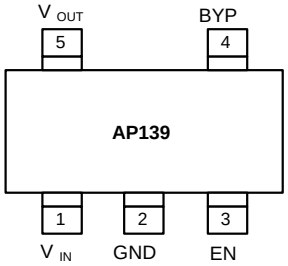
Pin Assignments

(Top View)

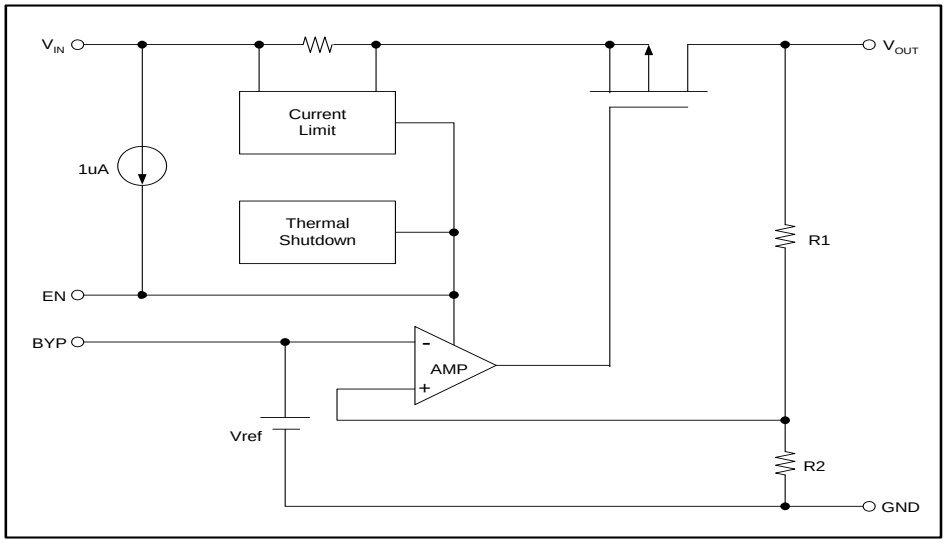


SOT25

Pin Descriptions

Pin Name	Pin No.	Description
V_{IN}	1	Power Supply
GND	2	Ground
EN	3	Enable Pin
BYP	4	Bypass Signal Pin
V_{OUT}	5	Output

Block Diagram



Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
V_{IN}	Input Voltage	+6	V
I_{OUT}	Output Current	$P_D/(V_{IN}-V_O)$	mA
V_{OUT}	Output Voltage	GND - 0.3 to V_{IN}+ 0.3	V
	ESD Classification	B	
T_{OP}	Operating Junction Temperature Range	-40 to +125	ºC
T_{MJ}	Maximum Junction Temperature	150	ºC
P_D	Internal Power Dissipation	250	mW

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Recommended Operating Conditions

Symbol	Parameter	Min	Max	Unit
V_{IN}	Input voltage	2.7	5.5	V
I_{OUT}	Output Current	0	300	mA
T_A	Operating Ambient Temperature	-40	85	°C

Electrical Characteristics (T_A = +25ºC, unless otherwise noted)

