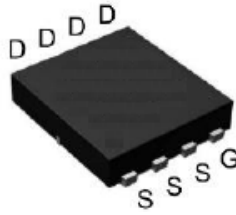
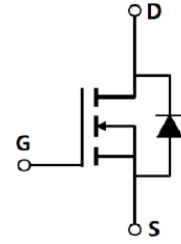


## Main Product Characteristics

$V_{DSS}$	100V
$R_{DS(on)}$	6.5m $\Omega$ (typ.)
$I_D$	100A ①



PDFN5\*6



Schematic diagram

## Features and Benefits

- Low  $R_{DS(on)}$  & FOM
- Extremely low switching loss
- Excellent stability and uniformity
- Fast switching and reverse body recovery
- 150°C operating temperature



## Applications

- Consumer electronic power supply
- Motor control
- Synchronous-rectification
- Isolated DC/DC convertor

## Description

It utilizes the latest processing techniques to achieve the high cell density and reduces the on-resistance with high repetitive avalanche rating. These features combine to make this design an extremely efficient and reliable device for use in power switching application and a wide variety of other applications.

## Absolute max Rating

Symbol	Parameter	Max.	Units
$I_D$ @ TC = 25°C	Continuous Drain Current, $V_{GS}$ @ 10V ①	100	A
$I_{DM}$	Pulsed Drain Current ②	300	
$P_D$ @TC = 25°C	Power Dissipation ③	148	W
$V_{DS}$	Drain-Source Voltage	100	V
$V_{GS}$	Gate-to-Source Voltage	$\pm 20$	V
$E_{AS}$	Single Pulse Avalanche Energy @ L=0.3mH	130	mJ
$T_J$ $T_{STG}$	Operating Junction and Storage Temperature Range	-55 to +150	°C

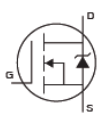
## Thermal Resistance

Symbol	Characterizes	Typ.	Max.	Units
R <sub>θJA</sub>	Junction-to-ambient (t ≤ 10s) ④	—	62	°C/W
R <sub>θJC</sub>	Junction-to-case ③	—	0.84	°C/W

## Electrical Characterizes @T<sub>A</sub>=25°C unless otherwise specified

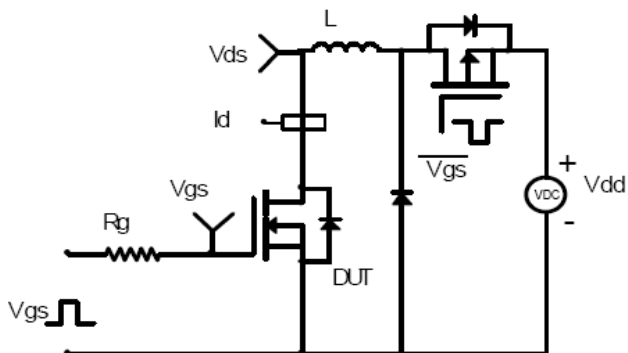
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
V <sub>(BR)DSS</sub>	Drain-to-Source breakdown voltage	100	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA
R <sub>DS(on)</sub>	Static Drain-to-Source on-resistance	—	6.5	8.0	mΩ	V <sub>GS</sub> =10V, I <sub>D</sub> =12A
		—	8.5	10		V <sub>GS</sub> =4.5V, I <sub>D</sub> =9A
V <sub>GS(th)</sub>	Gate threshold voltage	1	—	2.5	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA
I <sub>DSS</sub>	Drain-to-Source leakage current	—	—	1	μA	V <sub>DS</sub> = 100V, V <sub>GS</sub> = 0V
I <sub>GSS</sub>	Gate-to-Source forward leakage	—	—	100	nA	V <sub>GS</sub> = 20V
		—	—	-100		V <sub>GS</sub> = -20V
Q <sub>g</sub>	Total gate charge	—	60.7	—	nC	I <sub>D</sub> = 10A, V <sub>DS</sub> =50V, V <sub>GS</sub> = 10V
Q <sub>gs</sub>	Gate-to-Source charge	—	7.2	—		
Q <sub>gd</sub>	Gate-to-Drain("Miller") charge	—	14.6	—		
t <sub>d(on)</sub>	Turn-on delay time	—	22.5	—	ns	V <sub>GS</sub> =10V, V <sub>DD</sub> =50V, R <sub>GEN</sub> =2Ω I <sub>D</sub> =10A
t <sub>r</sub>	Rise time	—	8.6	—		
t <sub>d(off)</sub>	Turn-Off delay time	—	66.6	—		
t <sub>f</sub>	Fall time	—	42.1	—		
C <sub>iss</sub>	Input capacitance	—	3530	—	pF	V <sub>GS</sub> = 0V V <sub>DS</sub> = 50V f = 1MHz
C <sub>oss</sub>	Output capacitance	—	560.1	—		
C <sub>rss</sub>	Reverse transfer capacitance	—	9	—		

