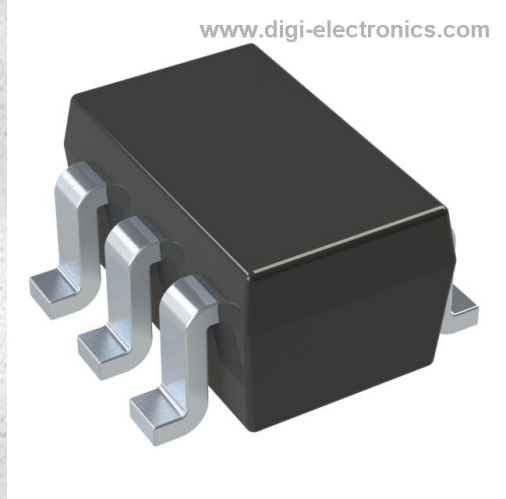
DRDN005W-7 Datasheet



https://www.DiGi-Electronics.com

DiGi Electronics Part Number	DRDN005W-7-DG
Manufacturer	Diodes Incorporated
Manufacturer Product Number	DRDN005W-7
Description	TRANS NPN 80V 0.5A SOT363
Detailed Description	Bipolar (BJT) Transistor NPN + Diode (Isolated) 80 V 500 mA 100MHz 200 mW Surface Mount SOT-363

Tel: +00 852-30501935

RFQ Email: Info@DiGi-Electronics.com

Purchase and inquiry

Manufacturer Product Number:	Manufacturer:
DRDN005W-7	Diodes Incorporated
Series:	Product Status:
-	Obsolete
Transistor Type:	Current - Collector (Ic) (Max):
NPN + Diode (Isolated)	500 mA
Voltage - Collector Emitter Breakdown (Max):	Vce Saturation (Max) @ Ib, Ic:
80 V	250mV @ 10mA, 100mA
Current - Collector Cutoff (Max):	DC Current Gain (hFE) (Min) @ Ic, Vce:
100nA	100 @ 100mA, 1V
Power - Max:	Frequency - Transition:
200 mW	100MHz
Operating Temperature:	Mounting Type:
-55°C ~ 150°C (TJ)	Surface Mount
Package / Case:	Supplier Device Package:
6-TSSOP, SC-88, SOT-363	SOT-363
Base Product Number:	
DRDN005	

Environmental & Export classification

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

Lead-free Green

DRD (xxxx) W

COMPLEX ARRAY FOR RELAY DRIVERS

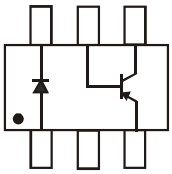
Features and Benefits

- Epitaxial Planar Die Construction
- One Transistor and One Switching Diode in One Package
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please contact us or your local Diodes representative. https://www.diodes.com/quality/product-definitions/**

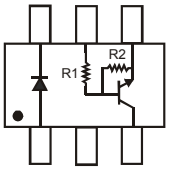
Mechanical Data

- Case: SOT-363
- Case Material: Molded Plastic. "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish - Matte Tin annealed over Alloy 42 lead-frame. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.008 grams (approximate)

Top View



DRDP006W



DRDNB16W

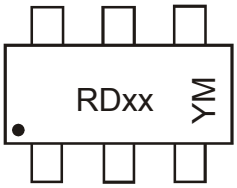
R1 = 1K Ω
R2 = 10K Ω

Ordering Information (Note 4)

Device	Compliance	Packaging	Shipping
DRDP006W-7	Commercial	SOT-363	3000/Tape & Reel
DRDNB16W-7	Commercial	SOT-363	3000/Tape & Reel

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
2. See https://www.diodes.com/quality/lead-free/ for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
4. For packaging details, go to our website at https://www.diodes.com/design/support/packaging/diodes-packaging/.

Marking Information



RDxx = Product Type Marking Code:
RD02 = DRDP006W
RD03 = DRDNB16W
YM = Date Code Marking
Y = Year (ex: I = 2021)
M = Month (ex: 9 = September)

Date Code Key

Year	2005	…..	2021	2022	2023	2024	2025	2026
Code	S	…..	I	J	K	L	M	N

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

Maximum Ratings, Total Device @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P_D	200	mW
Thermal Resistance, Junction to Ambient Air (Note 5)	$R_{\theta JA}$	625	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

Maximum Ratings, DRDP006W PNP Transistor @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	-60	V
Collector-Emitter Voltage	V_{CEO}	-60	V
Emitter-Base Voltage	V_{EBO}	-5.0	V
Collector Current (Note 5)	I_C	-600	mA

