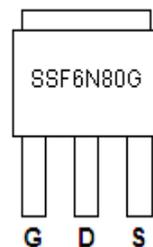


**Main Product Characteristics:**

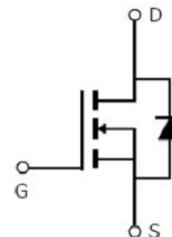
$V_{DS}$	800V
$R_{DS(on)}$	2.35 $\Omega$ (typ.)
$I_D$	5.5A



TO-251 (IPAK)



Marking and pin Assignment



Schematic diagram

**Features and Benefits:**

- Advanced MOSFET process technology
- Special designed for PWM, load switching and general purpose applications
- Ultra low on-resistance with low gate charge
- Fast switching and reverse body recovery
- 150°C operating temperature


**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 <sup>①</sup>	5.5	A
$I_D$ @ TC = 100°C	Continuous Drain Current, $V_{GS}$ @ 10V <sup>①</sup>	3.2	
$I_{DM}$	Pulsed Drain Current <sup>②</sup>	22	
$P_D$ @TC = 25°C	Power Dissipation <sup>③</sup>	69	W
	Linear Derating Factor	0.55	W/°C
$V_{DS}$	Drain-Source Voltage	800	V
$V_{GS}$	Gate-to-Source Voltage	± 30	V
$E_{AS}$	Single Pulse Avalanche Energy @ L=33.5mH	339	mJ
$I_{AS}$	Avalanche Current @ L=33.5mH	4.5	A
$T_J$ $T_{STG}$	Operating Junction and Storage Temperature Range	-55 to +150	°C

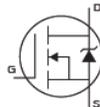
## Thermal Resistance

Symbol	Characterizes	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-case <sup>③</sup>	—	1.8	$^{\circ}C/W$
$R_{\theta JA}$	Junction-to-ambient ( $t \leq 10s$ ) <sup>④</sup>	—	62	$^{\circ}C/W$
	Junction-to-Ambient (PCB mounted, steady-state) <sup>④</sup>	—	40	$^{\circ}C/W$

