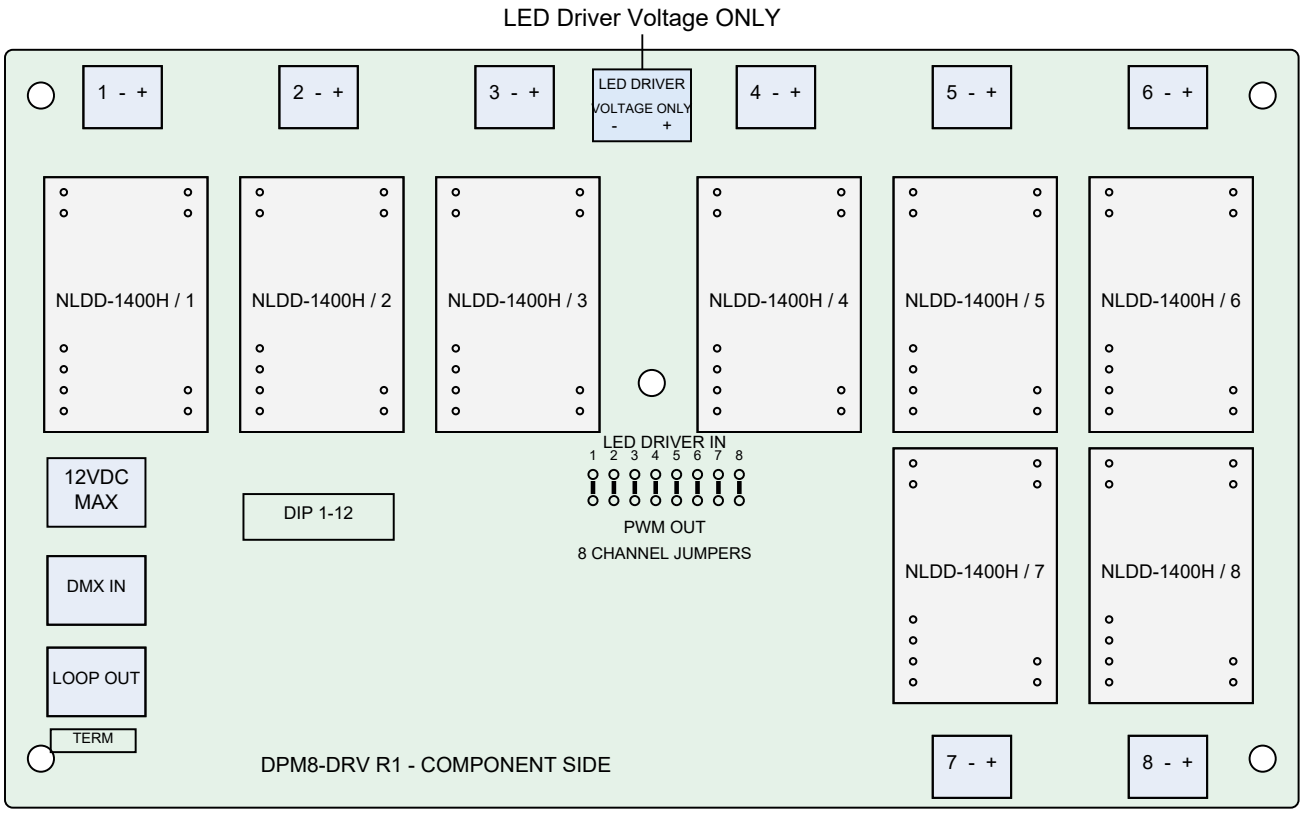
DPM8-DRV User Guide

DMX to PWM Driver PCB

SR 1.xx | NLDD-1400H configuration

ELM Video Technology, Inc.
"Innovative DMX and MIDI Products"

PCB Overview



Board drawing shows factory-installed drivers, terminals and jumpers. Component locations follow the R1 PCB; drawing is for identification, not fabrication.

12VDC INPUT: DO NOT APPLY ANY VOLTAGE OVER 12VDC!!

The DPM8-DRV converts eight consecutive DMX512 channels to eight independent constant-current LED outputs with installed NLDD-1400H drivers. Four frequency groups control output pairs 1/2 (A), 3/4 (B), 5/6 (C) and 7/8 (D). Each output PWM duty cycle follows its respective DMX Channel.