Maximum Ratings, DRDNB16W Pre-Biased NPN Transistor @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Supply Voltage	V_{CC}	50	V
Input Voltage	V_{IN}	-5 to +10	V
Output Current	I_C	600	mA

Maximum Ratings, Switching Diode @T_A = 25°C unless otherwise specified

Characteristic		Symbol	Value	Unit
Non-Repetitive Peak Reverse Voltage		V_{RM}	100	V
Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage		V_{RRM} V_{RWM} V_R	75	V
RMS Reverse Voltage		$V_{R(RMS)}$	53	V
Forward Continuous Current (Note 5)		I_{FM}	500	mA
Average Rectified Output Current (Note 5)		I_O	250	mA
Non-Repetitive Peak Forward Surge Current	@ t = 1.0μs @ t = 1.0s	I_{FSM}	4.0 1.0	A

Note: 5. Device mounted on FR-4 PCB, 1 inch square 2oz copper pad area.

Electrical Characteristics, DRDP006W PNP Transistor @T_A = 25°C unless otherwise specified

Characteristic (Note 6)	Symbol	Min	Typ	Max	Unit	Test Condition
DC Current Gain	h_{FE}	—	100	300	—	I_C = -150mA, V_{CE} = -10V
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	—	—	-0.4	V	I_C = -150mA, I_B = -15mA
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	-60	—	—	V	I_C = -10μA, I_E = 0
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	-60	—	—	V	I_C = -10mA, I_B = 0
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	-5	—	—	V	I_E = -10μA, I_C = 0
Collector Cutoff Current	I_{CBO}	—	—	-10	nA	V_{CB} = -50V, I_E = 0
Current Gain-Bandwidth Product	f_T	—	200	—	MHz	V_{CE} = -20V, I_C = -50mA, f = 100MHz
Capacitance	C_{obo}	—	—	8	pF	V_{CB} = -10V, I_E = 0, f = 1MHz

Electrical Characteristics, DRDNB16W Pre-Biased NPN Transistor @T_A = 25°C unless otherwise specified

Characteristic (Note 6)	Symbol	Min	Typ	Max	Unit	Test Condition
Input Voltage	$V_{I(off)}$	0.3	—	—	V	V_{CC} = 5V, I_O = 100μA
	$V_{I(on)}$	—	—	2.0	V	V_O = 0.3V, I_O = 20mA
Output Voltage	$V_{O(on)}$	—	—	0.3	V	I_O/I_I = 50mA/2.5mA
Input Current	I_I	—	—	7.2	mA	V_I = 5V
Output Current	$I_{O(off)}$	—	—	0.5	μA	V_{CC} = 50V, V_I = 0V
DC Current Gain	G_I	56	—	—	—	V_O = 5V, I_O = 50mA
Gain-Bandwidth Product	f_T	—	200	—	MHz	V_{CE} = 10V, I_E = 5mA, f = 100MHz

Electrical Characteristics, Switching Diode @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Min	Max	Unit	Test Condition
Reverse Breakdown Voltage (Note 6)	$V_{(BR)R}$	75	—	—	I_R = 10μA
Forward Voltage	V_F	0.62 — — —	0.72 0.855 1.0 1.25	V	I_F = 5.0mA I_F = 10mA I_F = 100mA I_F = 150mA
Reverse Current (Note 6)	I_R	—	2.5 50 30 25	μA μA μA nA	V_R = 75V V_R = 75V, T_J = 150°C V_R = 25V, T_J = 150°C V_R = 20V
Total Capacitance	C_T	—	4.0	pF	V_R = 0, f = 1.0MHz
Reverse Recovery Time	t_{rr}	—	4.0	ns	I_F = I_R = 10mA, I_{rr} = 0.1 x I_R, R_L = 100Ω

Note: 6. Short duration pulse test used to minimize self-heating effect.

Device Characteristics

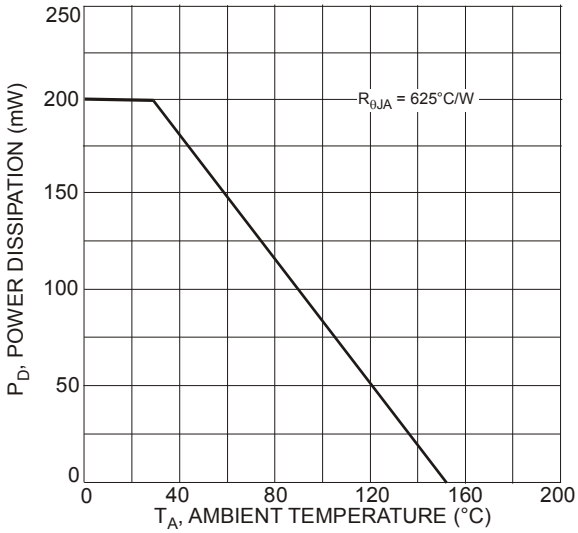


Fig. 1, Power Derating Curve (Total Device)

