Descriptions

The DW8502 is an instant On/Off LED driver for high power LED applications. At DW8502 output stage, one regulated current port is designed to provide a uniform and constant current sink for driving LEDs within a large range of V_F variations. DW8502 easily provides users a consistent current source. User may adjust the output current from up to 2.5A through an external resistor ,R_S, which gives users flexibility in controlling the light intensity of LEDs. In addition, users can precisely adjust LED brightness from 0% to 100% via output enable (EN) with Pulse Width Modulation. DW8502 also guarantees that LEDs can be cascaded to maximum 40V at the output port.

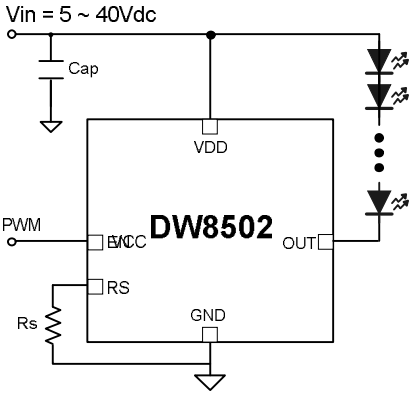
Features

- Constant output current invariant to supply and load voltage change
- 5V to 40V supply voltage
- Up to 2.5A adjustable regulated output current
- Built-in thermal derating circuit
- Available PWM dimming control
- Output current adjusted through an external resistor
- TO-263 Package
- TO-220 Package

Applications

- LED light bulbs
- Signage and decorative LED lighting
- General lighting of flat panel displays
- RGB backlighting LED driver
- Current stabilizer with DC/DC or AC/DC
- Automotive lighting
- General purpose constant current source

Typical Application Circuit



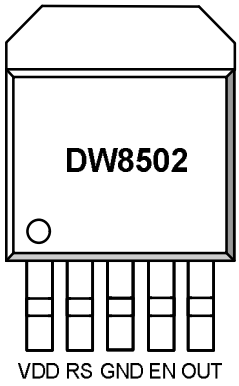
Ordering Information

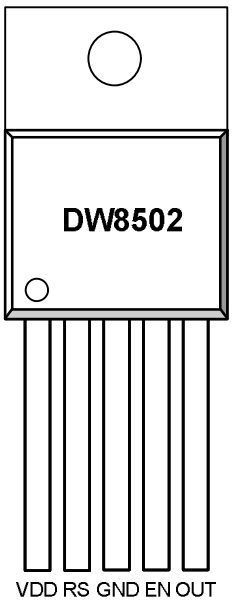
Device	Marking	Package	Operating Temp
DW8502-TO263	DW8502	TO-263	-35°C ~ +85°C
DW8502-TO220	DW8502	TO-220	-35°C ~ +85°C

Package Information

Package	Size
TO-263-5L	10.1x14.85x4.57(mm)
TO-220-5L	10.1x28.85x4.57(mm)

Pin Connection





Pin Description

Pin	Name	Description
1	VDD	Supply voltage input
2	RS	Output current set input. Connect a resistor from RS to GND to set the LED bias current
3	GND	Ground
4	EN	Output stage enable control pin. High enable the OUT pin. It can be left floating for normally on.
5	OUT	Output pin. Sink current is decided by the current on R_{SET} connected to RS
6	HS	Heat sink, normally connected GND

Absolute Maximum Ratings

Characteristics		Symbol	Value	Unit
Supply voltage		V_{DD}	41	V
Enable voltage		V_{EN}	41	V
Output voltage		V_{OUT}	23	V
Reference voltage		VRS	5	V
Package thermal resistance	TO-263-5L	θ_{JA}	22.85	℃/W
	TO-220-5L	θ_{JA}	62	℃/W
Operating temperature		T_{OPR}	-35~+85	℃
Storage Temperature		T_{STG}	-55~+150	℃

Note 1. θja is measured in the convection at Ta=30℃ on a high effective thermal conductivity test board(4 Layers, 2S2P) of JEDEC 51-7 thermal measurement standard.
2. PCB dimension is 100x100x1.6mm and 4 layers.