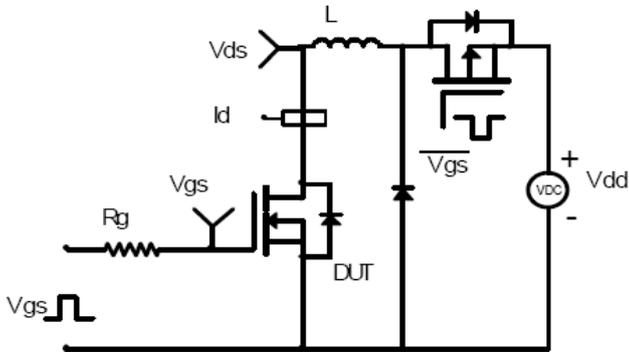
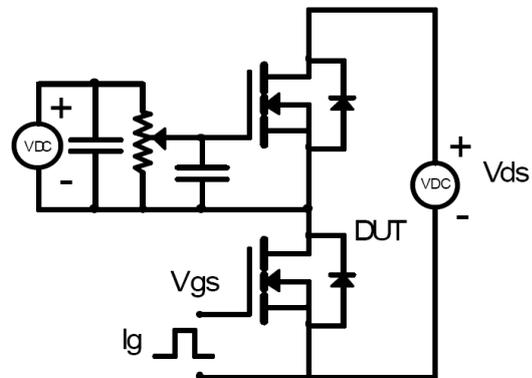
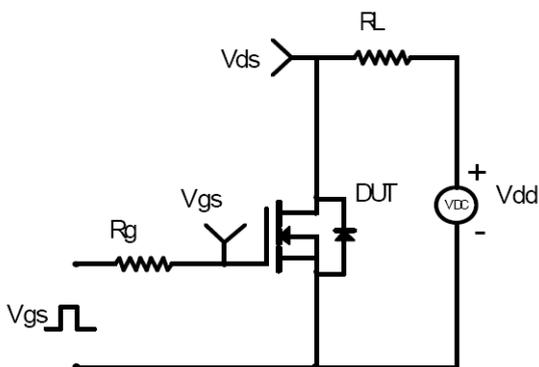
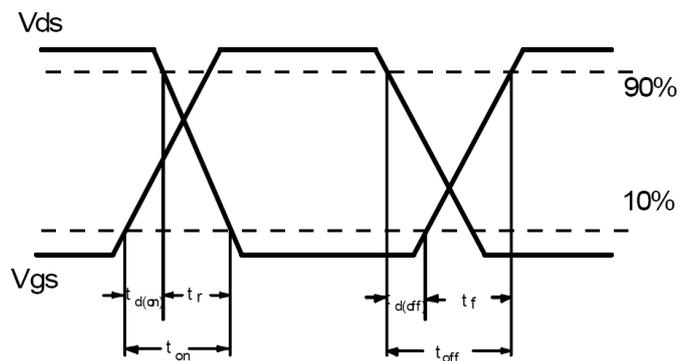
## Electrical Characterizes @ $T_A=25^{\circ}C$ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source breakdown voltage	800	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	2.35	2.7	$\Omega$	$V_{GS}=10V, I_D = 2.5A$ $T_J = 125^{\circ}C$
		—	5.2	—		
$V_{GS(th)}$	Gate threshold voltage	2	—	4	V	$V_{DS} = V_{GS}, I_D = 250\mu A$ $T_J = 125^{\circ}C$
		—	1.8	—		
$I_{DSS}$	Drain-to-Source leakage current	—	—	1	$\mu A$	$V_{DS} = 800V, V_{GS} = 0V$ $T_J = 125^{\circ}C$
		—	—	50		
$I_{GSS}$	Gate-to-Source forward leakage	—	—	100	nA	$V_{GS} = 30V$ $V_{GS} = -30V$
		—	—	-100		
$Q_g$	Total gate charge	—	15	—	nC	$I_D = 5.5A,$ $V_{DS}=100V,$ $V_{GS} = 10V$
$Q_{gs}$	Gate-to-Source charge	—	5.0	—		
$Q_{gd}$	Gate-to-Drain("Miller") charge	—	4.8	—		
$t_{d(on)}$	Turn-on delay time	—	14	—	ns	$V_{GS}=10V, V_{DS}=415V,$ $R_L=75\Omega,$ $R_{GEN}=25\Omega$ $I_D=5.5A$
$t_r$	Rise time	—	27	—		
$t_{d(off)}$	Turn-Off delay time	—	38	—		
$t_f$	Fall time	—	25	—		
$C_{iss}$	Input capacitance	—	698	—	pF	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1MHz$
$C_{oss}$	Output capacitance	—	75	—		
$C_{riss}$	Reverse transfer capacitance	—	3.9	—		