## Source-Drain Ratings and Characteristics

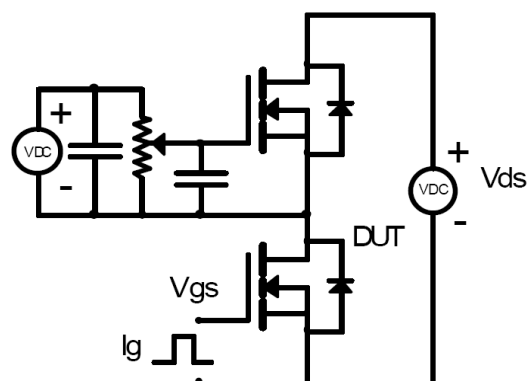
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I <sub>S</sub>	Continuous Source Current (Body Diode) ①	—	—	100	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I <sub>SM</sub>	Pulsed Source Current (Body Diode)	—	—	300	A	
V <sub>SD</sub>	Diode Forward Voltage	—	—	1.3	V	I <sub>S</sub> =30A, V <sub>GS</sub> =0V, T <sub>J</sub> = 25°C
t <sub>rr</sub>	Reverse Recovery Time	—	67	—	ns	T <sub>J</sub> = 25°C, I <sub>F</sub> = 10A, di/dt = 100A/μs
Q <sub>rr</sub>	Reverse Recovery Charge	—	160	—	nC	

## Test circuits and Waveforms

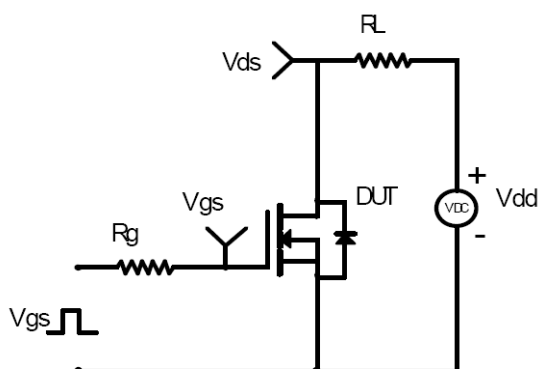
EAS Test Circuit:



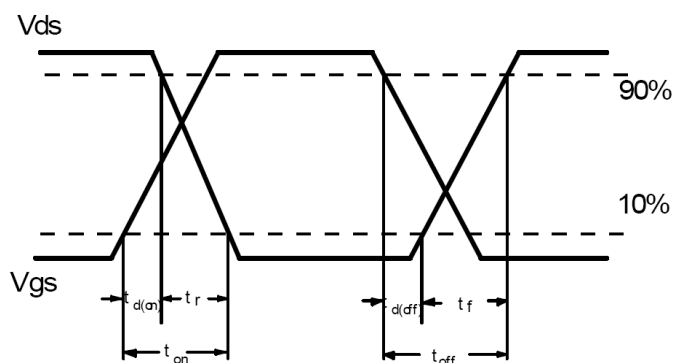
Gate charge test circuit:



Switching Time Test Circuit:

