

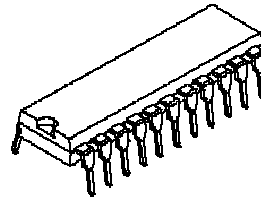
DUAL H BRIDGE DRIVER

■ GENERAL DESCRIPTION

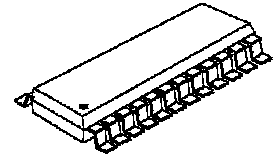
The NJM2670 is a general-purpose 60V dual H-bridge drive IC. It consists of a pair of H-bridges, a thermal shut down circuit and its alarm output. The alarm output can detect application problems and the system reliability will be significantly improved if monitored by Micro Processor.

Therefore, it is suitable for two-phase stepper motor application driven by microprocessor.

■ PACKAGE OUTLINE



NJM2670D2

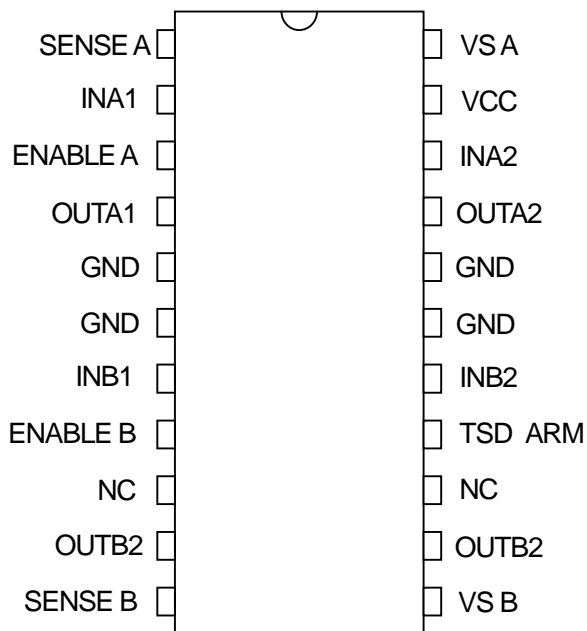


NJM2670E3

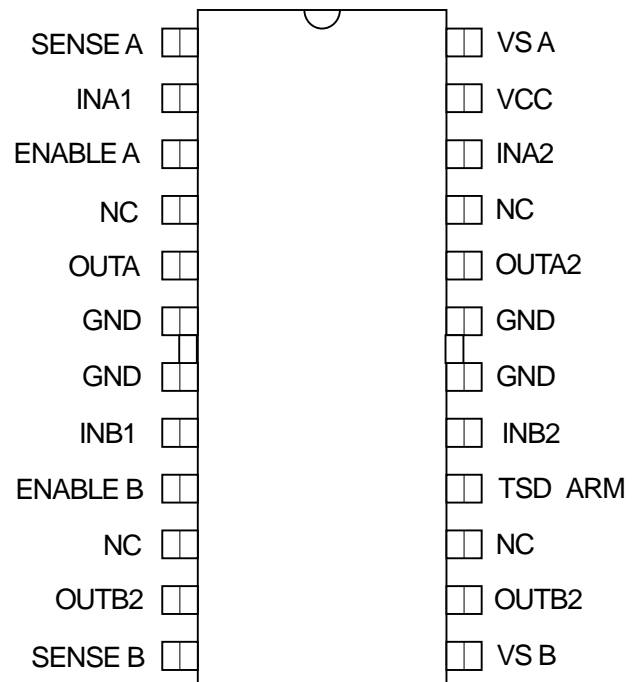
■ FEATURES

- Wide Voltage Range (4V to 60V)
- Wide Range of Current Control (5 to 1500mA)
- Thermal overload Protection
- Package Outline (DIP-22, EMP-24)