FACTORY PROGRAMMED: 900 Hz. MAXIMUM WITH NLDD-1400H: 1,000 Hz.
Keep DIP 10 OFF (low range). Never program a frequency above the installed driver's maximum. The controller's higher frequency capability is not the LED driver rating.

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Connections & LED Loads

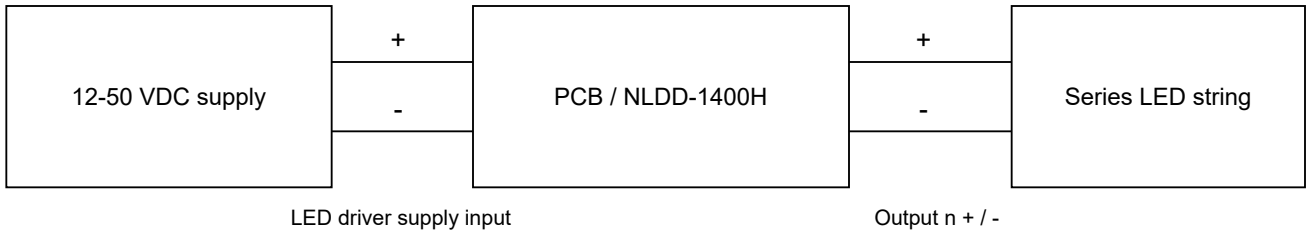
12VDC INPUT: DO NOT APPLY ANY VOLTAGE OVER 12VDC!!

TWO DC SUPPLIES

CONTROL POWER: Connect regulated 12 VDC to the PCB 12VDC input; observe + and -. Published control consumption is approximately 100 mA; a 12 VDC, 1 A supply is suitable. This supply does not power the LED loads.

LED DRIVER POWER: Connect a separate, suitably fused 12-50 VDC supply to the driver supply input. Select voltage for the LED string and size supply power for all channels at full brightness. The PCB product limit is 50 VDC even though the driver component has a higher input rating. Do not apply driver-supply voltage to the 12 V control input.

CONNECTION EXAMPLE - ONE CHANNEL; REPEAT FOR OUTPUTS 2-8



Connect each LED string only across its own numbered output + and -. Do not join channel outputs together, parallel drivers, or connect an LED output to another power supply. MEAN WELL specifies that -Vout must not be tied to -Vin; keep LED return wiring on the matching output terminal.

CONSTANT CURRENT - SELECT THE LOAD BEFORE APPLYING POWER

NLDD-1400H delivers nominal 1,400 mA during each ON pulse. PWM changes the ON time, not the rated pulse current. At 50% duty cycle the approximate average is 700 mA, but the ON-pulse current remains 1,400 mA. Select LEDs and thermal management for that current, including driver tolerance; lowering DMX is not protection for an undersized LED.

LED string voltage: 6-46 VDC, and at least 4 V below the driver supply. For example, a 24 V supply supports a string up to 20 V; a 48 V supply supports up to 44 V; a 50 V supply supports up to 46 V. Allow for LED forward-voltage variation. This is a step-down driver and cannot boost voltage.

Use series-connected LEDs or a compatible constant-current LED engine. Ordinary constant-voltage LED strips, bare low-current LEDs, and loads requiring less than 1.4 A are not suitable without an appropriately rated replacement driver. Do not connect unequal strings in parallel and assume equal current sharing.

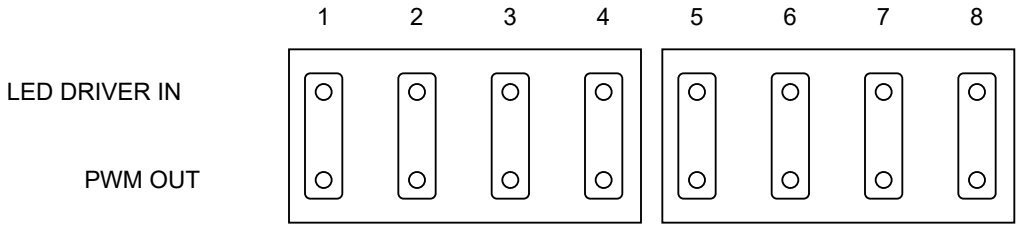
Supply sizing: Eight channels total 11.2 A of LED output current. This is not a fixed driver-supply input current: input power depends on LED voltage, channel loading and conversion losses. Size the supply from total full-load LED watts divided by supply voltage and efficiency, with margin. Do not route load power through the control input or its 1 A fuse, which protects only the 12 V electronics and microcontroller.

