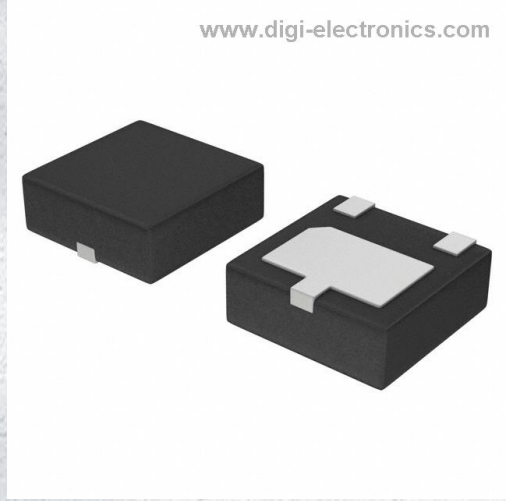
NSS20500UW3TBG Datasheet



DiGi Electronics Part Number	NSS20500UW3TBG-DG
Manufacturer	onsemi
Manufacturer Product Number	NSS20500UW3TBG
Description	TRANS PNP 20V 5A 3WDFN
Detailed Description	Bipolar (BJT) Transistor PNP 20 V 5 A 100MHz 875 m W Surface Mount 3-WDFN (2x2)

https://www.DiGi-Electronics.com

Tel: +00 852-30501935

RFQ Email: Info@DiGi-Electronics.com

Purchase and inquiry

Manufacturer Product Number:	Manufacturer:
NSS20500UW3TBG	onsemi
Series:	Product Status:
-	Active
Transistor Type:	Current - Collector (Ic) (Max):
PNP	5 A
Voltage - Collector Emitter Breakdown (Max):	Vce Saturation (Max) @ Ib, Ic:
20 V	260mV @ 400mA, 4A
Current - Collector Cutoff (Max):	DC Current Gain (hFE) (Min) @ Ic, Vce:
100nA (ICBO)	200 @ 2A, 2V
Power - Max:	Frequency - Transition:
875 mW	100MHz
Operating Temperature:	Mounting Type:
-55°C ~ 150°C (TJ)	Surface Mount
Package / Case:	Supplier Device Package:
3-WDFN Exposed Pad	3-WDFN (2x2)
Base Product Number:	
NSS20500	

Environmental & Export classification

RoHS Status:	Moisture Sensitivity Level (MSL):
ROHS3 Compliant	1 (Unlimited)
REACH Status:	ECCN:
REACH Unaffected	EAR99
HTSUS:	
8541.21.0075	

onsemi

DATA SHEET
www.onsemi.com

20 V, 7.0 A, Low $V_{CE(sat)}$ PNP Transistor NSS20500UW3

onsemi's e^2PowerEdge family of low $V_{CE(sat)}$ transistors are miniature surface mount devices featuring ultra low saturation voltage ($V_{CE(sat)}$) and high current gain capability. These are designed for use in low voltage, high speed switching applications where affordable efficient energy control is important.

Typical applications are DC−DC converters and power management in portable and battery powered products such as cellular and cordless phones, PDAs, computers, printers, digital cameras and MP3 players. Other applications are low voltage motor controls in mass storage products such as disc drives and tape drives. In the automotive industry they can be used in air bag deployment and in the instrument cluster. The high current gain allows e^2PowerEdge devices to be driven directly from PMU's control outputs, and the Linear Gain (Beta) makes them ideal components in analog amplifiers.

- This is a Pb−Free Device

MAXIMUM RATINGS (T_A = 25°C)

Rating	Symbol	Max	Unit
Collector-Emitter Voltage	V_{CEO}	−20	Vdc
Collector-Base Voltage	V_{CBO}	−20	Vdc
Emitter-Base Voltage	V_{EBO}	−7.0	Vdc
Collector Current − Continuous	I_C	−5.0	Adc
Collector Current − Peak	I_{CM}	−7.0	A
Electrostatic Discharge	ESD	HBM Class 3B MM Class C	