Recommended Operation Conditions

Characteristics	Symbol	Min.	Typ.	Max.	Unit
Supply voltage	V_{DD}	5	-	40	V
Enable voltage	V_{EN}	-	-	40	V
Output sink current	I_{OUT}	-	-	2.5	A

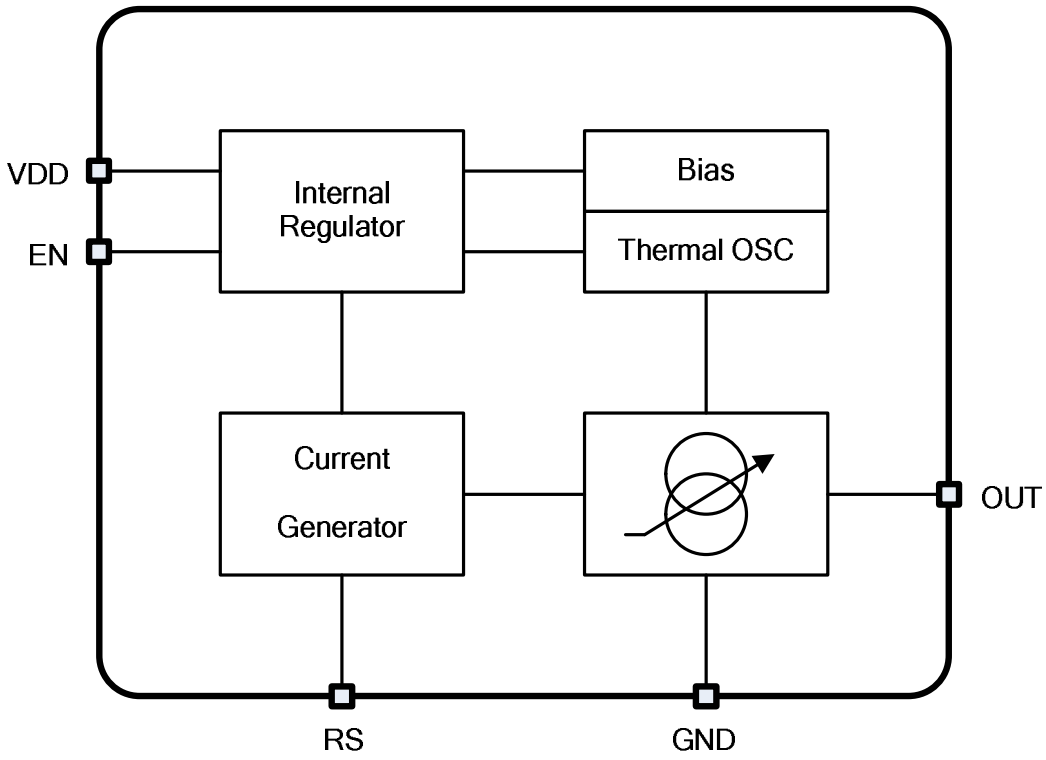
Electrical Characteristics

V_{DD} = 24V, EN= 0~24V, Ta = -35℃~+85℃, unless otherwise specified. Typical values are at T_A=+25℃

Characteristics	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input supply voltage	V_{DD}		5	-	40	V
Output linearity voltage	V_{OUT_LINE}	V_{DD}=24V, I_{SET}= 300mA,	-	-	3	V
Output current	I_{OUT}		-	-	1.5	A
Quiescent current	I_{Q_ON}	EN = 24V	0.8	1	1.5	mA
	I_{Q_OFF}	EN = 0V	85	120	250	uA
EN input leakage current	I_{EN_LIK}		30	45	60	uA
Input high voltage	V_{IH}		2	-	-	V
Input low voltage	V_{IL}		-	-	0.8	V
LED output drop-out voltage	V_{DROP}	V_{DD}=40V , I_{SET}=300mA	240	270	300	mV
Thermal derating	T_D		-	140	-	℃
Thermal derating hysteresis	T_{DHYS}		-	15	-	℃
Rset voltage	V_{SET}		0.58	0.61	0.64	V
Output current	I_{OUT}	2KΩ	290	305	320	mA