■ PIN CONNECTION



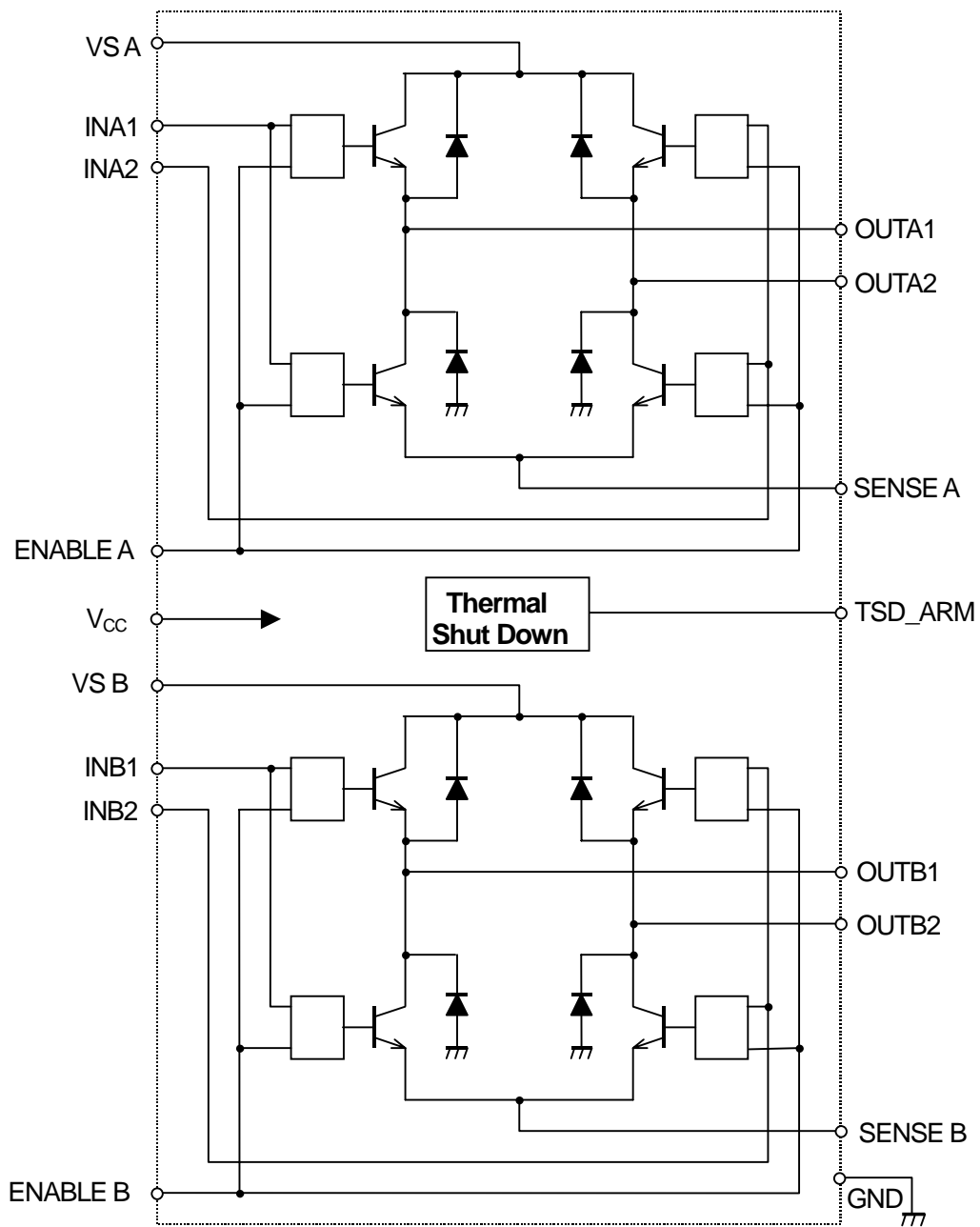
DIP-22



EMP-24

NJM2670

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Maximum Supply Voltage	V_{MM}	60	V
Logic Supply Voltage	V_{CC}	7	V
Input Voltage Range	V_{IN}	-0.3 to 7	V
Output Current	I_{OUT}	1.5	A
Power Dissipation@T(GND)=25°C	P_{D25}	5	W
Power Dissipation@T(GND)=125°C	P_{D125}	2	W
Operating Junction Temperature	T_{opr}	-40 ~ 85	°C
Storage Temperature	T_{stg}	-55 ~ 150	°C

■ RECOMENENDO OPERATING CONDITIONS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Supply Voltage	V_{MM}		4	-	55	V
Logic Voltage Range	V_{CC}		4.75	5.00	5.25	V
Maximum Output Current	I_{OUT}		-	-	1.3	A
Total Power Dissipation	P_D	$T_{GND}=25^\circ\text{C}$	-	-	5	W
	P_D	$T_{GND}=125^\circ\text{C}$	-	-	2.2	W

■ THERMAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Thermal resistance	$R_{th_{j-GND}}$	DIP22 package.	-	11	-	°C/W
	$R_{th_{j-A}}$	DIP22 package. Note	-	40	-	°C/W
	$R_{th_{j-GND}}$	EMP24 package.	-	13	-	°C/W
	$R_{th_{j-A}}$	EMP24 package. Note	-	42	-	°C/W

Note : All ground pins soldered onto a 20 cm² PCB copper area with free air convection, $T_A=+25^\circ\text{C}$