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Jumpers & Operation

CHANNEL JUMPERS - PWM OUT TO LED DRIVER IN

The two rows marked PWM OUT and LED DRIVER IN are numbered 1-8. Install one jumper across the two matching pins for each channel: PWM OUT 1 to LED DRIVER IN 1, and so on. The jumper bridges the rows, not adjacent channel numbers. Use all eight jumpers for normal onboard DMX control.



REMOVING A JUMPER IS NOT AN OFF SWITCH. An open NLDD-1400H DIM input commands ON. Removing a channel jumper can therefore produce full LED output. Switch off both supplies before fitting or removing jumpers or wiring.

For external dimming, LED DRIVER IN is the DIM side and PWM OUT is the controller side. Remove the corresponding jumper to isolate the two sources. NLDD-1400H DIM control: HIGH >2.5 to 5 V, LOW <0.8 V, referenced to -Vin; PWM 100-1,000 Hz. Do not exceed 5 V on DIM. Leave factory solder links and unlabelled service/programming pads unchanged.

ONE PWM CHANNEL CONTROLLING MULTIPLE DRIVERS

Example: PWM OUT 3 to LED DRIVER IN 3 and 7. Use jumper wires from PWM OUT 3 to both driver inputs. Remove the normal PWM OUT 7-to-LED DRIVER IN 7 jumper so PWM OUT 7 remains isolated. Both drivers then follow PWM channel 3, including its duty cycle, frequency and stored stand-alone level. **Never connect two PWM OUT pins together.** Keep each LED load on its own numbered + / - power output; do not parallel the LED power outputs. Remove both power supplies before changing jumpers.

DMX TERMINATION AND SPRING TERMINALS

TERM: Set termination ON only when this PCB is the last device on the DMX cable. Set it OFF when the DMX loop continues to another device, and terminate the final device. Connect Data + and Data - to the matching IN markings; LOOP OUT continues the same pair.

Push-button spring terminals: With power removed, press the terminal's release button using a suitable small tool, insert the stripped conductor fully, then release and gently tug-check. Press again to remove the wire. Keep strands contained and observe the connector manufacturer's wire and strip-length limits.

SETTINGS AND PROGRAMMING

See the DIP switch diagram and operation instructions on page 4. Stand-alone programming and frequency information follow on page 5; the frequency DIP drawings, preset boxes and setup procedure are on page 6.

12VDC INPUT: DO NOT APPLY ANY VOLTAGE OVER 12VDC!!

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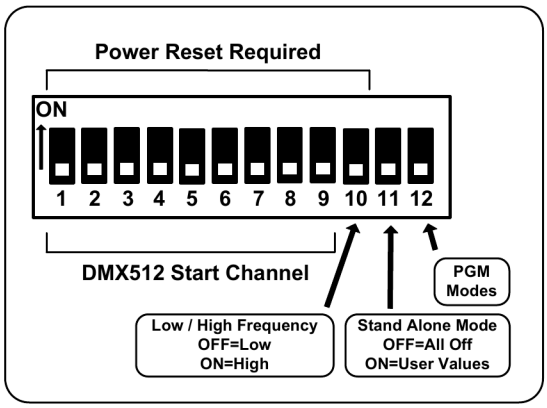
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Operation

DIP SWITCHES – It is recommended to have a DMX Start Channel value of 503 or less to have channels assigned to 8 PWM outputs and 2 for frequency programming and setup. See the Frequency *Setup Procedures for more information.*
NOTE – A RESET/REPOWER IS REQUIRED FOR DMX START CHANNEL and LOW / HIGH SPEED FREQUENCY SETTINGS



DIP SWITCHES 1-9 - DMX START CHANNEL: [POWER RESET REQUIRED] sets the DMX512 start channel *(see the DMX512 Channel Assignment Document).* PWM output 1 will be the DMX assigned start channel and the 2nd PWM output is controlled by the assigned DMX start channel +1 (consecutively) and so on.