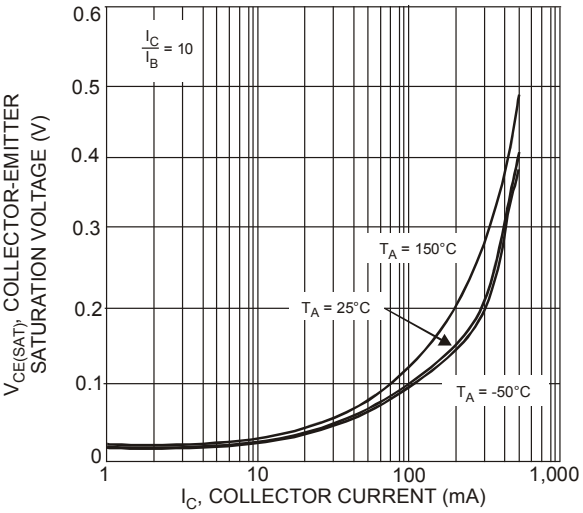


Fig. 2, Typical Collector-Emitter Saturation Voltage vs. Collector Current (DRDP006W)

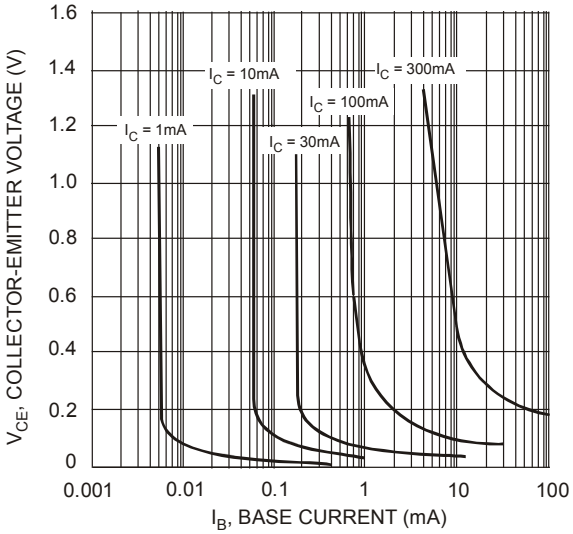


Fig. 3, Typical Collector Saturation Region (DRDP006W)

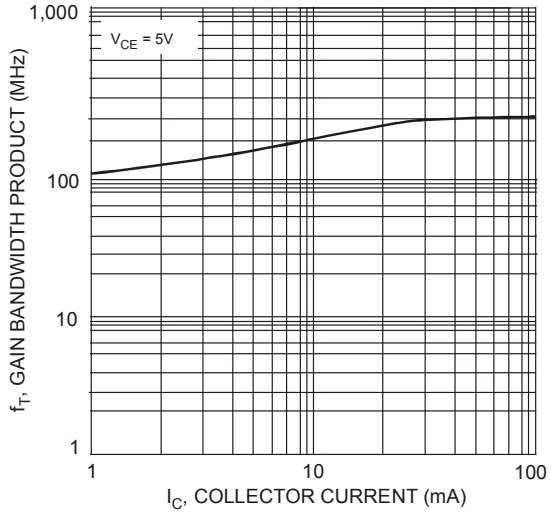


Fig. Typical Gain Bandwidth Product vs. Collector Current (DRDP006W)

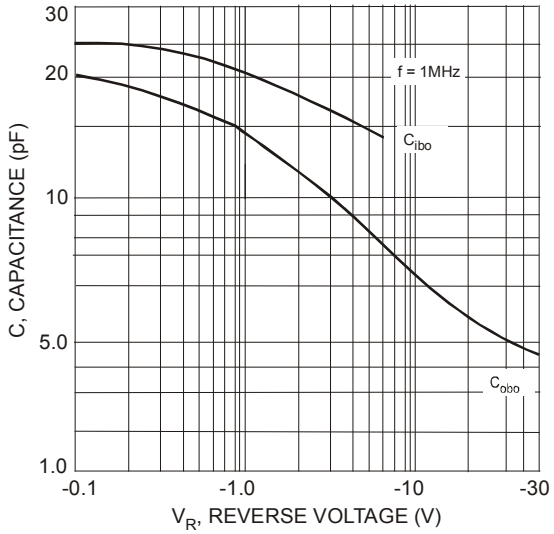


Fig. 5, Typical Capacitance (DRDP006W)