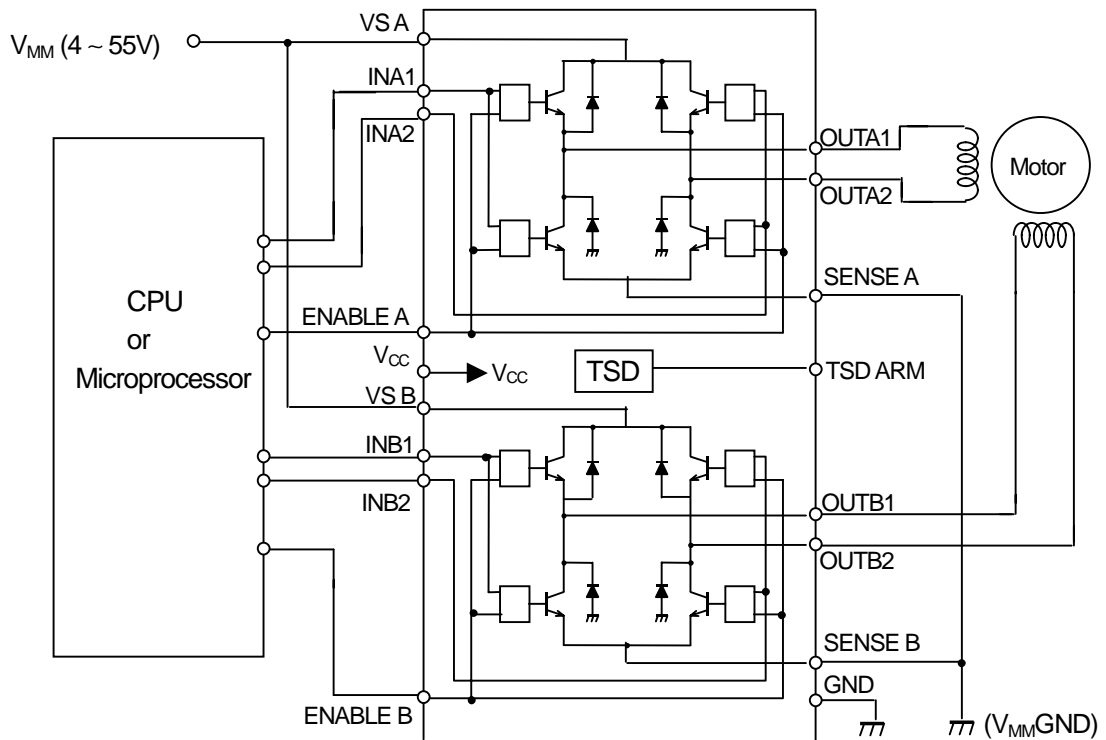
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■ ELECTRICAL CHARACTERISTICS