Note2 : Output dropout voltage : 90% x I_{OUT}

Block Diagram



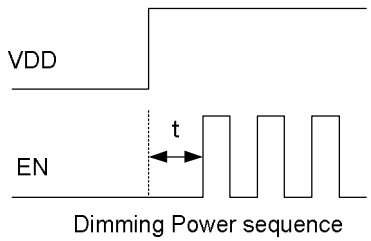
Circuit Description

Setting Output Current

Iout [mA] = (610[mV]/Rset[ohm])X 1000

Powersequence

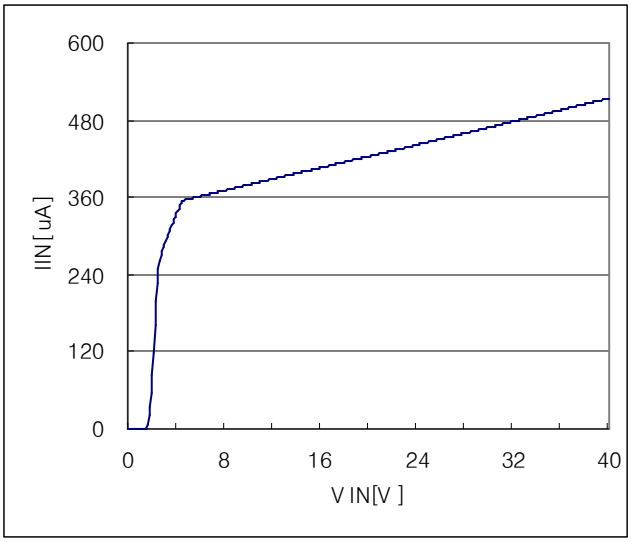
There is an electrostatic diode between VDD and EN.
When dimming control, It must input EN signal after inputs VDD. (t ≥ 1ms)
If not use Dimming control, EN connect to VDD.



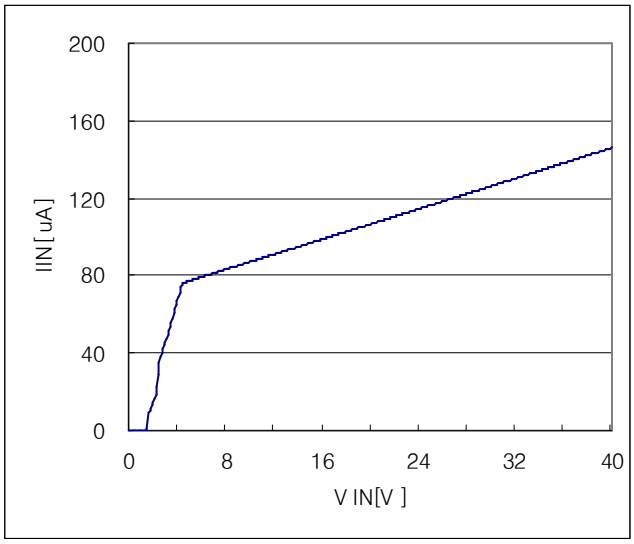
Dimming Power sequence

Electrical Characteristics Curves

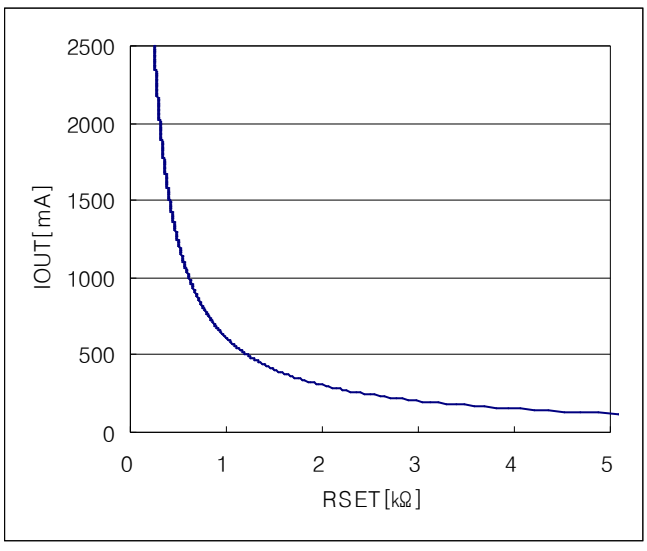
V_{DD} = 12V, V_{OUT} =2V, Ta = -35℃~+85℃, unless otherwise specified. Typical values are at T_A=+25℃