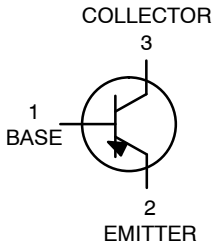
THERMAL CHARACTERISTICS

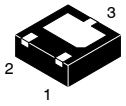
Characteristic	Symbol	Max	Unit
Total Device Dissipation, T_A = 25°C Derate above 25°C (Note 1)	P_D	875 7.0	mW mW/°C
Thermal Resistance, Junction−to−Ambient (Note 1)	$R_{\theta JA}$	143	°C/W
Total Device Dissipation, T_A = 25°C Derate above 25°C (Note 2)	P_D	1.5 11.8	W mW/°C
Thermal Resistance, Junction−to−Ambient (Note 2)	$R_{\theta JA}$	85	°C/W
Thermal Resistance, Junction−to−Lead #1 (Note 2)	$R_{\theta JL}$	23	°C/W
Total Device Dissipation (Single Pulse < 10 sec) (Notes 2, 3)	$P_{Dsingle}$	3.0	W
Junction and Storage Temperature Range	T_J, T_{stg}	−55 to +150	°C
Operating Case Temperature (Note 1)	T_C	−55 to +125	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. FR−4 @ 100 mm^2, 1 oz copper traces.
2. FR−4 @ 500 mm^2, 1 oz copper traces.
3. Thermal response.

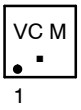
−20 VOLTS
7.0 AMPS
PNP LOW $V_{CE(sat)}$ TRANSISTOR
EQUIVALENT $R_{DS(on)}$ 50 mΩ





WDFN3
CASE 506AU

MARKING DIAGRAM



VC = Specific Device Code
M = Date Code
▪ = Pb−Free Package

ORDERING INFORMATION

Device	Package	Shipping†
NSS20500UW3T2G	WDFN3 (Pb−Free)	3000/ Tape & Reel
NSS20500UW3TBG	WDFN3 (Pb−Free)	3000/ Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

NSS20500UW3

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typical	Max	Unit
OFF CHARACTERISTICS					
Collector – Emitter Breakdown Voltage (I_C = −10 mAdc, I_B = 0)	$V_{(BR)CEO}$	−20	–	–	Vdc
Collector – Base Breakdown Voltage (I_C = −0.1 mAdc, I_E = 0)	$V_{(BR)CBO}$	−20	–	–	Vdc
Emitter – Base Breakdown Voltage (I_E = −0.1 mAdc, I_C = 0)	$V_{(BR)EBO}$	−7.0	–	–	Vdc
Collector Cutoff Current (V_{CB} = −20 Vdc, I_E = 0)	I_{CBO}	–	–	−0.1	μAdc
Emitter Cutoff Current (V_{EB} = −7.0 Vdc)	I_{EBO}	–	–	−0.1	μAdc
ON CHARACTERISTICS					
DC Current Gain (Note 4) (I_C = −10 mA, V_{CE} = −2.0 V) (I_C = −500 mA, V_{CE} = −2.0 V) (I_C = −1.0 A, V_{CE} = −2.0 V) (I_C = −2.0 A, V_{CE} = −2.0 V) (I_C = −3.0 A, V_{CE} = −2.0 V)	h_{FE}	 250 250 220 200 180	 – – 300 300 250	 – – – – –	
Collector – Emitter Saturation Voltage (Note 4) (I_C = −0.1 A, I_B = −0.010 A) (Note 5) (I_C = −1.0 A, I_B = −0.100 A) (I_C = −1.0 A, I_B = −0.010 A) (I_C = −2.0 A, I_B = −0.020 A) (I_C = −3.0 A, I_B = −0.030 A) (I_C = −4.0 A, I_B = −0.400 A)	$V_{CE(sat)}$	 – – – – – –	 −0.010 −0.050 −0.080 −0.150 −0.200 −0.270	 −0.015 −0.070 −0.100 −0.170 −0.240 −0.260	V
Base – Emitter Saturation Voltage (Note 4) (I_C = −1.0 A, I_B = −0.01 A)	$V_{BE(sat)}$	–	0.76	−0.900	V
Base – Emitter Turn−on Voltage (Note 4) (I_C = −2.0 A, V_{CE} = −3.0 V)	$V_{BE(on)}$	–	0.80	−0.900	V
Cutoff Frequency (I_C = −100 mA, V_{CE} = −5.0 V, f = 100 MHz)	f_T	100	–	–	MHz
Input Capacitance (V_{EB} = −0.5 V, f = 1.0 MHz)	Cibo	–		475	pF
Output Capacitance (V_{CB} = −3.0 V, f = 1.0 MHz)	Cobo	–		180	pF
SWITCHING CHARACTERISTICS					
Delay (V_{CC} = −15 V, I_C = 750 mA, I_{B1} = 15 mA)	t_d	–	–	75	ns
Rise (V_{CC} = −15 V, I_C = 750 mA, I_{B1} = 15 mA)	t_r	–	–	160	ns
Storage (V_{CC} = −15 V, I_C = 750 mA, I_{B1} = 15 mA)	t_s	–	–	350	ns
Fall (V_{CC} = −15 V, I_C = 750 mA, I_{B1} = 15 mA)	t_f	–	–	160	ns