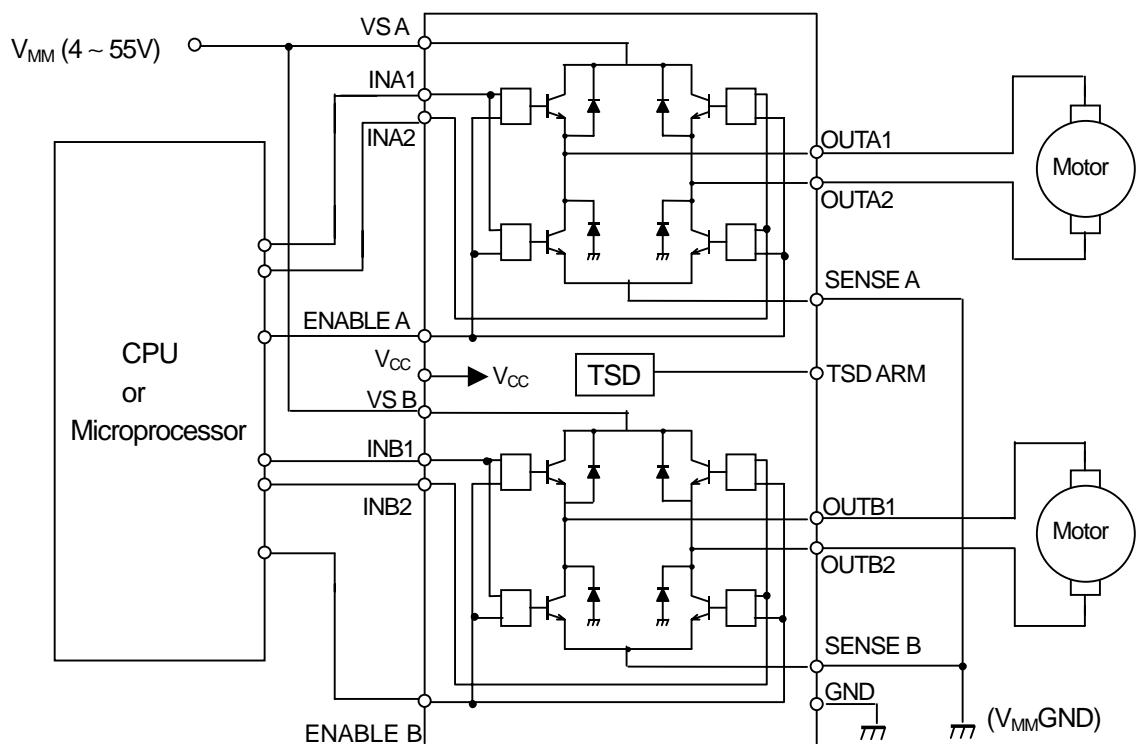
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
GENERAL						
Quiescent current	I _{cc}	Enable=H, IN1=IN3=L, IN2=IN4=H	-	40	-	mA
Thermal shutdown	T _{tsd}		-	170	-	°C
Off-State leak current	I _{tsd-LEAK}	TSD ARM=5V	-	-	50	μA
Thermal alarm output saturation	V _{tsd}	I _o =5mA	-	0.5	0.7	V
Dead time protection	T _d		-	1	-	μs
LOGIC						
Input LOW voltage	V _{IL}		-	-	0.6	V
Input HIGH voltage	V _{IH}		2	-	-	V
Input HIGH current	I _{iH}	V _i =2.4V	-	-	20	μA
Input LOW current	I _{iL}	V _i =0.4V	-0.4	-	-	mA
OUTPUT						
Upper transistor saturation	V _{OU1}	I _o =1000mA	-	1.3	1.5	V
	V _{OU2}	I _o =1300mA	-	1.5	1.8	V
Lower transistor saturation	V _{OL1}	I _o =1000mA	-	0.5	0.8	V
	V _{OL2}	I _o =1300mA	-	0.8	1.3	V
Upper diode forward	V _{FU1}	I _o =1000mA	-	1.3	1.6	V
	V _{FU2}	I _o =1300mA	-	1.6	1.9	V
Lower diode forward	V _{FL1}	I _o =1000mA	-	1.3	1.6	V
	V _{FL2}	I _o =1300mA	-	1.6	1.9	V
Output leakage current	I _{LO-LEAK}	V _{MM} =50V	-	-	1	mA
Upper diode recovery time	T _{rrU}		-	250	-	ns
Lower diode recovery time	T _{rrL}		-	250	-	ns

■ TYPICAL APPLICATION

1). Bipolar Stepping Motor



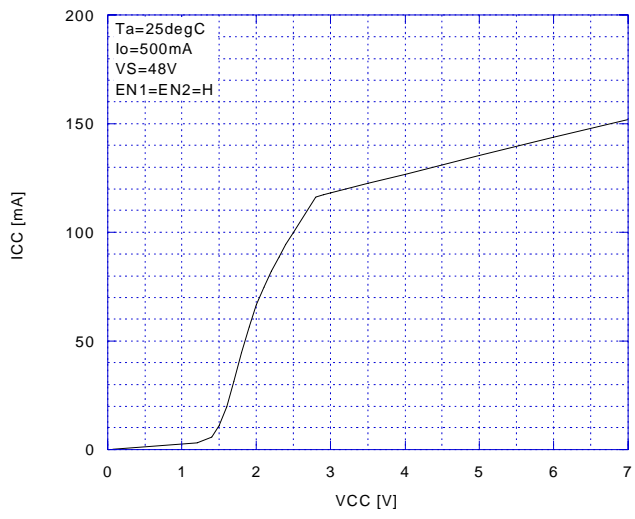
2). Single Phase DC Motor



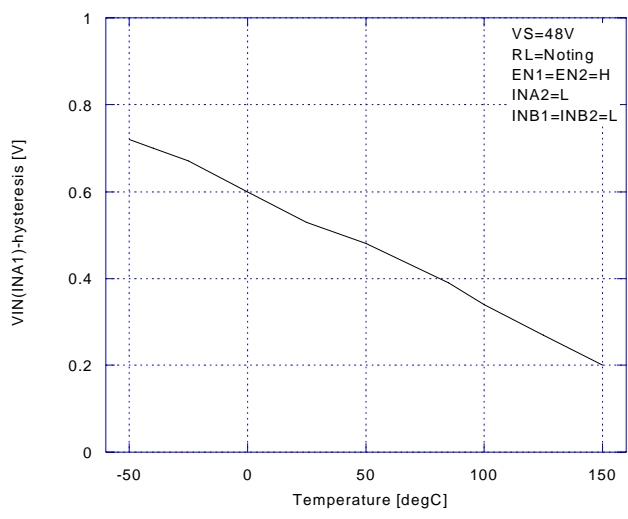
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TYPICAL APPLICATION 1