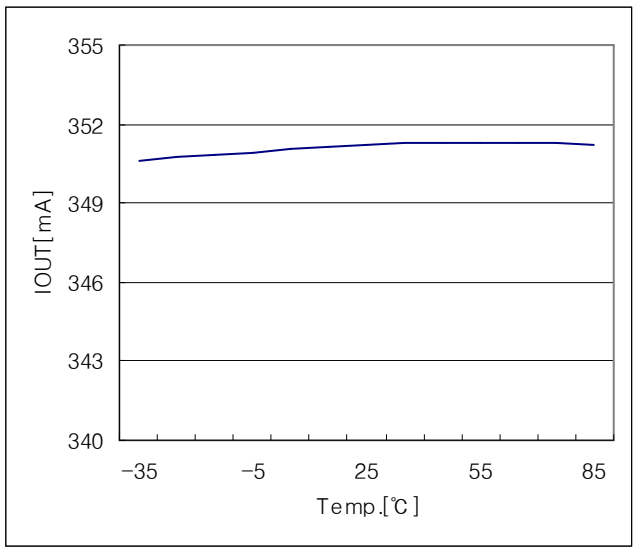
Quiescent vs. VDD



Ishutdown vs. VDD



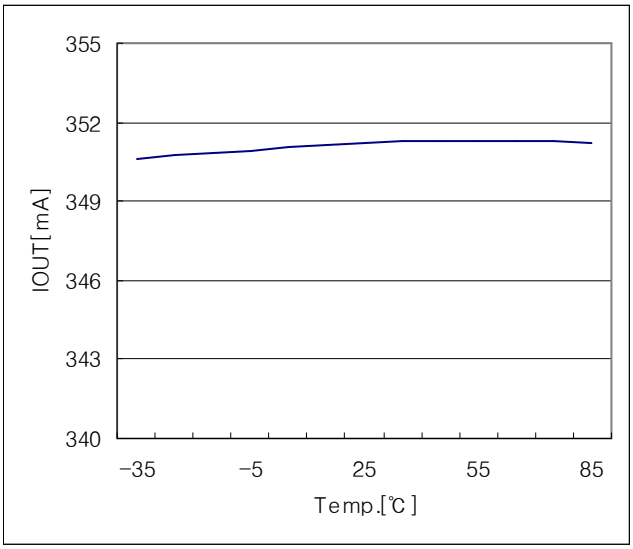
IOUT vs. RSET



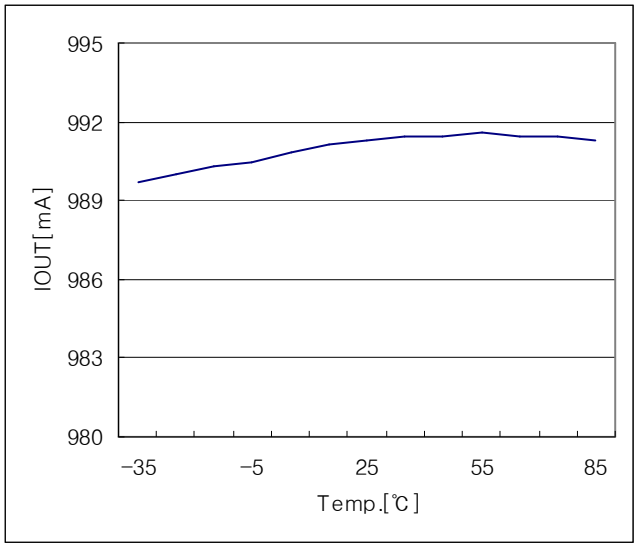
IOUT vs. Temperature

Electrical Characteristics Curves (continued)

