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A711

1.1A High Voltage Adjustable Current Regulator With Enable Control

DESCRIPTION

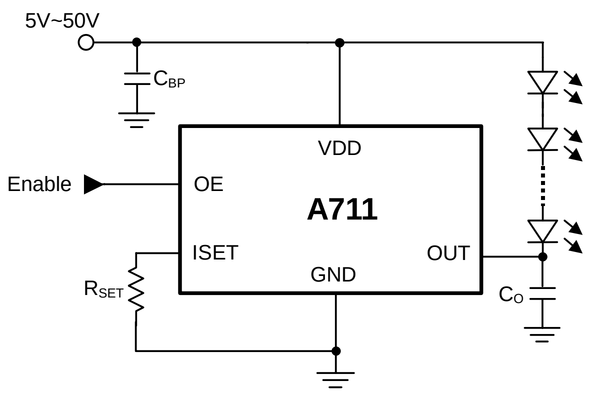
The A711 is a high voltage, low dropout current regulator for high power LED, that the maximum output current can be up to 1.1Amp. The output current was decided by an external resistor. The output sink current could be disabled via OE pin. PWM dimming function could also be controlled by OE pin.

TO-263 package is available for good power dissipation ability. Build-in thermal protection to prevent the chip from over heat damage, and adequate heat sink is required to control the junction temperature below 125°C.

FEATURES

- **0.8V Output Drop-out Voltage at 1.1Amp.**
- **1.1Amp. Maximum Output Current.**
- **Output Current Controlled by External Resistor.**
- **3us Fast Response Output Stage Enable Control.**
- **Output Pin Sustaining Voltage Up To 75V.**
- **Supply Voltage Range 5V~50V**
- **TO-263-5L package**

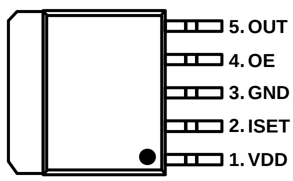
TYPICAL APPLICATION CIRCUIT



APPLICATIONS

- High Power LED Driver
- RGB Full Color Power LED driver
- LCD Monitor/TV LED Backlight Driver
- LED Lighting
- LED Street Lamp / Table Lamp

PACKAGE PIN OUT



TO-263-5L
(Top View)

ORDER INFORMATION

V	**TO-263-5L**
	5 pin
A711VFT	

Note: All surface-mount packages are available in Tape & Reel. Append the letter "T" to part number (i.e. A711VFT). The letter "F" is marked for Lead Free process.

ABSOLUTE MAXIMUM RATINGS (Note)	
Input Voltage, V_{DD}	50V
Output Pin Sustaining Voltage, V_{OUT}	75V
Enable Voltage, V_{OE}	13.2V
Maximum Operating Junction Temperature, T_J	150°C
Storage Temperature Range	-65°C to 150°C
Lead Temperature (soldering, 10 seconds)	260°C

Note: Exceeding these ratings could cause damage to the device. All voltages are with respect to Ground.
Currents are positive into, negative out of the specified terminal.

PIN DESCRIPTION

Pin Name	Pin Function
OUT	Output pin. Sink current is decided by the current on R_{SET} connected to I_{SET}. $I_{OUT} = I_{SET} \times 500 = \frac{1.2V}{R_{SET}} \times 500$
OE	Output stage enable control pin. High enable the OUT pin. It can be left floating for normally on.
I_{SET}	Output current set input. Connect a resistor from I_{SET} to GND to set the LED bias current.
VDD	Power supply.
GND	Ground

THERMAL DATA

TO-263 Package:

Thermal Resistance-Junction to Tab, θ_{JT}	3 °C /W
Thermal Resistance-Junction to Ambient, θ_{JA}	45 °C /W

Junction Temperature Calculation: $T_J = T_A + (P_D \times \theta_{JA})$.
The θ_{JA} numbers are guidelines for the thermal performance of the device/pc-board system.
Connect the ground pin to ground using a large pad or ground plane for better heat dissipation.
All of the above assume no ambient airflow.

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage	V_{DD}	5		50	V
Output Sink Current	I_{OUT}	0.3		1.1	A
Operating free-air temperature range	T_A	-40		+85	℃

DC ELECTRICAL CHARACTERISTICS

V_{DD}=24V, Ta=25°C, No Load, (Unless otherwise noted)

Parameter	**Condition**	**Min**	**Typ**	**Max**	**Unit**
Output Current	V_{OUT}=0.5V, R_{SET}=800Ω		750		mA
	V_{OUT}=0.8V, R_{SET}=600Ω		1000		
Output Current Deviation	V_{OUT}=0.5V, R_{SET}=800Ω			±5	%
	V_{OUT}=0.8V, R_{SET}=600Ω			±5	
SET Current Range		0.6		2.2	mA
Maximum Output Current	V_{OUT}=0.8V, R_{SET}=545Ω		1100		mA
Output Drop-out Voltage	R_{SET}=800Ω, Note 1		0.5		V
Load Regulation	I_{OUT}=750mA, V_{OUT}=0.5V to 3V			10	mA
Line Regulation	I_{OUT}=750mA, V_{OUT}=0.5V, V_{DD}= 5V to 50V,			1	mA/V
Thermal Shut-down Junction Temperature	Hysteresis 20℃		160		℃
"Low" Input Voltage		0		0.8	V
"High" Input Voltage		2		Min{V_{DD}, 12}	V
"Low" Input Current		-20		+20	µA
"High" Input Current		-5.0		+5.0	µA
Output Enable Delay Time	OE from Low to High, V_{OUT}=0.5V, I_{OUT}=750mA, 50%		5		µS
Output Disable Delay Time	OE from High to Low, V_{OUT} =0.5V, I_{OUT}=750mA, 50%		5		µS
Supply Current Consumption				5	mA

