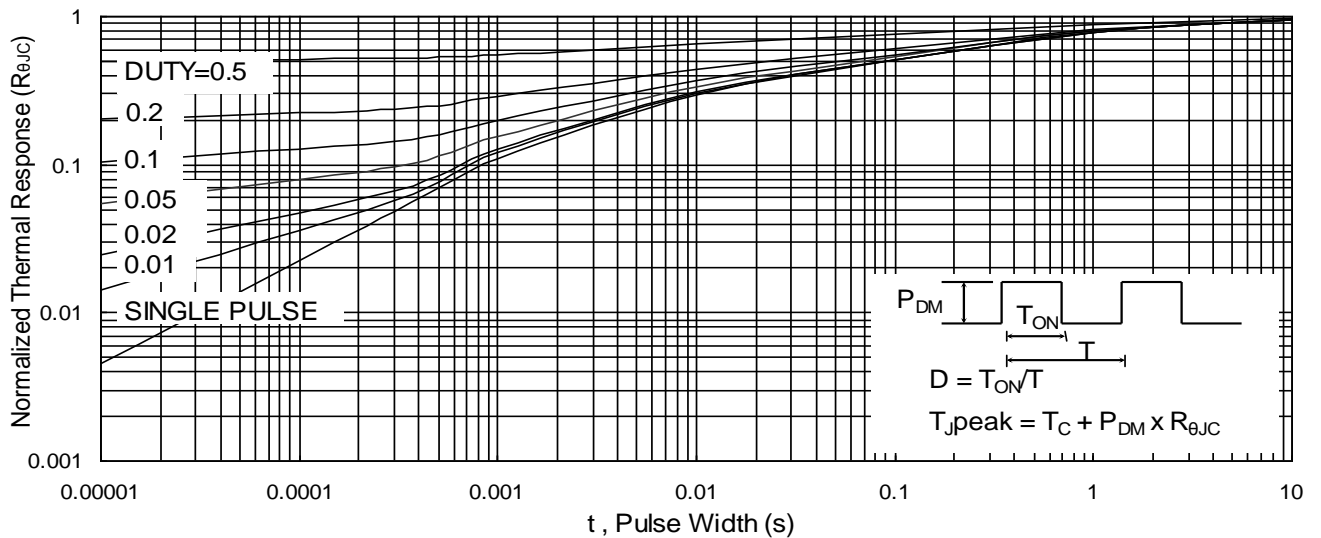
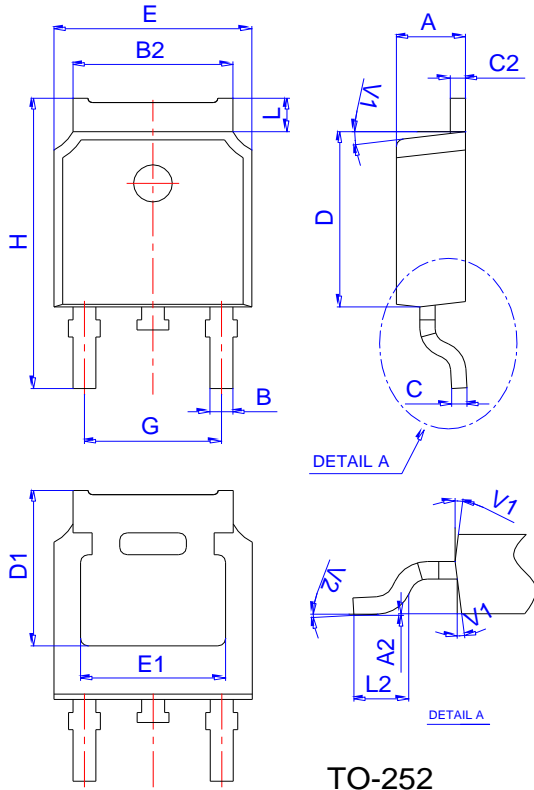