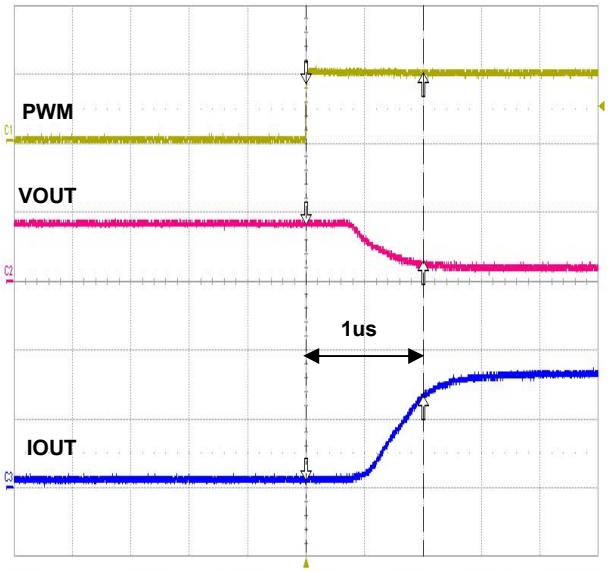
V_{DD} = 12V, V_{OUT} =2V, Ta = -35℃~+85℃, unless otherwise specified. Typical values are at T_A=+25℃