Symbol	Parameter	Test Conditions		Min	Typ.	Max	Unit
V_{IN}	Input Voltage			**Note 3**	-	5.5	V
I_Q	Quiescent Current	I_O = 0mA		-	45	60	µA
I_{STB}	Standby Current	V_{IN} = 5.0V, V_{OUT} = 0V, V_{EN} < V_{EL}		-	2.0	3.0	µA
V_{OUT}	Output Voltage Accuracy	I_O = 1mA, V_{IN} = 5V		-2	-	2	%
	V_{OUT} Temperature Coefficient			-	50	-	ppm/ºC
$V_{DROPOUT}$	Dropout Voltage	I_O = 1mA to 300mA, V_{OUT} = $V_{O(NOM)}$ - 1.5%	V_O ≥2.8V	-	-	0.45	V
I_{OUT}	Output Current			300	-	-	mA
I_{LIMIT}	Current Limit	V_{OUT} > 1.05V		300	450	-	mA
I_{short}	Short Circuit Current	V_{cc} = 5V, V_{out} < 1.05V		-	150	300	mA
△V_{LINE}	Line Regulation	I_{OUT} = 1mA, V_{IN} = (V_{OUT} +1V) to 5.5V		-	0.1	0.3	%
△V_{LOAD}	Load Regulation	I_O = 1mA to 300mA, V_{IN} = 5V		-	0.3	1	%
PSRR	Power Supply Rejection	I_O = 100mA, C_O = 2.2µF ceramic	f = 1KHz	-	60	-	dB
			f = 10KHz	-	50	-	
			f = 100KHz	-	40	-	
PSRR	Power Supply Rejection	I_O = 100mA, C_O = 2.2µF ceramic, C_{BYP} = 20nF	f = 1KHz	-	75	-	dB
			f = 10KHz	-	55	-	
			f = 100KHz	-	30	-	
V_{EH}	EN Input Threshold	Output ON		1.7	-	-	V
V_{EL}		Output OFF		-	-	0.8	V
I_{EN}	Enable Pin Current			-	-	<0.1	µA
OTS	Over Temperature Shutdown			-	130	-	ºC
OTH	Over Temperature Hysteresis			-	20	-	ºC
$θ_{JA}$	Thermal Resistance	SOT25 (Note 4)			226		ºC/W
$θ_{JC}$	Thermal Resistance	SOT25 (Note 4)			34		ºC/W

Notes: 3. $V_{IN(MIN)}$ = V_{OUT} + $V_{DROPOUT}$.
4. Test conditions for SOT25: Devices mounted on FR-4 PC board, MRP, 1 oz. copper, single sided, calibrate at T_J=85 ºC, measure at T_A=25 ºC, no heat Sink, no air flow.

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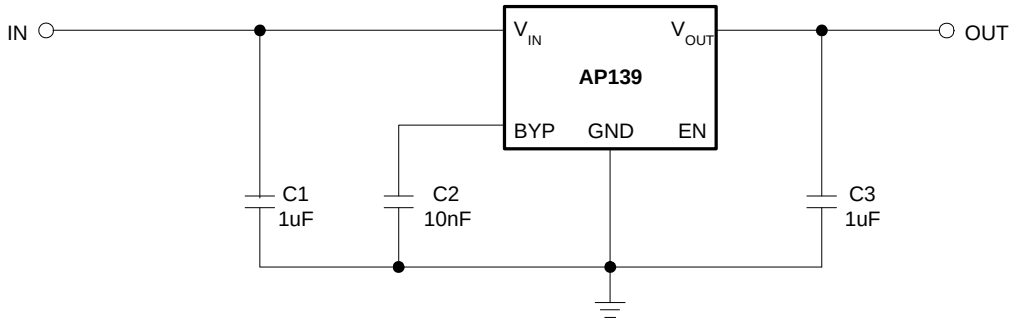
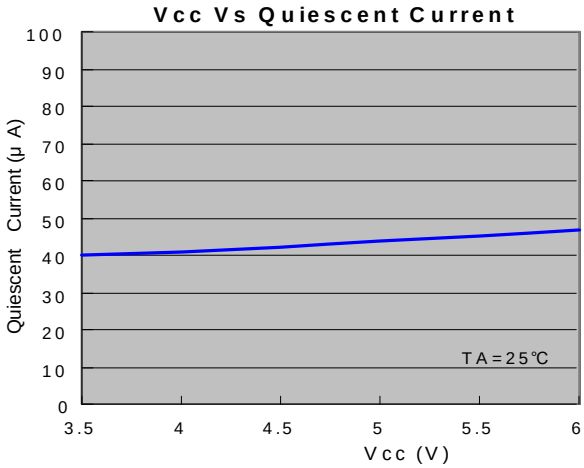
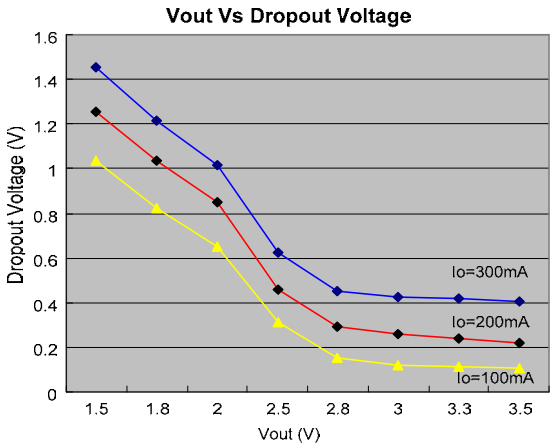
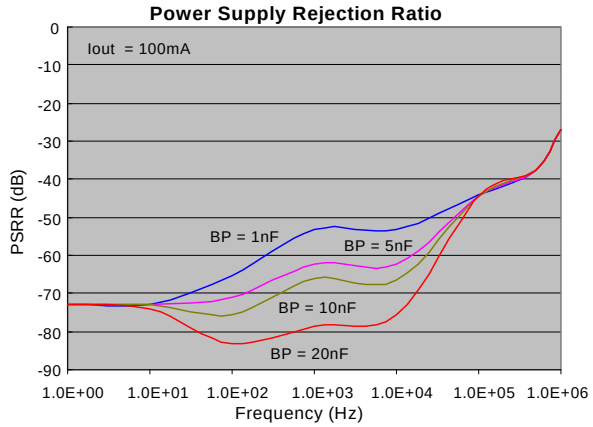
Typical Application