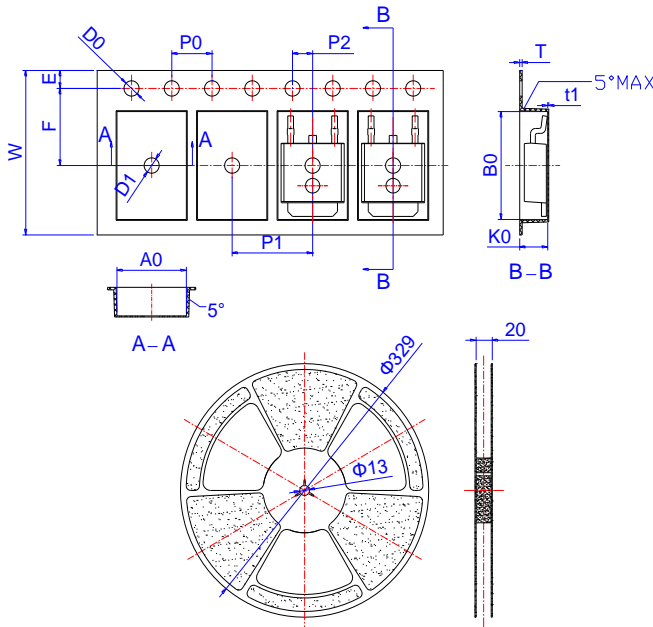
Fig11. Normalized Maximum Transient Thermal Impedance