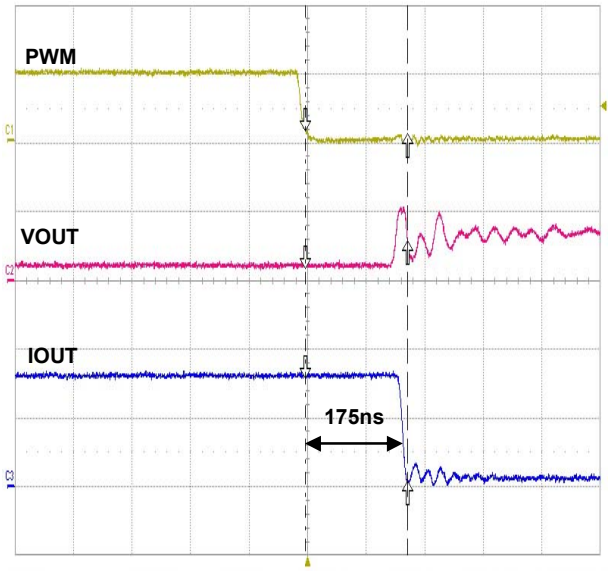
IOUT vs. Temperature



IOUT vs. Temperature



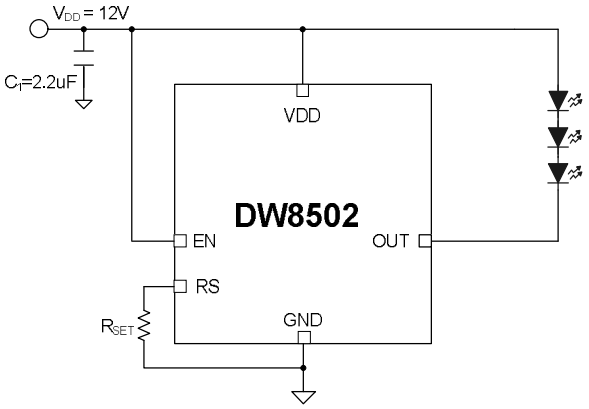
PWM Rising Time

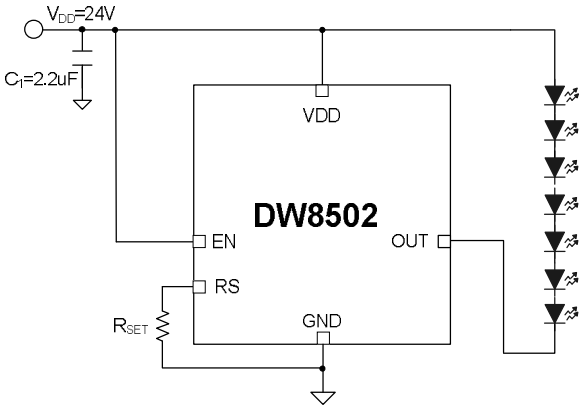


PWM Falling Time

Typical Applications

※ LED VF = 3.3V, IF = 20mA





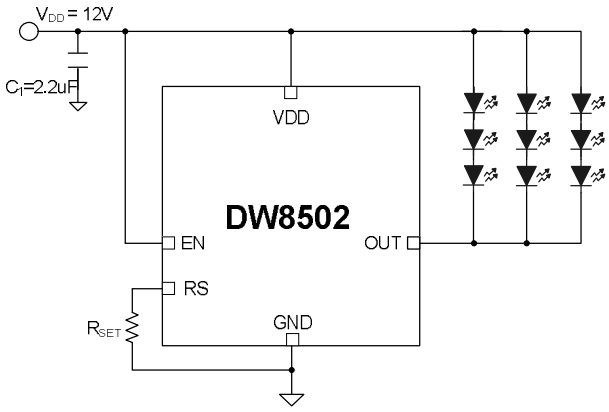


Figure 3. PWM Dimming Typical Application