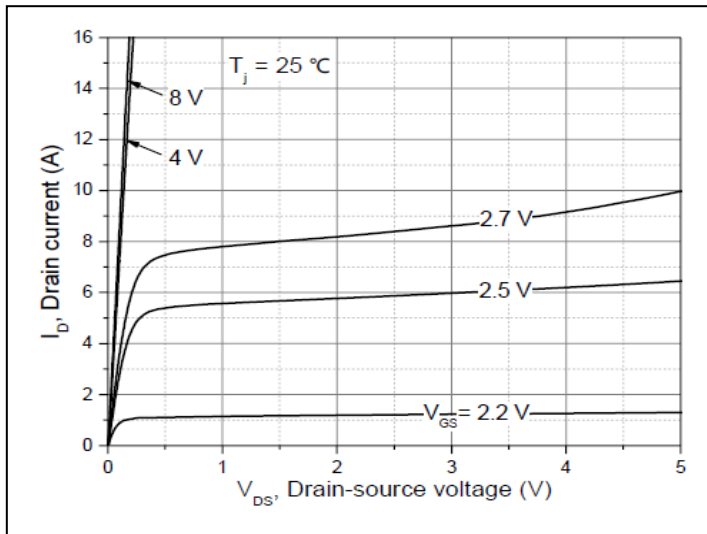
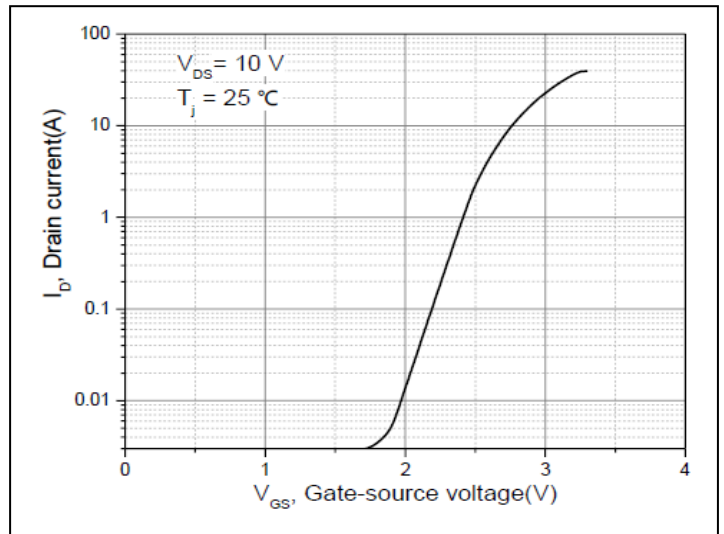
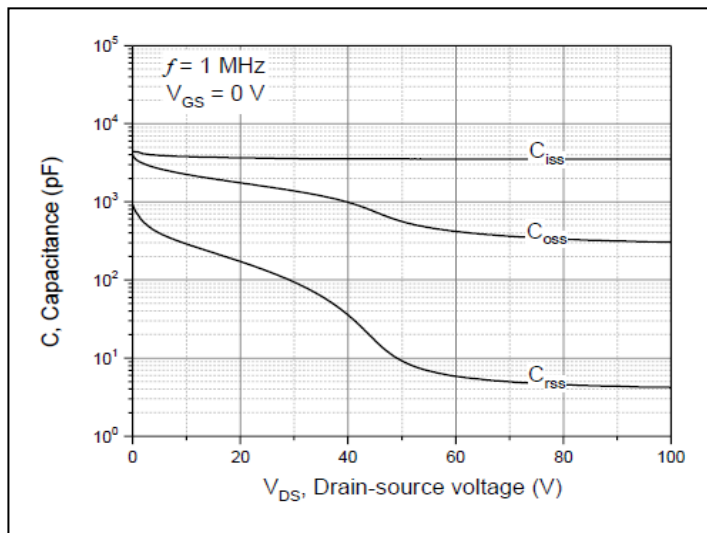