## Source-Drain Ratings and Characteristics

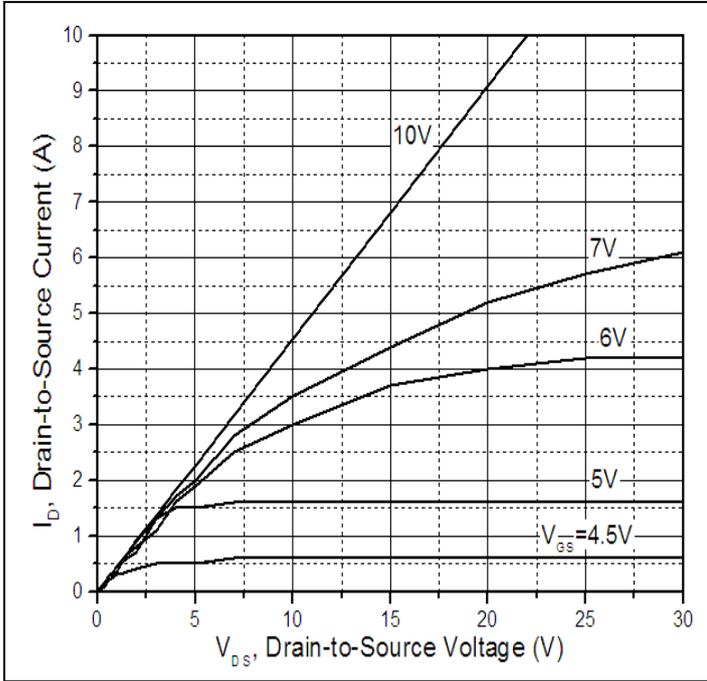
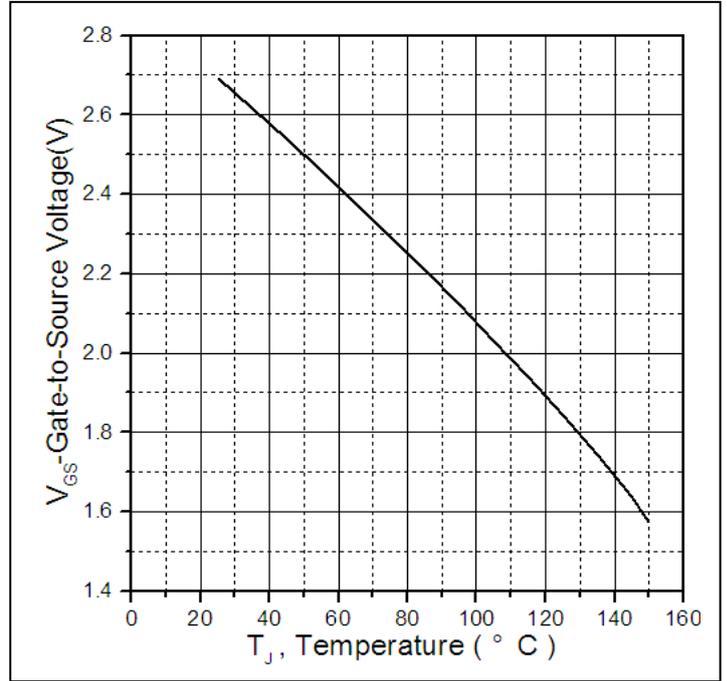
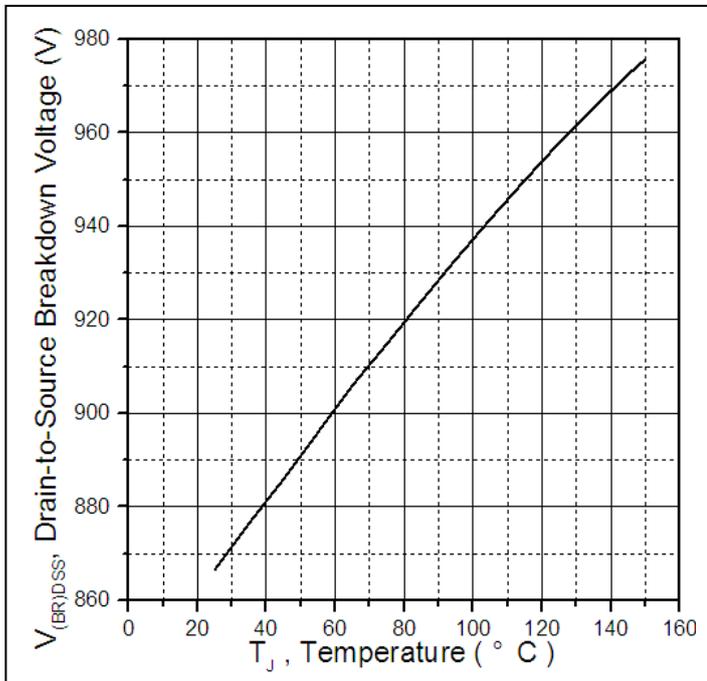
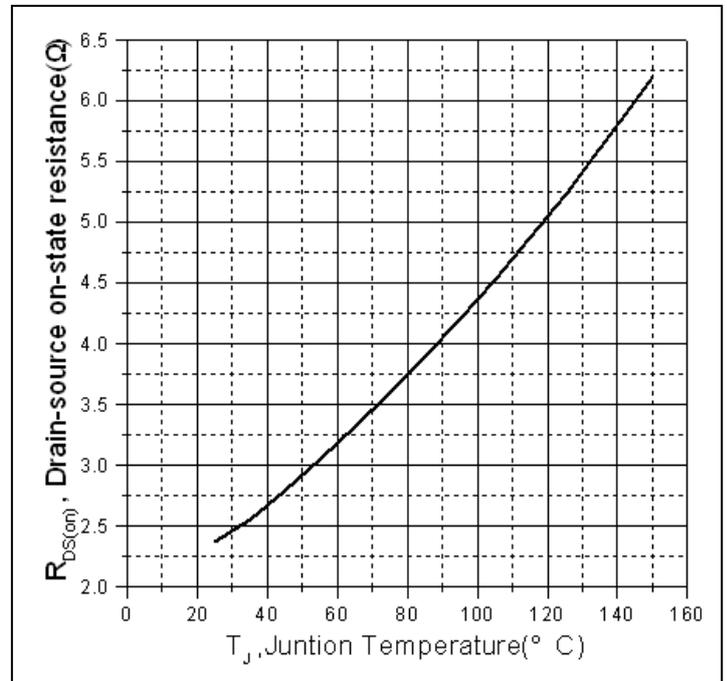
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$I_S$	Continuous Source Current (Body Diode)	—	—	5.5	A	MOSFET symbol showing the integral reverse p-n junction diode. 
$I_{SM}$	Pulsed Source Current (Body Diode)	—	—	22	A	
$V_{SD}$	Diode Forward Voltage	—	0.87	1.4	V	$I_S=5A, V_{GS}=0V$
$t_{rr}$	Reverse Recovery Time	—	1029	—	ns	$T_J = 25^{\circ}C, I_F = 5.5A,$
$Q_{rr}$	Reverse Recovery Charge	—	3835	—	nC	$di/dt = 100A/\mu s$