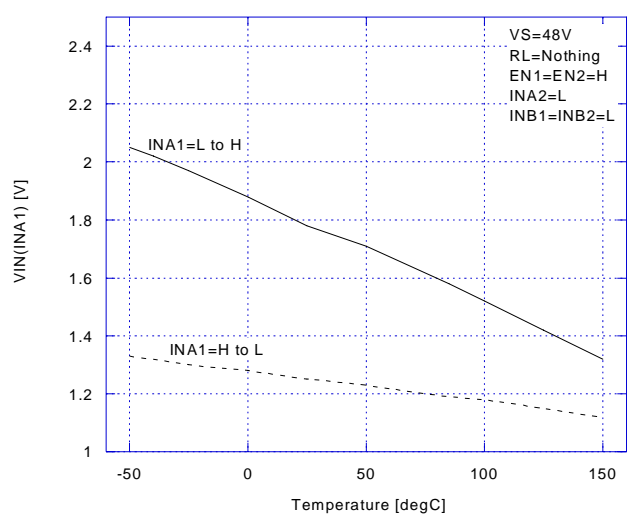
ICC vs. VCC



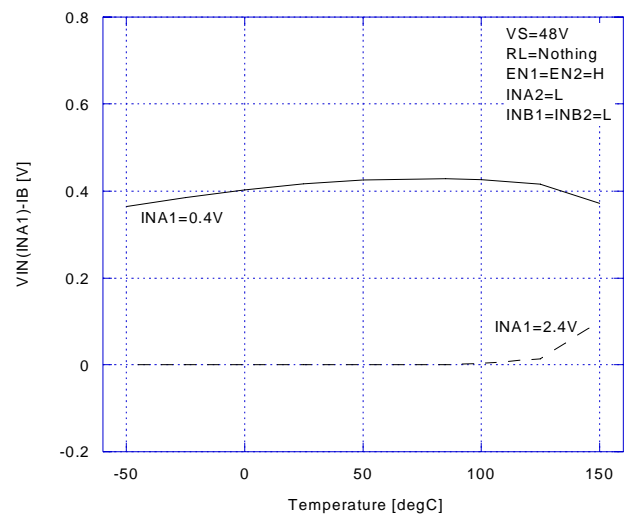
VIN(INA1)-hysteresis vs. Temperature



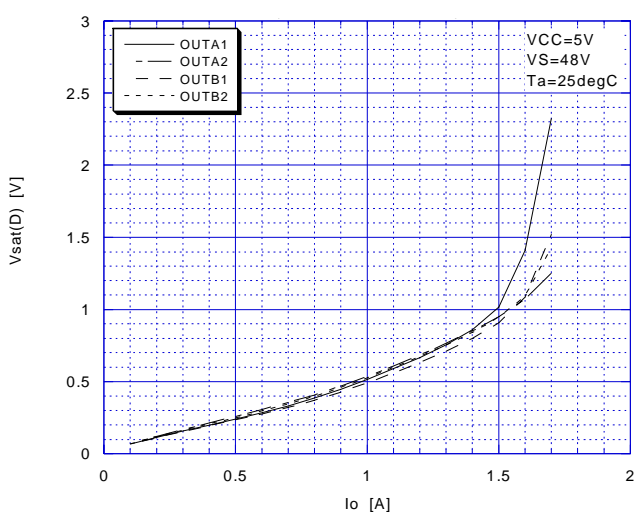
VIN(INA1) vs. Temperature



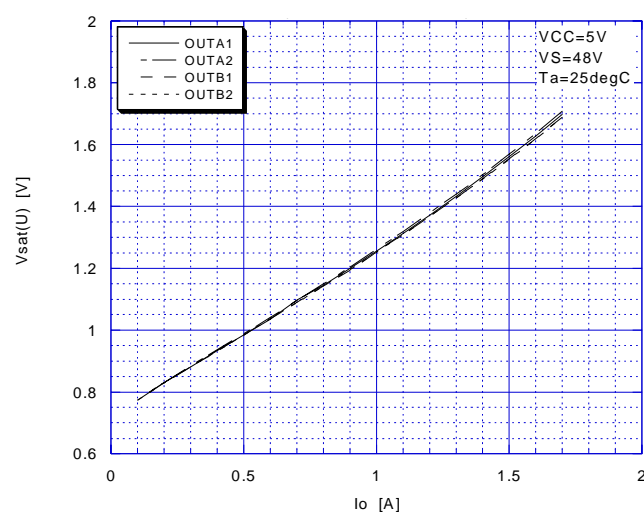
VIN(INA1)-IB vs. Temperature



Vsat(D) vs. Io