Dip Switch's 1-6 are also used to program the frequency settings. *See the Frequency Setup Procedure*

DIP SWITCH 10 - FREQUENCY RANGE: [POWER RESET REQUIRED] selects the low or high frequency range for all outputs. **For NLDD-1400H LED drivers keep DIP 10 OFF (low range).**

DIP SWITCH 11 – STAND ALONE (No DMX): OFF (down position) = With no DMX signal the all PWM outputs will turn off. ON (up position) = With no DMX signal the PWM outputs will be the user preset (8 independent) values. *See the Stand Alone programming setup instructions*

DIP SWITCH 12 – ENTER PROGRAM SETUP MODES: OFF = normal operation. If the DPM8 is powered and DIP 12 is turned on the stand alone values can be programmed *(see the stand alone programming setup instructions)*. When powering up the DPM8 and DIP 12 is ON then the frequency settings can be programmed, modified and stored. *See the Frequency Setup Procedure instructions*

STANDALONE MODE - The Stand Alone Mode is activated when there is no valid DMX present indicated by the status indicator off. The PWM duty cycle values are all off if the Stand Alone Dip Switch is in the OFF position. The user set PWM duty cycle values are applied when the Stand Alone Dip Switch is in the ON position. Take care to setup the values and place the dip switch in the desired position. Test the unit to insure the desired results.

LED INDICATOR – The Power LED will illuminate indicating power is applied. The Status LED will indicate the status and modes of the DPM8.

STATUS LED: ON: indicates DMX data is being received.
OFF: indicates no DMX data is being received and the unit is in Stand Alone Mode
SLOW BLINK:
DMX receive error – [overrun error] (reset clears)
Pre Program/Setup Mode, waiting on user to apply settings
MEDIUM BLINK: Programming/setup mode
RAPID BLINK: Programming/setup mode can't be entered, check settings
PULSE: Programming/setup complete – Reset DIP Switches if needed and RESET POWER

NLDD-1400H: factory programmed to 900 Hz. Never exceed 1,000 Hz.

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Programming & Setup

STAND ALONE PROGRAMMING SETUP PROCEDURE

- *To ABORT any changes from storing turn off the power and reset the dips switches as desired*
- *If the Status LED has a rapid blink this indicates either No DMX present, the Start Channel is above 505, or dip 11 or 12 are not in the respective position or order of switching*

To store the 8 desired stand alone PWM values:

- Connect a valid DMX signal – Status LED on solid
- Set the respective DMX levels to the desired stand alone values
- Turn on Dip 11
- Turn on Dip 12 – Status LED medium blink
- Toggle Dip 11 - OFF and then ON – Status LED pulses (waiting)
- Turn of Dip 12 – The new values are stored in permanent memory – Status LED blinks twice to confirm

FREQUENCY SETTINGS

The DPM8 has 4 groups (A, B, C, D) that can each have a set frequency. Outputs 1 and 2 (A) have the same frequency, 3 and 4 (B) the same, 5 and 6 (C) the same, and 7 and 8 (D) the same. The duty cycle of each output remains independently controlled by its DMX channel.

The frequency range is selected by DIP 10 when control power is applied. **For the NLDD-1400H drivers, keep DIP 10 OFF (low range).** The controller can produce approximately 123 Hz to 31.25 kHz in low range and 980 Hz to 250 kHz in high range; these controller ranges are not the LED driver operating range.

Factory programmed to 900 Hz. The NLDD-1400H dimming input is rated for 100-1,000 Hz. The usable controller/driver overlap is approximately 123-1,000 Hz. Do not program the unit above the maximum frequency of the installed driver. The 1,800 Hz preset and all high-range presets must not be used with NLDD-1400H drivers.

Frequency can be adjusted for an application such as reducing visible LED flicker on camera, provided the installed driver limit is observed. A higher PWM frequency does not guarantee that camera banding will be eliminated.