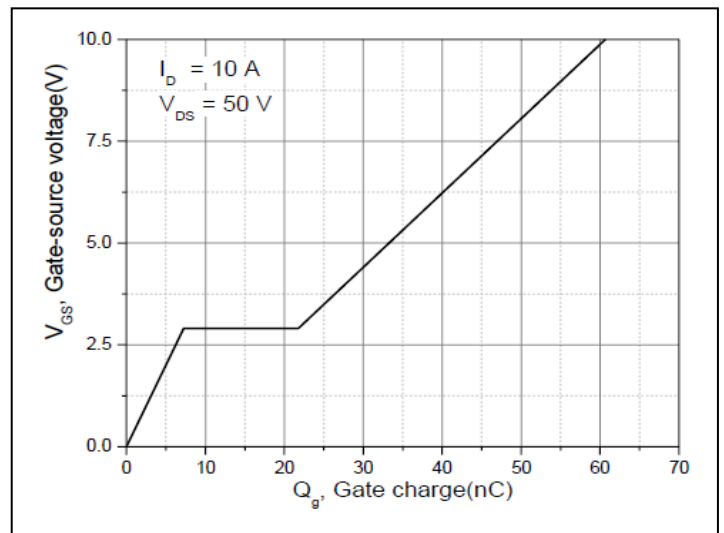
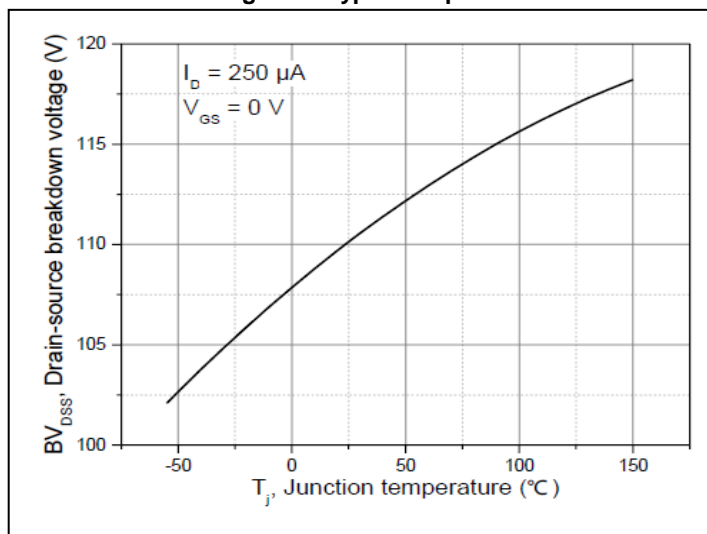
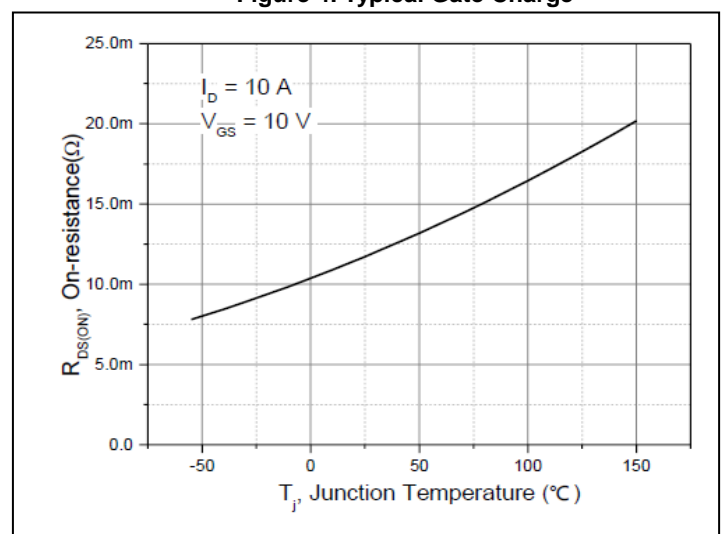