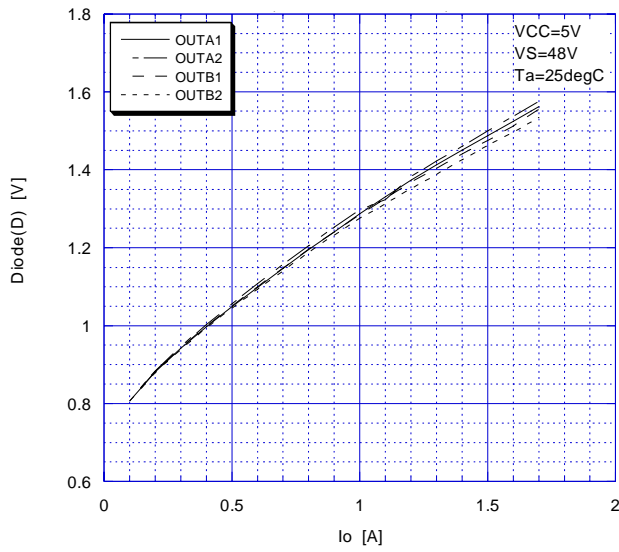


Vsat(U) vs. Io

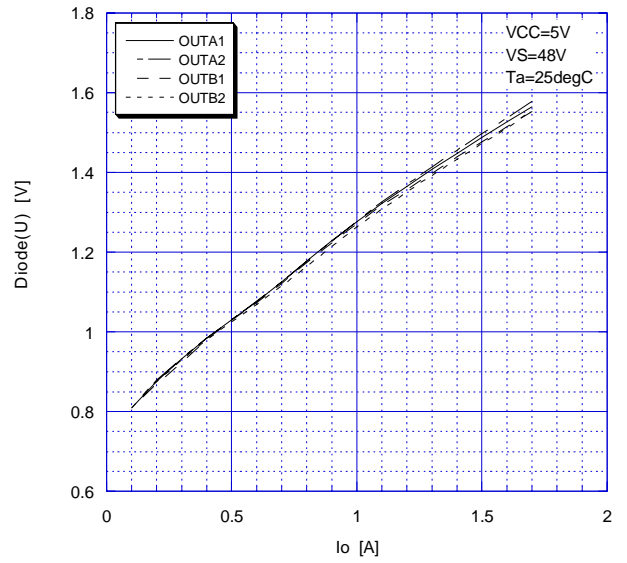


■ TYPICAL APPLICATION 2

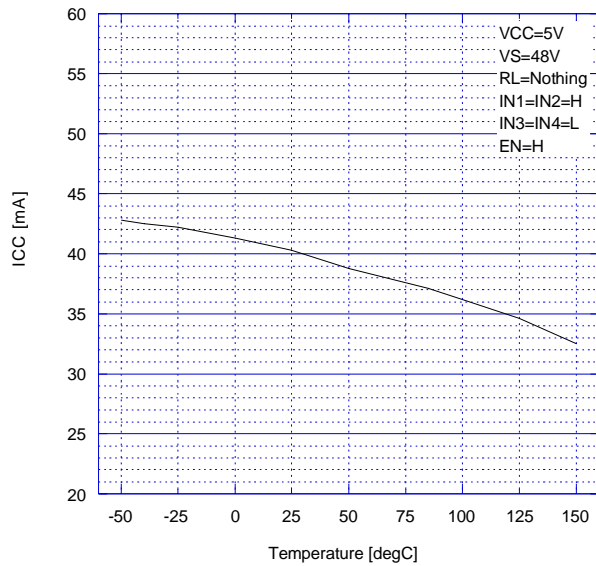
Diode(D) vs. I_o



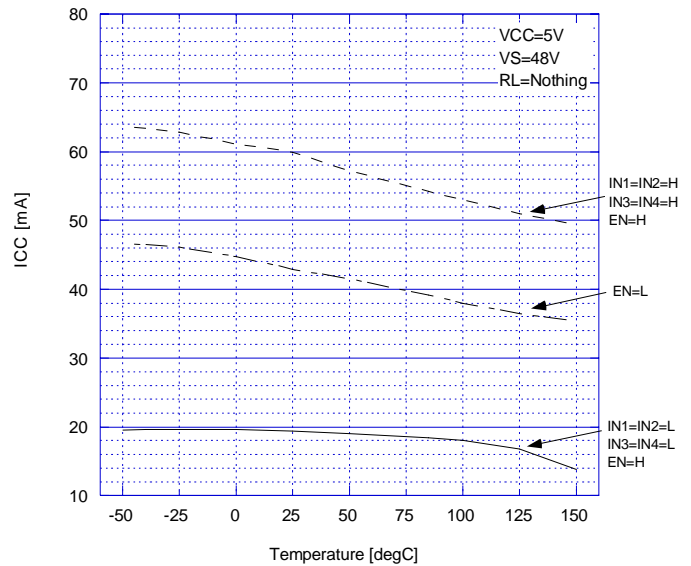
Diode(U) vs. I_o



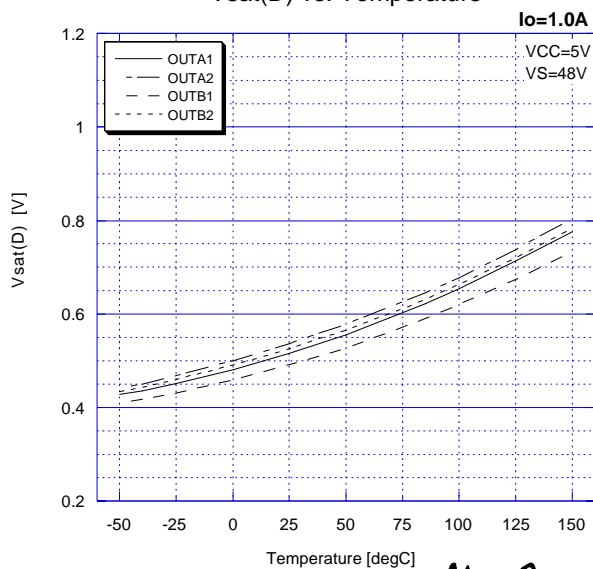