PWM FREQUENCY PROGRAMMING

The controller stores four frequency values for each low/high range. DIP switches 1-4 select the groups to adjust. DIP switches 5 and 6 select a preset or variable adjustment as shown in Table FPP-1 on page 6.

For variable adjustment, use the 9th assigned DMX channel (start address +8) for coarse control and the 10th assigned channel (start address +9) for fine control. *For precisely setting a specific frequency an oscilloscope is required.*

To calculate the approximate desired frequency (df) in low range:
100 - ((31,372 / df) / 2.55) = coarse %

PCB FREQUENCY SETUP: Turn LED-driver power OFF and keep control power available for programming. Leave the channel jumpers installed for measurement. Verify all four group frequencies before restoring LED-driver power.

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Programming & Setup

Table FPP-1



Dip 1 ON = PWM A 1/2
Dip 2 ON = PWM B 3/4
Dip 3 ON = PWM C 5/6
Dip 4 ON = PWM D 7/8

Set duty cycles with the respective DMX channels. Select one or more PWM groups. Keep DIP 10 OFF; use only frequencies within the installed LED driver rating. Repower to abort; turn DIP 12 OFF to store.



VARIABLE
Frequency setting using DMX coarse (9th) and DMX fine (10th) values



PRESETS
Low Freq 300hz
NLDD: 1 kHz max



PRESETS
Low Freq 900hz
Factory setting



DO NOT USE
1,800 Hz exceeds
NLDD-1400H limit

FREQUENCY PROGRAMMING SETUP PROCEDURE:

- *While programming if the Status LED has a rapid blink this indicates either no DMX present, the Start Channel is above 503*
- *To ABORT any changes from storing turn off the power and reset the dips switches as desired*

To store any of the 4 PWM group frequency values:

- Turn LED-driver supply OFF; leave control electronics powered for setup.
- Connect a valid DMX signal – Status LED on solid
- Turn off power, turn on dip 12, set DMX Start Channel to 503 or less
- Turn on power – [Waiting on user to preset dips switches 1-6] (all can be set to OFF) - LED BLINKS FAST
- Toggle Dip 12 off then on to enter programming setup mode, PWM outputs will be responsive to settings - Status LED medium blink
- Set dip switches according to table FPP-1 until any or all of the frequencies are as desired
- Turn on DIPs 1-4 respectively for the PWM(s) to adjust
  - Turn on DIPs 1, 2, 3, and/or 4 respectively for the PWM(s) groups (A, B, C, and/or D) to adjust
  - For variable frequency adjust dips 5 & 6 should be OFF, use the 9th channel to coarse adjust and the 10th channel to fine adjust the desired frequency.
  - For preset frequency(s) dips 5 and 6 should be set per table FPP-1
  - Continue to repeat PWM group(s) selections and adjustments until any or all frequencies are set
- Once the PWMs are set as desired turn off DIP 12 to store settings - 2 confirm blinks
- Repower and test the new frequencies are as desired

NLDD-1400H: NEVER EXCEED 1,000 Hz. KEEP DIP 10 OFF.

RESTORE 900 Hz: During setup select all four groups with DIPs 1-4 ON, set DIP 5 ON and DIP 6 OFF, then turn DIP 12 OFF to store. Turn control power OFF, restore DIPs 1-9 to the operating DMX start address, and leave DIP 10 OFF. Repower the control electronics, verify frequency, then restore LED-driver power.

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Specifications & Checks

Item	DPM8-DRV with installed NLDD-1400H
Output channels	8 independent constant-current LED outputs; 4 frequency groups
Current per output	1,400 mA nominal ON-pulse current; driver typical accuracy +/-5% at 48 V input
Control supply	12 VDC; approximately 100 mA published consumption; 1 A supply suitable
LED-driver supply	12-50 VDC PCB product range; separate customer-supplied source
LED output voltage	6-46 VDC; also limited to driver input voltage minus 4 V
PWM frequency	Factory programmed to 900 Hz; 1,000 Hz maximum with NLDD-1400H
Data / RDM	DMX512, 250 kbit/s; RDM not supported
Connections	Marked PCB terminals; optional DMX loop output; 8 channel jumpers
PCB dimensions	6.4 x 3.8 inches; assembled PCB height approximately 1 inch
Environment	32-100 F (0-38 C), noncondensing; provide ventilation and load cooling
Protection	1 A SMT fuse for the 12 V electronics and microcontroller only; LED-driver supply requires separate external protection

STATUS LED AND FIRST-POWER CHECK

Solid: valid DMX received. **Off:** no valid DMX; stand-alone behavior applies. **Slow blink:** receive overrun error or waiting in setup; a reset clears an overrun. **Medium blink:** programming. **Rapid blink:** setup entry/settings error (also used during frequency setup entry). **Pulse:** programming complete/waiting; follow the setup sequence.