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

4. Pulsed Condition: Pulse Width = 300 μsec, Duty Cycle ≤ 2%.
5. Guaranteed by design but not tested.

NSS20500UW3

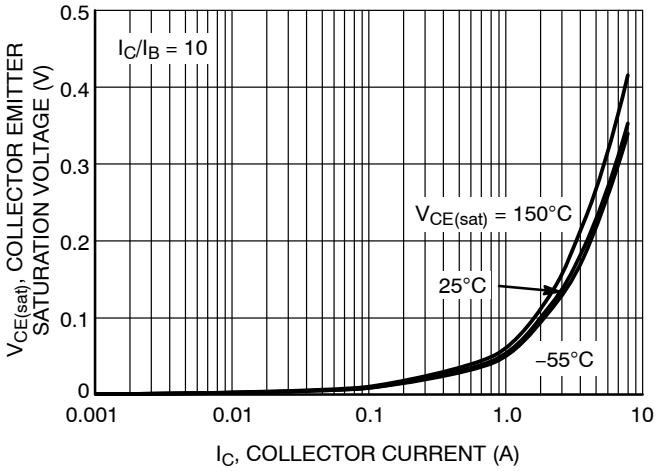


Figure 1. Collector Emitter Saturation Voltage vs. Collector Current

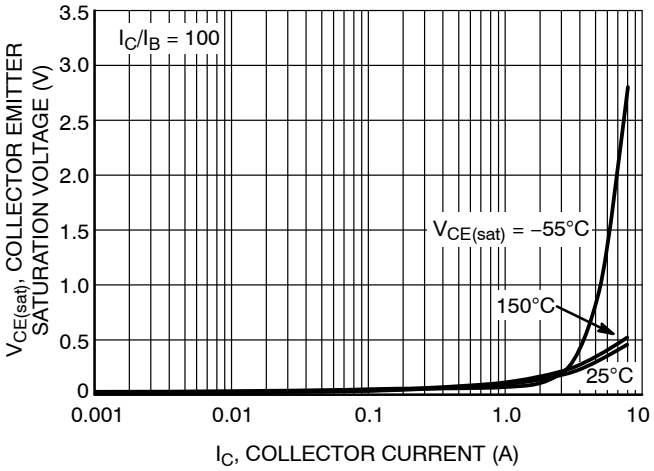


Figure 2. Collector Emitter Saturation Voltage vs. Collector Current

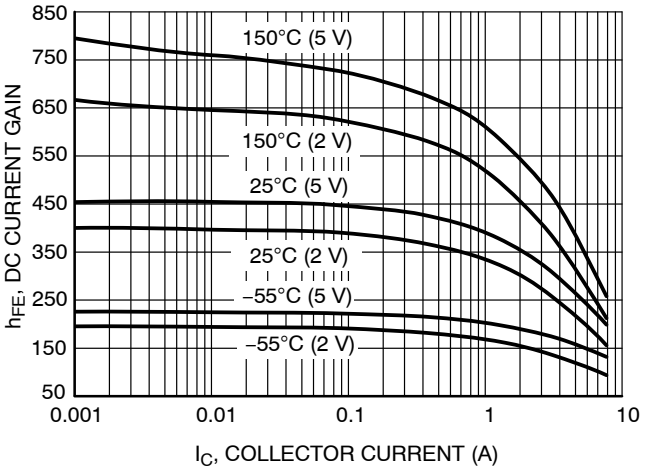


Figure 3. DC Current Gain vs. Collector Current