ICC vs. Temperature



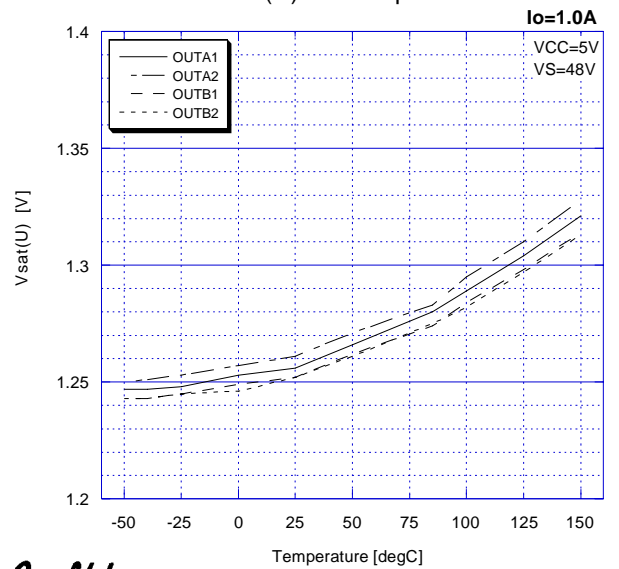
ICC vs. Temperature



Vsat(D) vs. Temperature

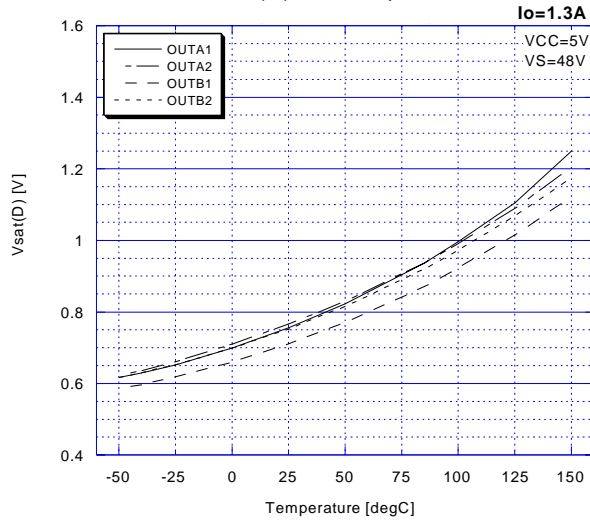


Vsat(U) vs. Temperature

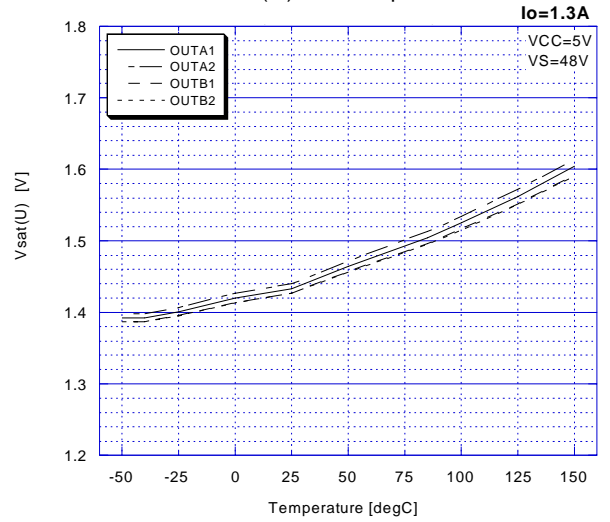


■ TYPICAL APPLICATION 3

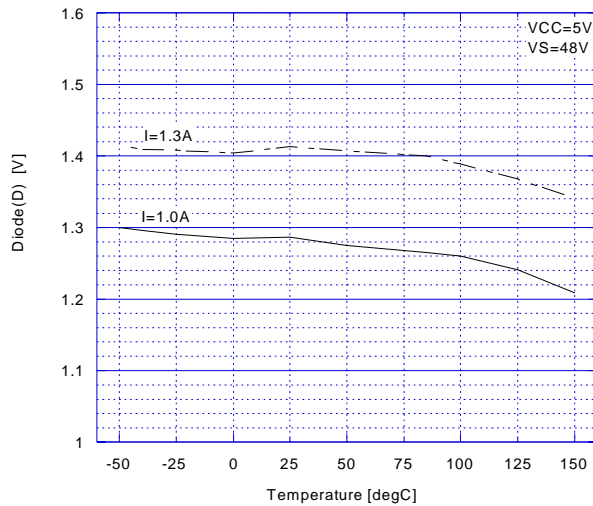