Before connecting LED power, inspect soldering, driver orientation, polarity and all eight channel jumpers. Set DIP 10 OFF and DIP 12 OFF. Select the DMX address and DIP 11 no-DMX behavior. With control power applied, verify 900 Hz or the intended safe frequency on all four groups. Connect rated LED loads with power off, then apply driver power. Test DMX zero, full level, and DMX loss.

No light: Check both supplies, LED polarity/string voltage, jumpers, DMX address and DIP 11. **Full brightness unexpectedly:** Remove LED-driver power; check for a missing jumper or open DIM connection. **Flicker/incorrect dimming:** Check frequency, DMX termination, supply capacity and load compatibility.

DMX CONTROL WARNING: Never use DMX data devices where human safety must be maintained, or for pyrotechnics or similar controls.

Driver limits: MEAN WELL NLDD-H specification, 2024-10-16, pages 2-4.
www.meanwell.com/Upload/PDF/NLDD-H/NLDD-H-SPEC.PDF

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Driver Options & NT Version

STANDARD AND SOCKETED PURCHASE OPTIONS

The standard assembled DPM8-DRV is supplied with eight installed MEAN WELL NLDD-1400H drivers (1,400 mA per output). The socketed option is supplied without drivers for installation of customer-purchased MEAN WELL pin-type models listed below.

Customer driver model	Nominal ON-pulse current	Driver DIM pin
NLDD-350H	350 mA	22
NLDD-500H	500 mA	22
NLDD-700H	700 mA	22
NLDD-1050H	1,050 mA	22
NLDD-1200H	1,200 mA	21
NLDD-1400H (stock model)	1,400 mA	21

Verified footprint: DPM8-DRV R2. All eight driver positions provide both DIM pads 21 and 22, connected to the respective channel PWM input. Socket contacts must accommodate both positions. Use the exact models above without a W suffix; HW wire-lead versions are not plug-in replacements.

Connections and voltage: Follow page 2. The PCB driver supply remains 12-50 VDC. For every listed model, LED string voltage on this PCB is 6-46 VDC and at least 4 V below the supply (48 V supply: 44 V maximum string). The lower-current drivers' 52 V component rating does not increase the PCB limit.

Current and PWM: Match the LEDs to the installed driver current, including tolerance. PWM changes duty cycle, not ON-pulse current. All listed models accept 100-1,000 Hz; keep DIP 10 OFF and never exceed 1,000 Hz. Factory programming is 900 Hz. Keep each LED return on its own output; do not join -Vout to -Vin or parallel outputs.

NT PURCHASE - CUSTOMER-INSTALLED DRIVERS AND CONNECTORS

The DPM8-DRV-NT PCB has surface mount electronics installed and tested. It is supplied for customers who install their own drivers and connectors. Install 8 compatible pin-type drivers, 11 two-pole spring terminals (Wurth 691412320002; DMX loop terminal optional), two 2 x 4 headers on 0.1-inch pitch, and 8 shorting jumpers for the normal one-to-one channel mapping. The LED-driver supply input connector is supplied/installed. Fit each component to its marked footprint and polarity; use insulated mounting spacers.

Remove both supplies before installing drivers. Check orientation, current rating and connections; verify PWM frequency before applying LED-driver power. An open DIM input can command full LED output. Pages 1, 2 and 7 specify the standard 1,400 mA configuration.

12VDC INPUT: DO NOT APPLY ANY VOLTAGE OVER 12VDC!!

Driver data: MEAN WELL NLDD-H specification, pages 2-4. www.meanwell.com/Upload/PDF/NLDD-H/NLDD-H-SPEC.PDF

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