Device Characteristics (continued)

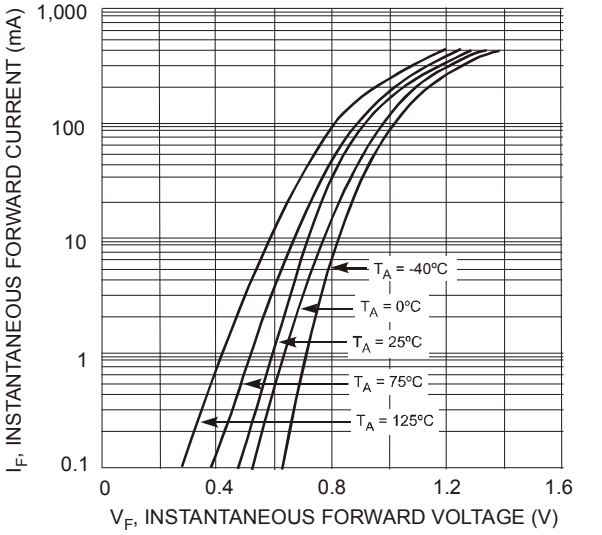


Fig. 6, Typical Forward Characteristics (Switching Diode)

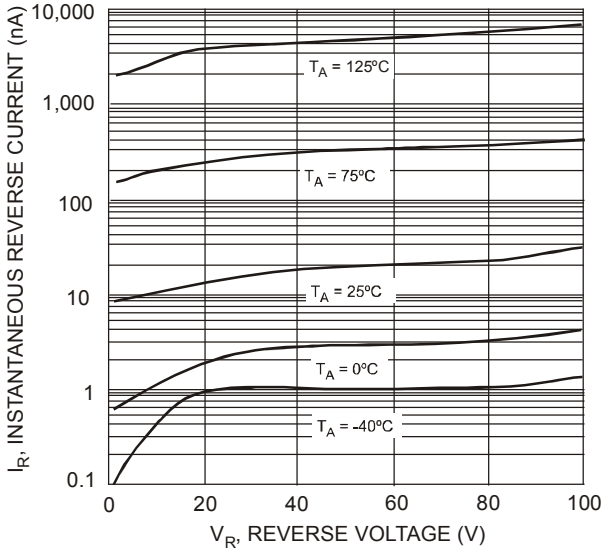


Fig. 7, Typical Reverse Characteristics (Switching Diode)

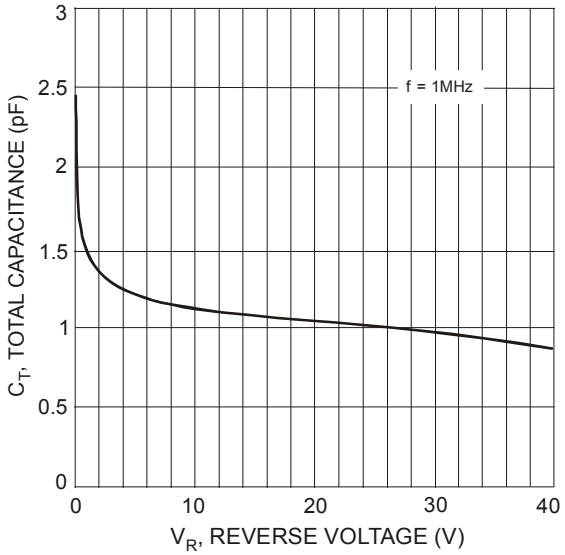
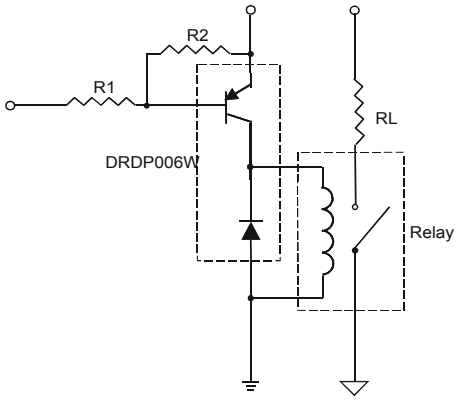
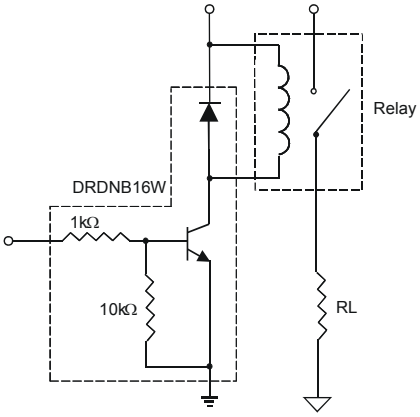