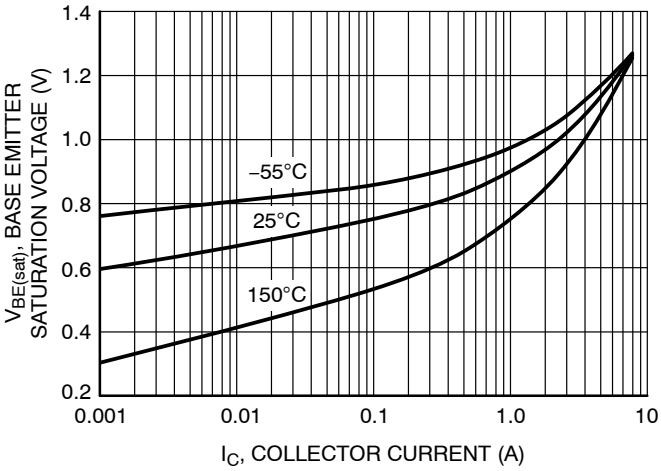


Figure 4. Base Emitter Saturation Voltage vs. Collector Current

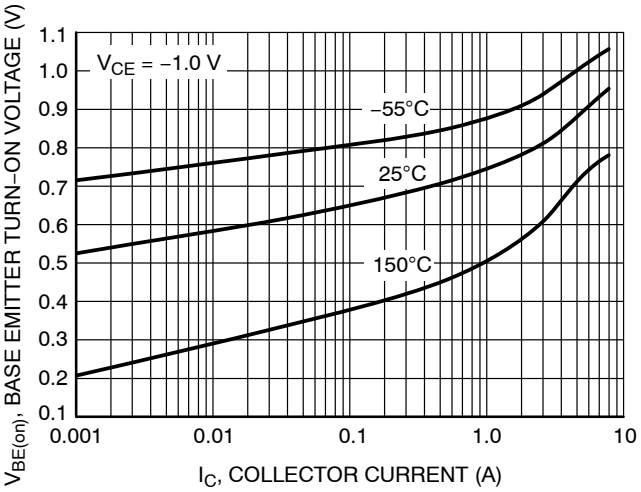


Figure 5. Base Emitter Turn−On Voltage vs. Collector Current

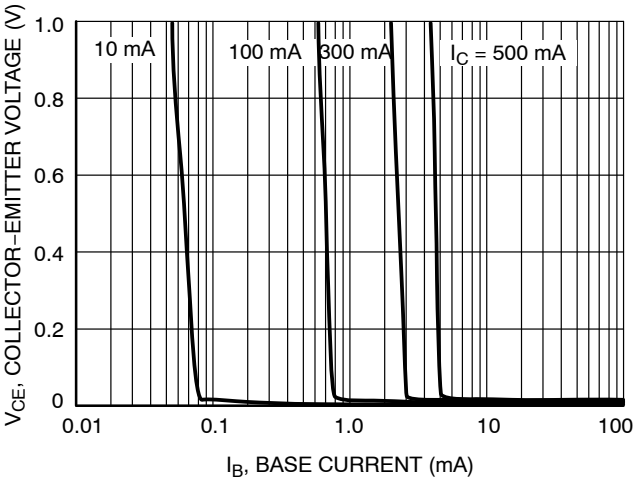


Figure 6. Saturation Region

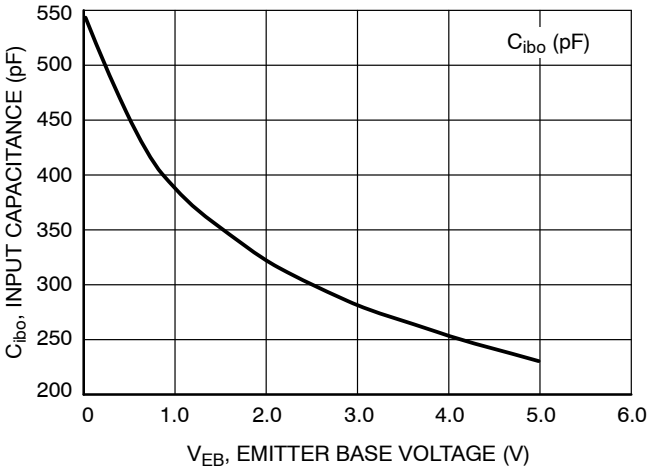


Figure 7. Input Capacitance

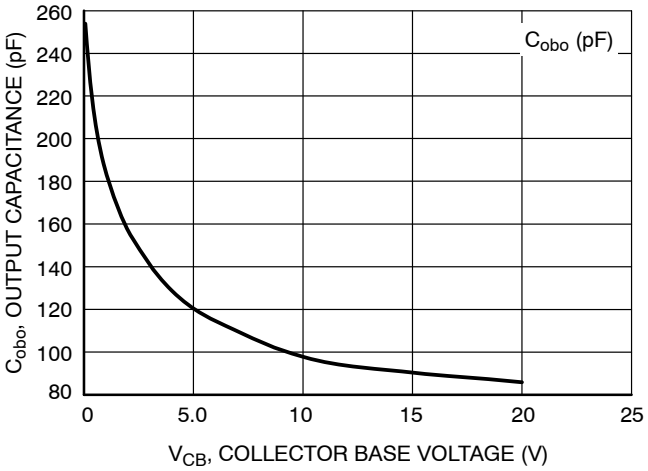


Figure 8. Output Capacitance

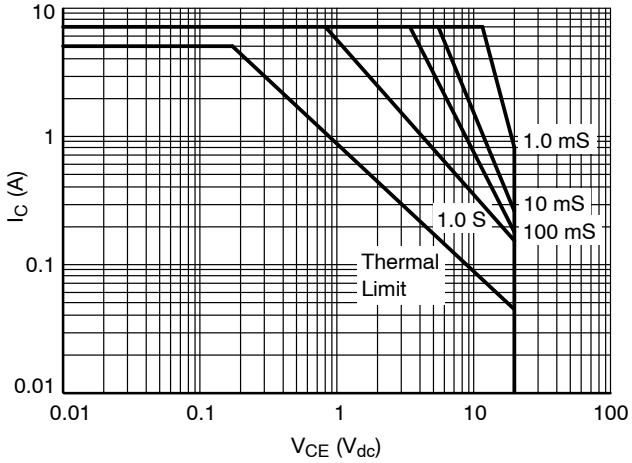
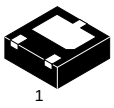