Switching Waveforms:



### Notes:

- ① Calculated continuous current based on maximum allowable junction temperature.
- ② Repetitive rating; pulse width limited by max. junction temperature.
- ③ The power dissipation PD is based on max. junction temperature, using junction-to-case thermal resistance.
- ④ The value of  $R_{\theta JA}$  is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with  $T_A = 25^\circ\text{C}$

**Typical electrical and thermal characteristics**

**Figure 1: Typical Output Characteristics**

**Figure 2: Typical Transfer Characteristics**

**Figure 3: Typical Capacitances**

**Figure 4: Typical Gate Charge**

**Figure 5: Drain-to-Source Breakdown Voltage**

**Figure 6: Drain-to-Source On-state Resistance**

Typical electrical and thermal characteristics

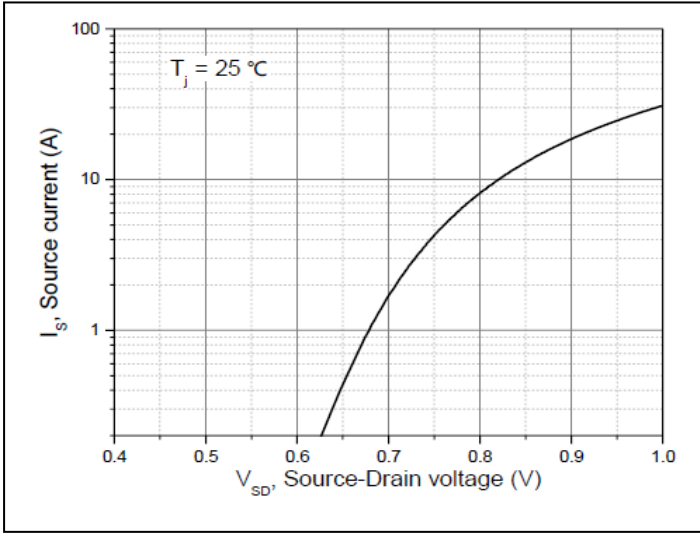


Figure7. Forward Characteristic Of Body Diode

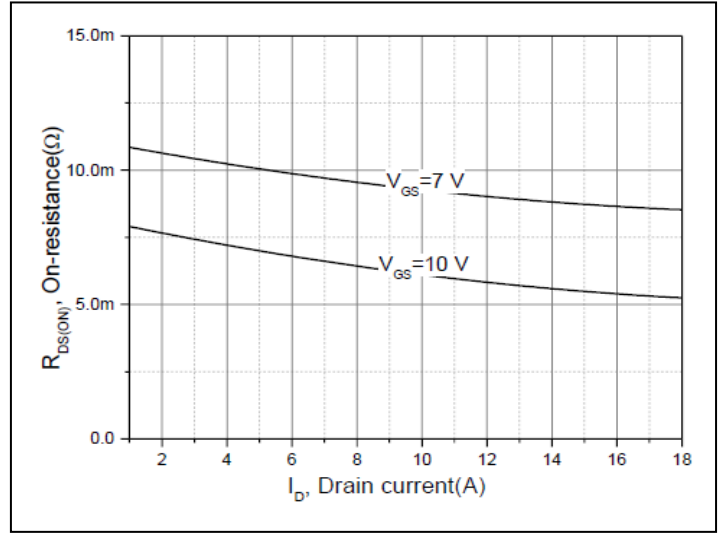


Figure8. Drain-to-Source On-state Resistance

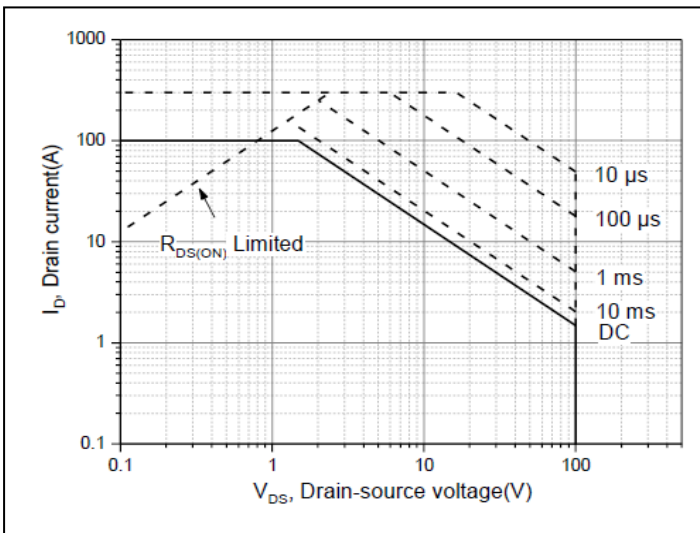


Figure9. Safe Operation Area(T<sub>c</sub>=25°C)