**Package Mechanical Data: TO-252-3L**



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

**100V N-Channel Enhancement Mode MOSFET****Attention**

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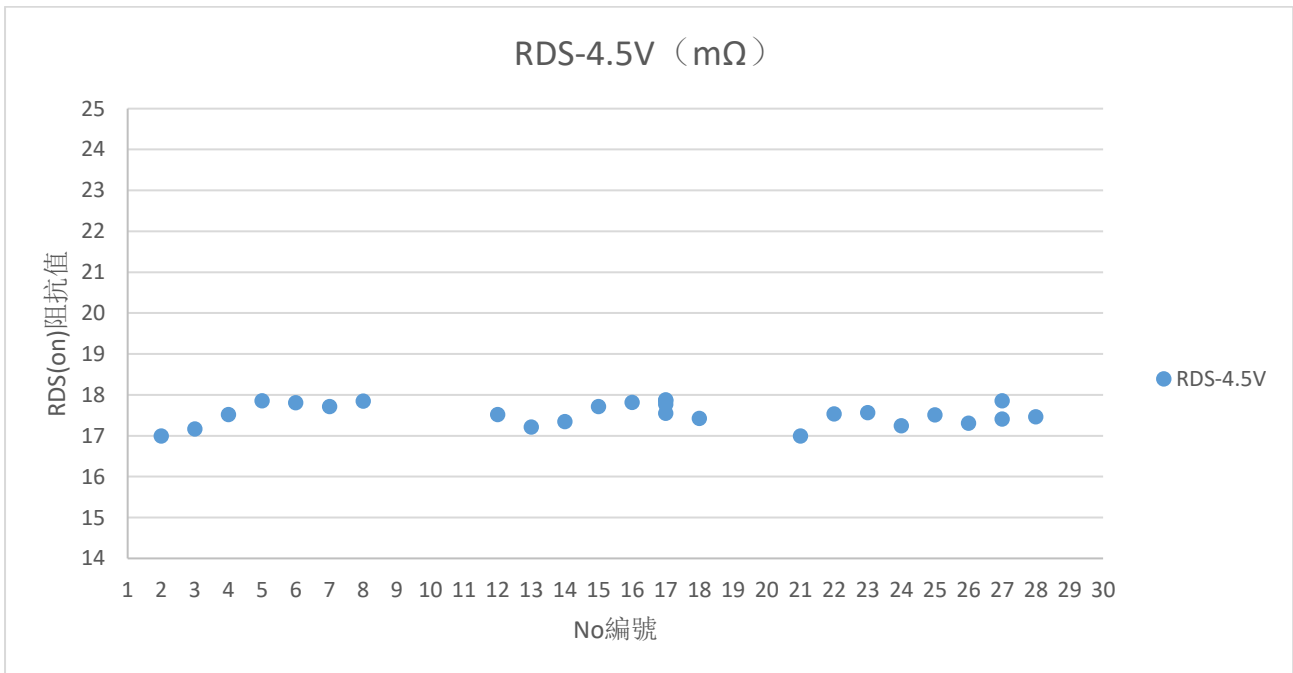
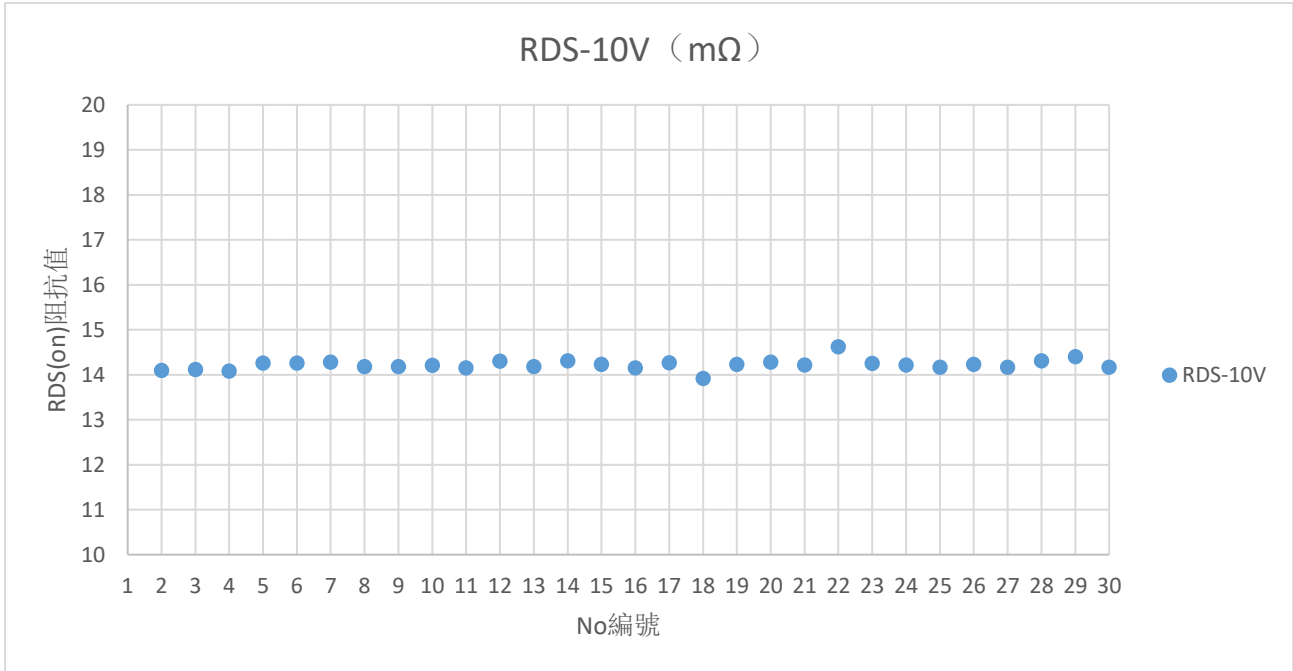
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**100V N-Channel Enhancement Mode MOSFET**

<b>Edition</b>	<b>Date</b>	<b>Change</b>
Rve1.0	2018/11/10	Initial release
Rve2.0	2020/4/25	Reduce RDS(on) and Ciss

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**Test Report For 30PCS (30pcs 典型測試報告)**





## 100V N-Channel Enhancement Mode MOSFET