Vsat(D) vs. Temperature



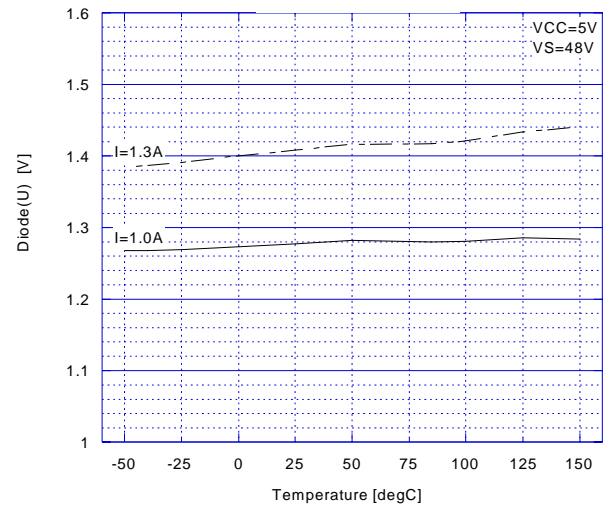
Vsat(U) vs. Temperature



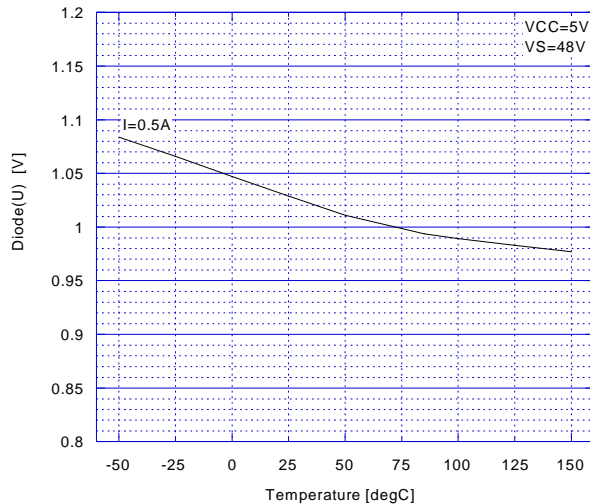
Diode(D) vs. Temperature



Diode(U) vs. Temperature



Diode(U) vs. Temperature



[CAUTION]

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