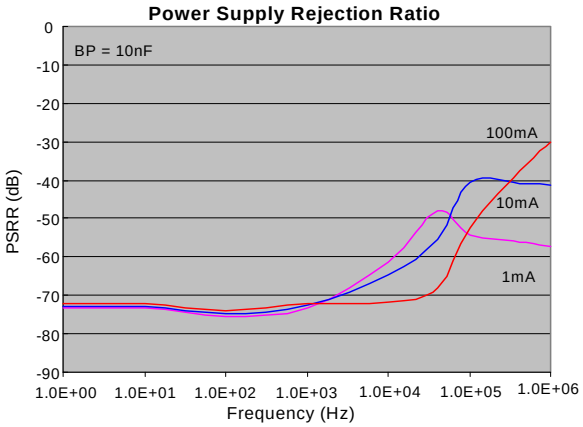


Typical Performance Characteristics









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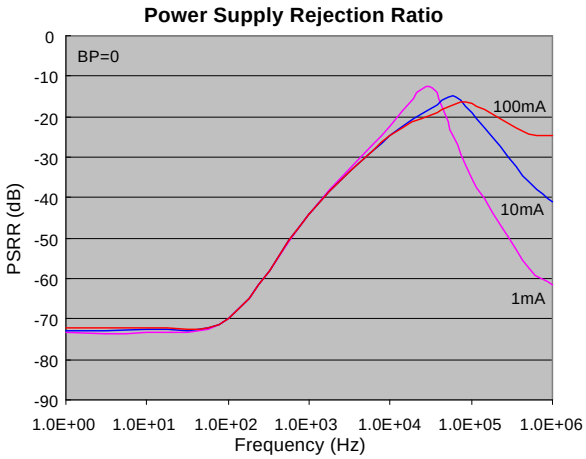
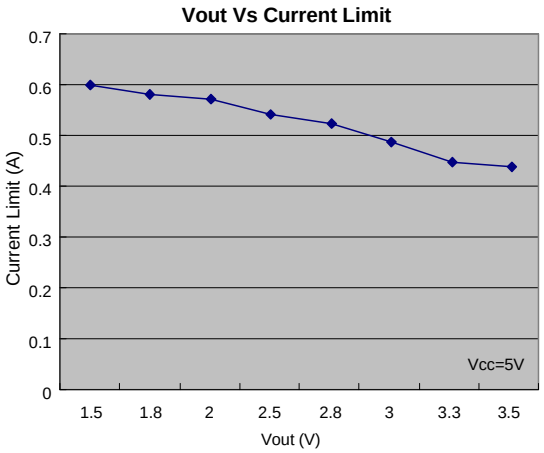
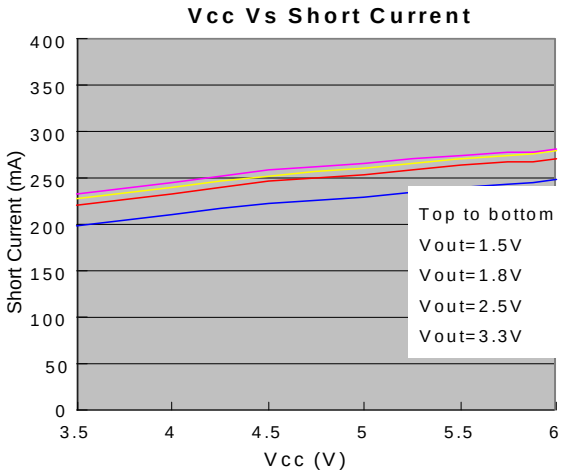
Typical Performance Characteristics (Continued)