Figure 9. PNP Safe Operating Area

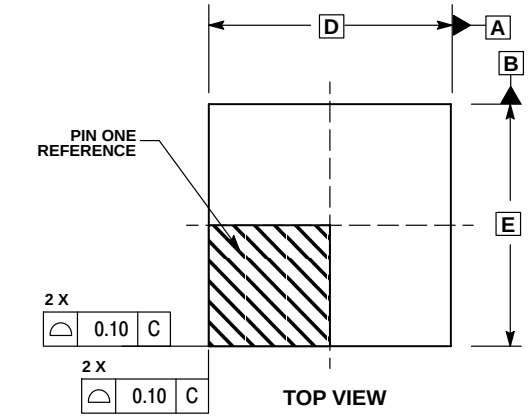
MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS

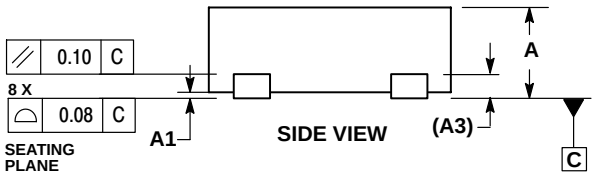


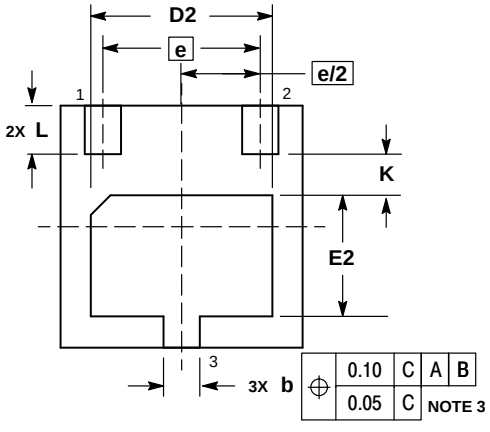
WDFN3 2x2, 1.3P
CASE 506AU
ISSUE A

DATE 18 AUG 2016

SCALE 4:1







NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994 .
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.25 AND 0.30 MM FROM TERMINAL.
4. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.