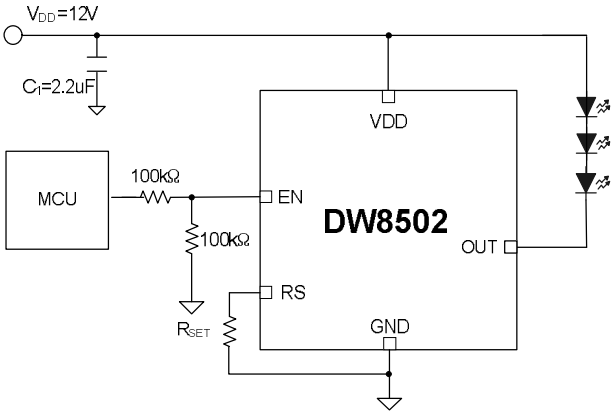


Figure 4. VDD=12V, 9 LED

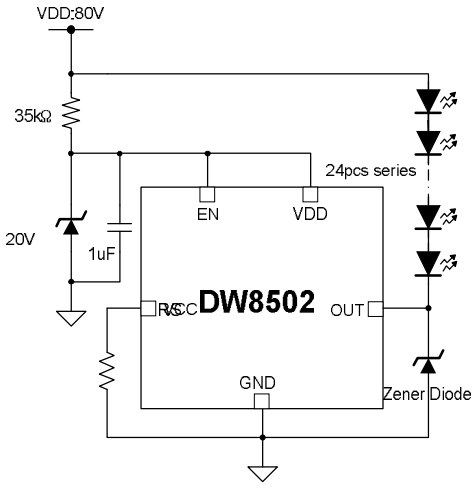
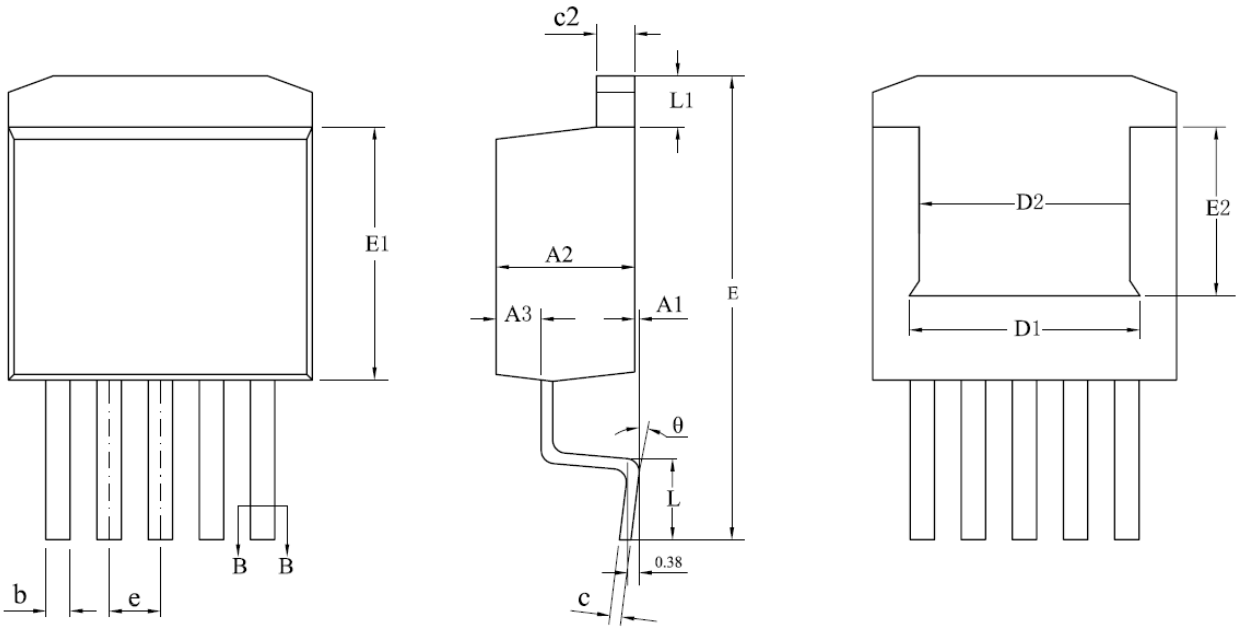
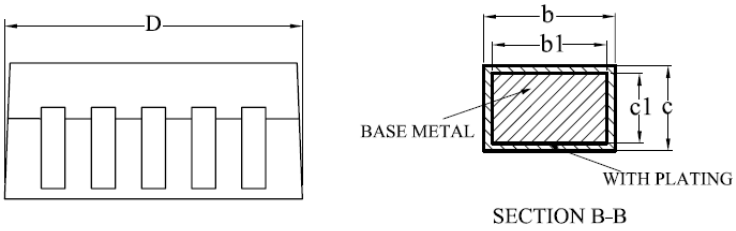


Figure 5. High Voltage Application (VDD=80V)

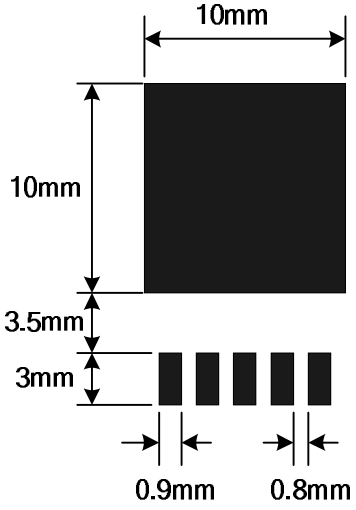
Package Dimension (TO-263-5L 10.1 x 14.85 x 4.57)