Functional Description

The AP139 of CMOS regulators contain a PMOS pass transistor, voltage reference, error amplifier, over-current protection, thermal shutdown.

The P-channel pass transistor receives data from the error amplifier, over-current protection, and thermal protection circuits. During normal operation, the error amplifier compares the output voltage to a precision reference. The over-current and thermal shutdown circuits become active when the junction temperature exceeds 130°C, or the current exceeds 300mA. During thermal shutdown, the output voltage remains low. Normal operation is restored when the junction temperature drops below 110°C.

The AP139 switches from voltage mode to current mode when the load exceeds the rated output current. This prevents over-stress.

Enable
The enable pin normally floats high. When actively, pulled low, the PMOS pass transistor shuts off, and all internal circuits are powered down. In this state, the quiescent current is less than 2µA. This pin behaves much like an electronic switch.

External Capacitor
The AP139 is stable with a low ESR output capacitor to ground of 1.0µF or greater. It can keep stable even with higher ESR capacitors. A second capacitor is recommended between the input and ground to stabilize V_{IN}. The input capacitor should be larger than 0.1µF to have a beneficial effect. All capacitors should be placed in close proximity to the pins. A "quiet" ground termination is desirable.

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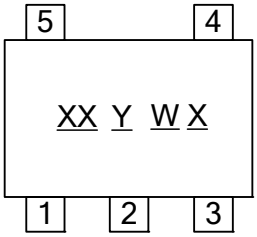
Marking Information

(1) SOT25

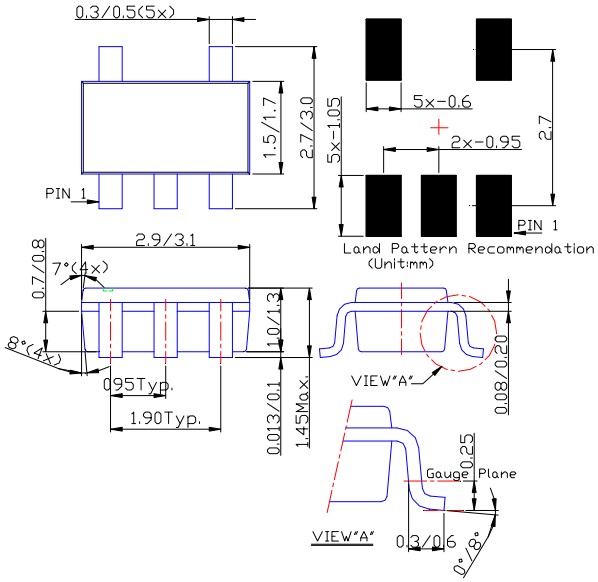
(Top View)



XX : Identification code
Y : Year 0~9
W : Week : A~Z : 1~26 week;
a~z : 27~52 week; z represents
52 and 53 week
X : a~z : Lead Free
A~Z : Green

Part Number	Package	Identification Code
AP139-15W	SOT25	N0
AP139-18W	SOT25	N1
AP139-20W	SOT25	N2
AP139-25W	SOT25	N3
AP139-28W	SOT25	N4
AP139-30W	SOT25	N5
AP139-33W	SOT25	N6
AP139-35W	SOT25	N7

Package Information (All Dimensions in mm)



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