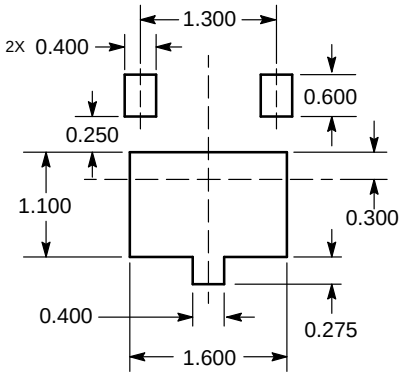
	MILLIMETERS			INCHES		
DIM	MIN	NOM	MAX	MIN	NOM	MAX
A	0.70	0.75	0.80	0.028	0.030	0.031
A1	0.00		0.05	0.000		0.002
A3		0.20 REF			0.008 REF	
b	0.25	0.30	0.35	0.010	0.012	0.014
D		2.00 BSC			0.079 BSC	
D2	1.40	1.50	1.60	0.055	0.059	0.063
E		2.00 BSC			0.079 BSC	
E2	0.90	1.00	1.10	0.035	0.039	0.043
e		1.30 BSC			0.051 BSC	
K		0.35 REF			0.014 REF	
L	0.35	0.40	0.45	0.014	0.016	0.018

GENERIC MARKING DIAGRAM*

XX = Specific Device Code
M = Date Code

*This information is generic. Please refer to device data sheet for actual part marking.
Pb−Free indicator, “G” or microdot “ ▪”, may or may not be present.

SOLDERING FOOTPRINT*



DIMENSIONS: MILLIMETERS

*For additional information on our Pb−Free strategy and soldering details, please download the **onsemi** Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

DOCUMENT NUMBER:	**98AON21416D**	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped “CONTROLLED COPY” in red.	
DESCRIPTION:	**WDFN3 2X2, 1.3P**		**PAGE 1 OF 1**

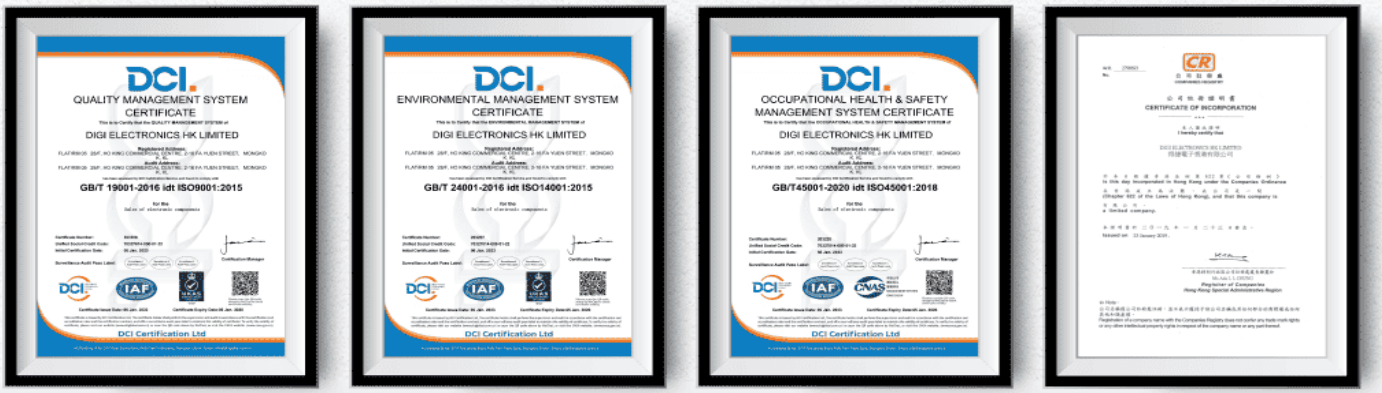
ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:
Technical Library: www.onsemi.com/design/resources/technical−documentation
onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support
For additional information, please contact your local Sales Representative at www.onsemi.com/support/sales

OUR CERTIFICATE

DiGi provide top-quality products and perfect service for customer worldwide through standardization, technological innovation and continuous improvement. DiGi through third-party certification, we striciy control the quality of products and services. Welcome your RFQ to Email: Info@DiGi-Electronics.com



Tel: +00 852-30501935

RFQ Email: Info@DiGi-Electronics.com

DiGi is a global authorized distributor of electronic components.