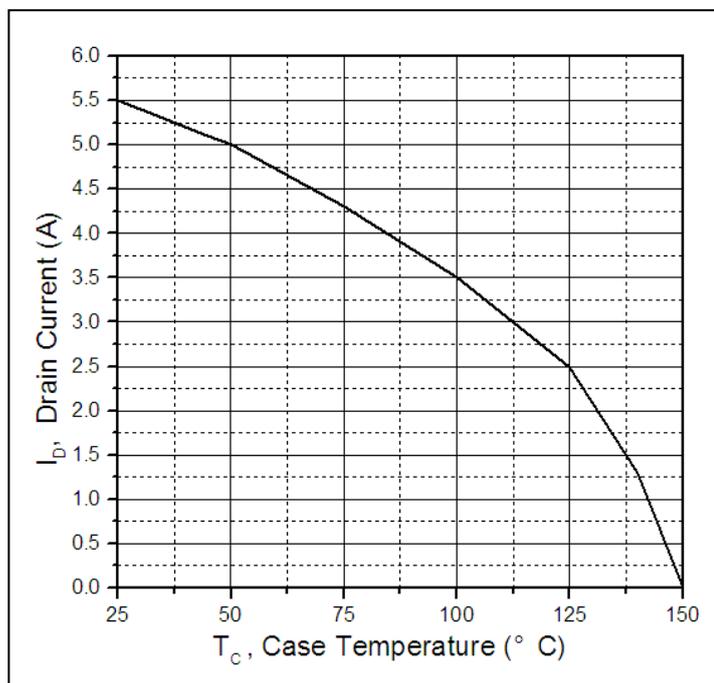
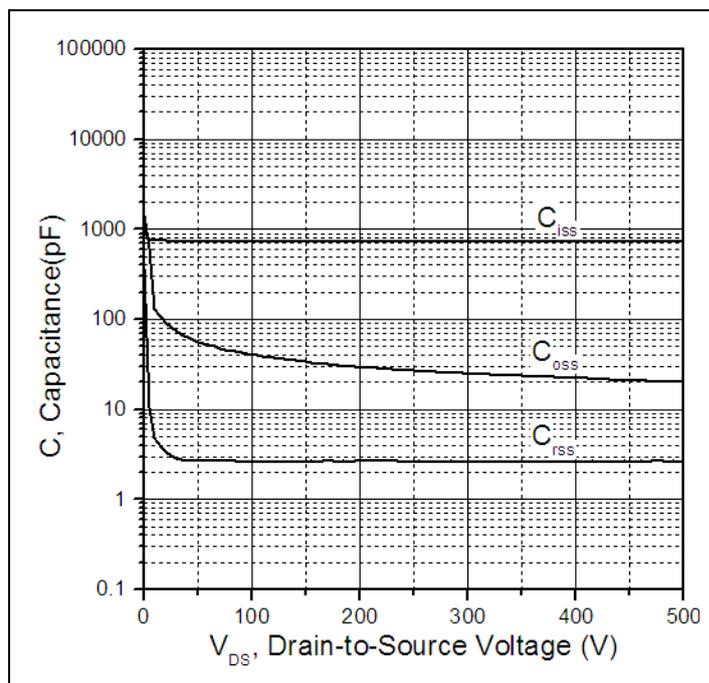
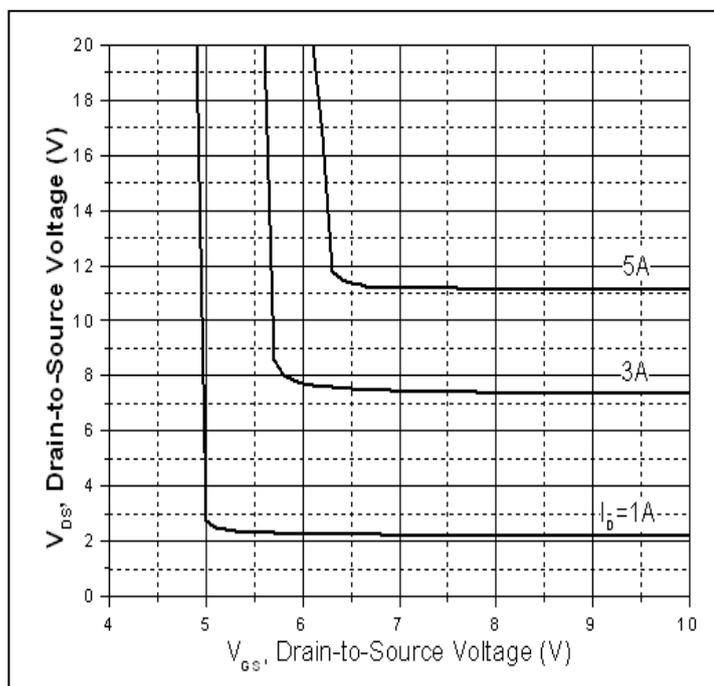
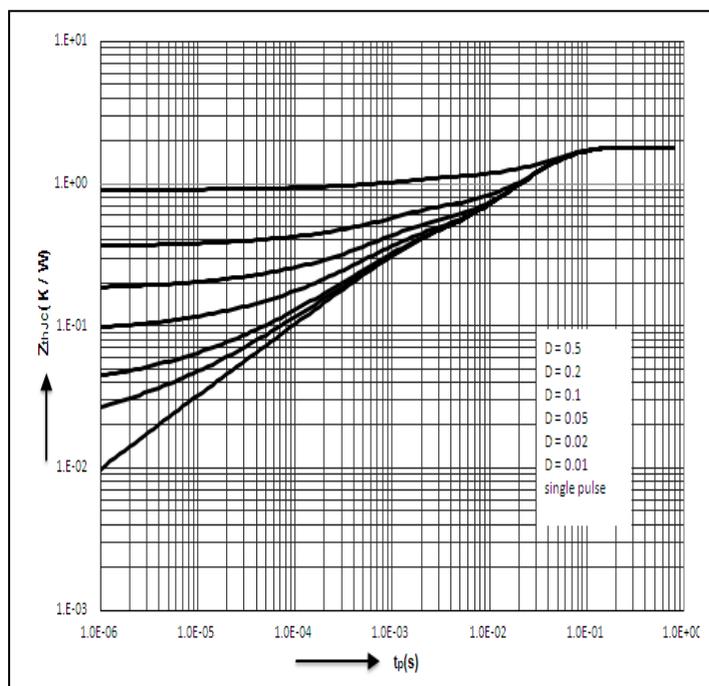
## Test circuits and Waveforms