Note1: Output dropout voltage: 90% x I_{OUT} @ V_{OUT}=750mV

THERMAL CONSIDERATION

The Maximum Power Dissipation on Current Regulator:

$P_{D(MAX)} = V_{OUT(MAX)} \times I_{OUT(NOM)} + V_{IN(MAX)} \times I_{DD}$

$V_{OUT(MAX)}$ = the maximum voltage on output pin;
$I_{OUT(NOM)}$ = the nominal output current;
I_{DD} = the quiescent current the regulator consumes at $I_{OUT(NOM)}$;
$V_{IN(MAX)}$ = the maximum input voltage.

Thermal Consideration:

The A711 has internal power and thermal limiting circuitry designed to protect the device under overload conditions. However, maximum junction temperature ratings should not be exceeded under continuous normal load conditions. The thermal protection circuit of A711 prevents the device from damage due to excessive power dissipation. When the device junction temperature rises to approximately 150°C, the regulator will be turned off. When power consumption is over about 1.22W (TO-263 package, at T_A=70°C), additional heat sink is required to control the junction temperature below 125°C.

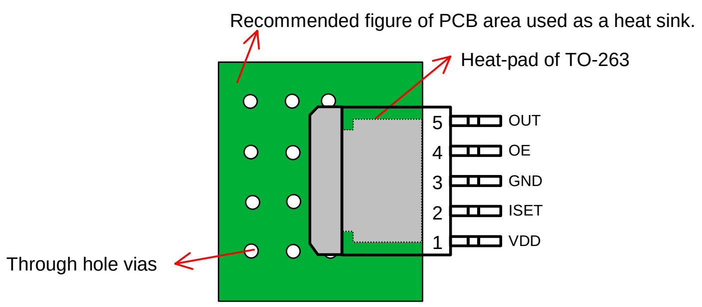
The junction temperature is:

$T_J = P_D (\theta_{JT} + \theta_{CS} + \theta_{SA}) + T_A$

P_D .: Dissipated power.
θ_{JT}: Thermal resistance from the junction to the mounting tab of the package.
For TO-263 package, θ_{JT} = 3.0 oC /W.
θ_{CS}: Thermal resistance through the interface between the IC and the surface on which it is mounted. (typically, $\theta_{CS} < 1.0$°C /W)
θ_{SA}: Thermal resistance from the mounting surface to ambient (thermal resistance of the heat sink).

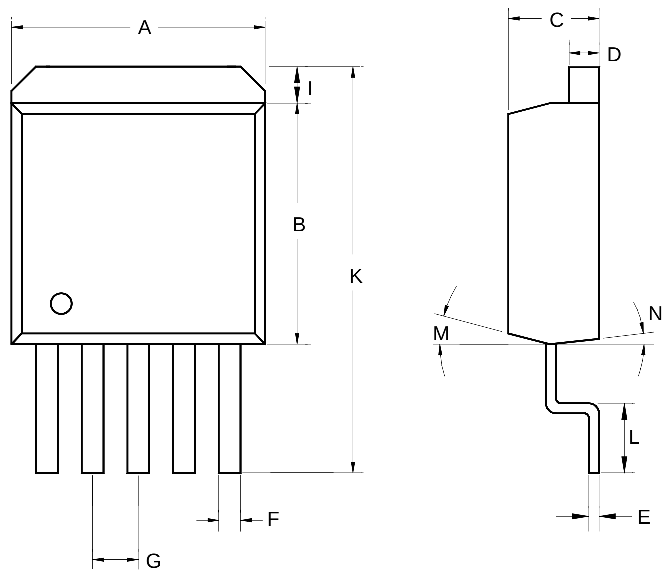
If PC Board copper is going to be used as a heat sink, below table can be used to determine the appropriate size of copper foil required. For multi-layered PCB, these layers can also be used as a heat sink. They can be connected with several through-hole vias.

PCB θ_{SA} (°C /W)	59	45	38	33	27	24	21
PCB heat sink size (mm^2)	500	1000	1500	2000	3000	4000	5000



PACKAGE

5-Pin Surface Mount TO-263



	INCHES			MILLIMETERS		
	MIN	TYP	MAX	MIN	TYP	MAX
A	0.395	-	0.420	10.03	-	10.67
B	0.325	-	0.361	8.25	-	9.17
C	0.171	-	0.181	4.34	-	4.59
D	0.045	-	0.055	1.14	-	1.40
E	0.013	-	0.017	0.330	-	0.432
F	0.029	-	0.035	0.737	-	0.889
G	0.062	-	0.072	1.57	-	1.83
I	-	-	0.065	-	-	1.65
K	0.575		0.635	14.60		16.13
L	0.090		0.110	2.29		2.79
M	7°			7°		
N	3°			3°		

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