Fig. 8, Typical Capacitance vs. Reverse Voltage (Switching Diode)

Sample Applications



Application Example: DRDP006W current source configuration, bias resistors not included

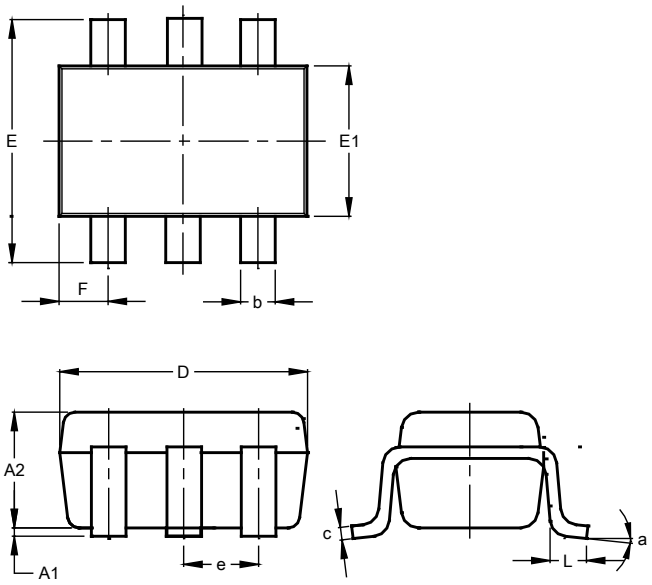


Application Example: DRDNB16W current sink configuration with built-in bias resistors

Package Outline Dimensions

Please see http://www.diodes.com/package-outlines.html for the latest version.

SOT363

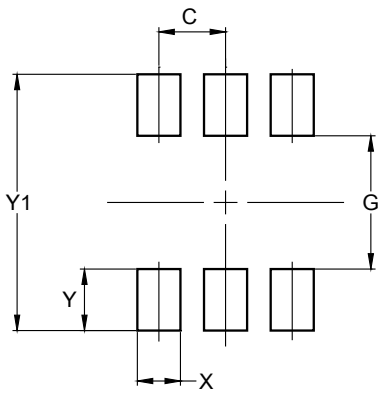


SOT363			
Dim	**Min**	**Max**	**Typ**
A1	0.00	0.10	0.05
A2	0.90	1.00	0.95
b	0.10	0.30	0.25
c	0.10	0.22	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650 BSC		
F	0.40	0.45	0.425
L	0.25	0.40	0.30
a	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.

SOT363



Dimensions	Value (in mm)
C	0.650
G	1.300
X	0.420
Y	0.600
Y1	2.500

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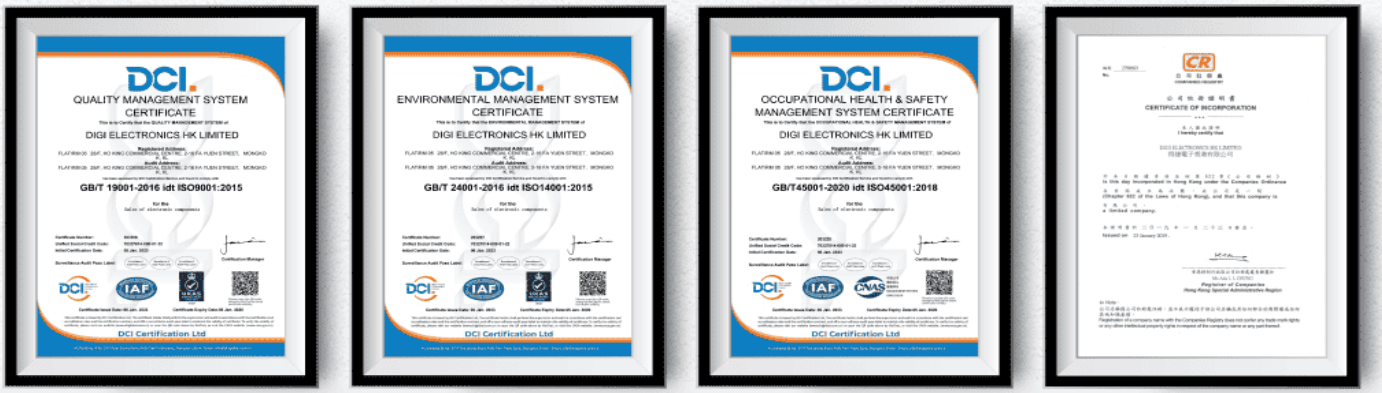

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