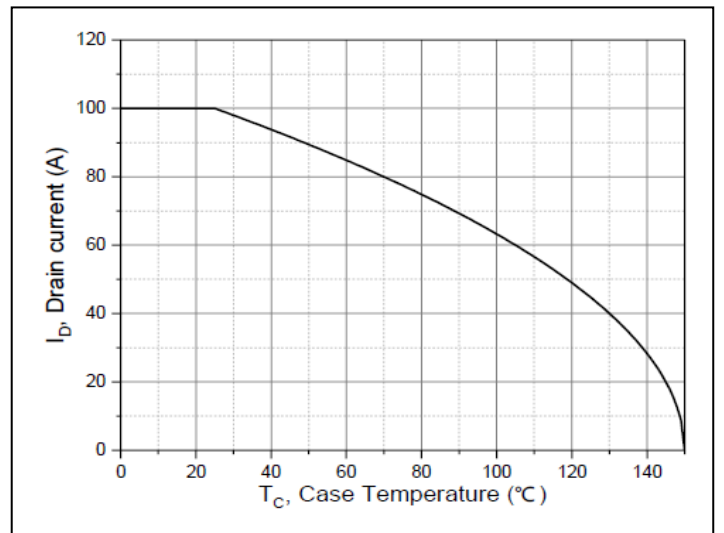
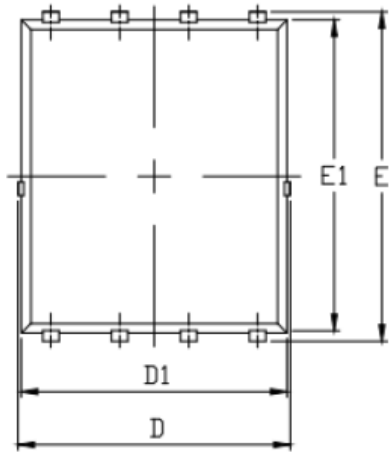
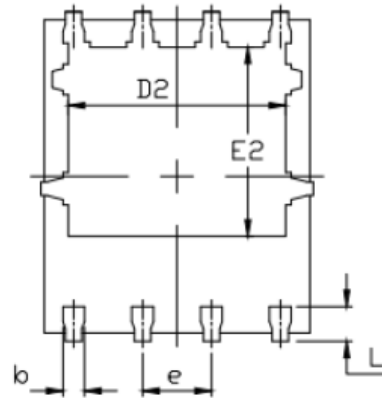


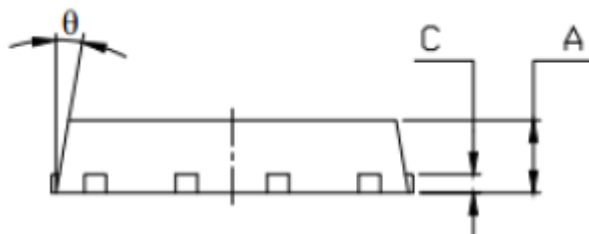
Figure10. Drain Current

**Mechanical Data:**


Top View



Bottom View



Side View

Power56			
DIM.	MIN.	MAX.	TYP.
A	0.95	1.05	1.00
b	0.30	0.50	0.40
C	0.254		
D	5.02		
D1	4.80	5.00	4.90
D2	3.91	4.11	4.01
E	5.95	6.15	6.05
E1	5.60	5.90	5.75
E2	3.38	3.58	3.48
e	1.27REF		
L	0.45	0.65	0.55
$\theta$	10°		

**Ordering**

<b>Package (Available)</b> <b>PDFN5*6</b> <b>Operating Temperature Range</b> <b>C : -55 to 150 °C</b>
--

**Devices per Unit**

<b>Package Type</b>	<b>Units/Tube</b>	<b>Tubes/Inner Box</b>	<b>Units/Inner Box</b>	<b>Inner Boxes/Carton Box</b>	<b>Units/Carton Box</b>
PDFN5*6	5000	2	10000	5	50000

**Reliability Test Program**

<b>Test Item</b>	<b>Conditions</b>	<b>Duration</b>	<b>Sample Size</b>
<b>High Temperature Reverse Bias(HTRB)</b>	$T_j=125^{\circ}\text{C}$ to $175^{\circ}\text{C}$ @ 80% of Max $V_{DSS}/V_{CES}/VR$	168 hours 500 hours 1000 hours	3 lots x 77 devices
<b>High Temperature Gate Bias(HTGB)</b>	$T_j=125^{\circ}\text{C}$ or $175^{\circ}\text{C}$ @ 100% of Max $V_{GSS}$	168 hours 500 hours 1000 hours	3 lots x 77 devices

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