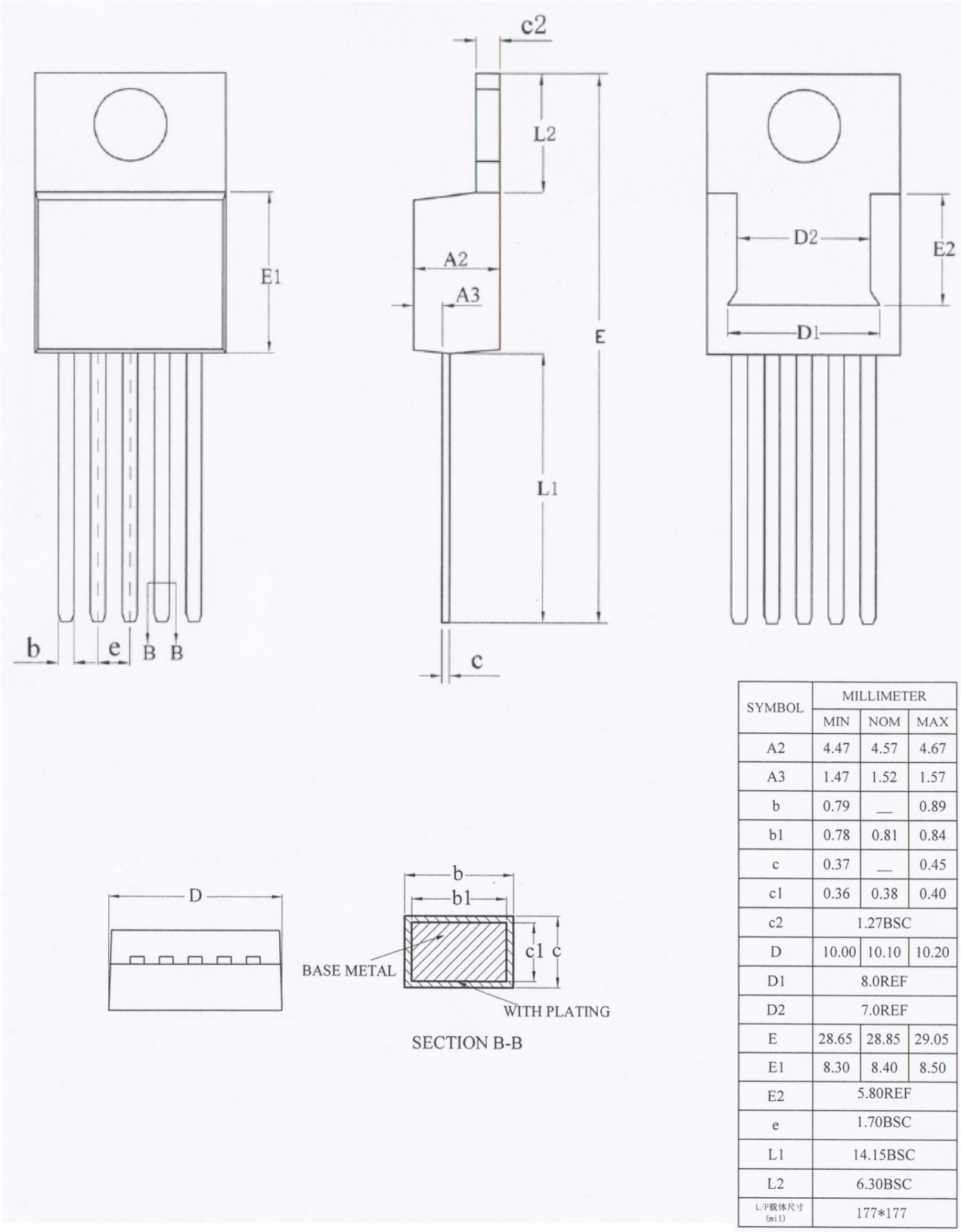


SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A1	0.05	—	0.25
A2	4.47	4.57	4.67
A3	1.47	1.52	1.57
b	0.79	—	0.89
b1	0.78	0.81	0.84
c	0.37	—	0.45
c1	0.36	0.38	0.40
c2	1.27BSC		
D	10.00	10.10	10.20
D1	8.0REF		
D2	7.0REF		
E	14.65	14.85	15.05
E1	8.30	8.40	8.50
E2	5.80BSC		
e	1.70BSC		
L	1.84	—	2.24
L1	1.65BSC		
θ	0	—	8°

Foot Print



Package Dimension (TO-220-5L 10.1x28.85x4.57(mm))



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A2	4.47	4.57	4.67
A3	1.47	1.52	1.57
b	0.79	—	0.89
b1	0.78	0.81	0.84
c	0.37	—	0.45
c1	0.36	0.38	0.40
c2	1.27BSC		
D	10.00	10.10	10.20
D1	8.0REF		
D2	7.0REF		
E	28.65	28.85	29.05
E1	8.30	8.40	8.50
E2	5.80REF		
e	1.70BSC		
L1	14.15BSC		
L2	6.30BSC		
L/F载体尺寸 (mil)	177*177		