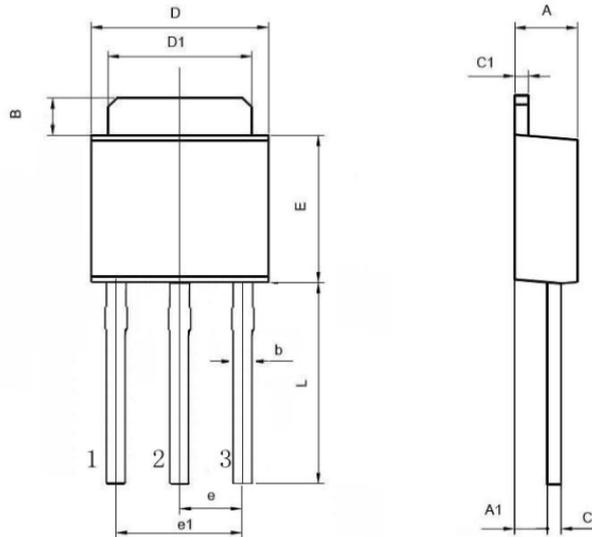
**EAS Test Circuit:**

**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  $T_A = 25^\circ C$

**Typical electrical and thermal characteristics**

**Figure 1: Typical Output Characteristics**

**Figure 2. Gate to source cut-off voltage**

**Figure 3. Drain-to-Source Breakdown Voltage Vs. Case Temperature**

**Figure 4: Normalized On-Resistance Vs. Case Temperature**

**Typical electrical and thermal characteristics**

**Figure 5. Maximum Drain Current Vs. Case Temperature**

**Figure 6. Typical Capacitance Vs. Drain-to-Source Voltage**

**Figure 7. Drain-to-Source Voltage Vs. Gate-to-Source Voltage**

**Figure 8. Maximum Effective Transient Thermal Impedance, Junction-to-Case**

**Mechanical Data:**
**TO-251 PACKAGE OUTLINE DIMENSION**


Symbol	Dimension In Millimeters			Dimension In Inches		
	Min	Nom	Max	Min	Nom	Max
A	2.200	-	2.400	0.087	-	0.094
A1	0.950	-	1.150	0.037	-	0.045
B	0.950	-	1.250	0.037	-	0.049
b	0.500	-	0.700	0.020	-	0.028
c	0.450	-	0.550	0.018	-	0.022
c1	0.450	-	0.550	0.018	-	0.022
D	6.450	-	6.750	0.254	-	0.266
D1	5.200	-	5.400	0.205	-	0.213
E	5.950	-	6.250	0.234	-	0.246
e	2.240	-	2.340	0.088	-	0.092
e1	4.430	-	4.730	0.174	-	0.186
L	9.000	-	9.400	0.354	-	0.370

**Ordering and Marking Information**
**Device Marking: SSF6N80G**

**Package (Available)**  
**TO-251(IPAK)**  
**Operating Temperature Range**  
**C : -55 to 150 °C**

**Devices per Unit**

Package Type	Units/Tube	Tubes/Inner Box	Units/Inner Box	Inner Boxes/Carton Box	Units/Carton Box
TO-251	75	48	3600	5	18000

**Reliability Test Program**

Test Item	Conditions	Duration	Sample Size
High Temperature Reverse Bias(HTRB)	$T_j=125^{\circ}\text{C}$ to $150^{\circ}\text{C}$ @ 80% of Max $V_{DSS}/V_{CES}/V_R$	168 hours 500 hours 1000 hours	3 lots x 77 devices
High Temperature Gate Bias(HTGB)	$T_j=150^{\circ}\text{C}$ @ 100% of Max $V_{GSS}$	168 hours 500 hours 1000 hours	3 lots x 77 devices

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