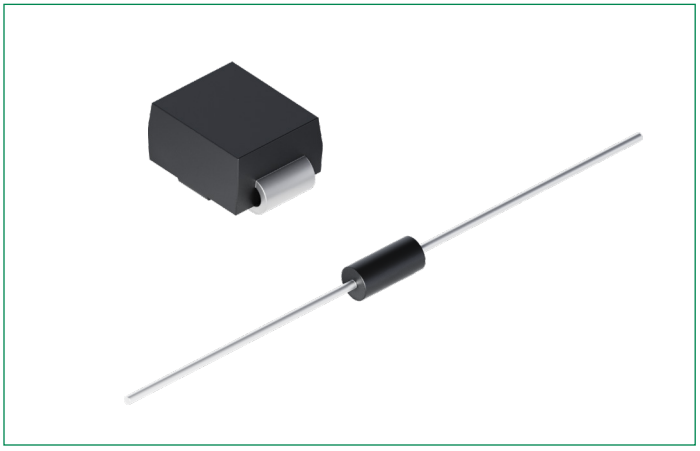
K2xx0yHU Series

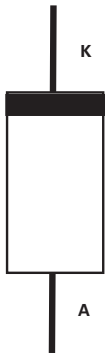
High Energy Unidirectional SIDACs

RoHS

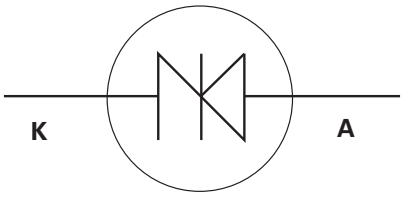


Pinout Diagram

DO-15



DO-214



K: Cathode; **A:** Anode

Description

The K2xx0yHU device is a high-energy SIDAC switch for gas ignition applications that require a high pulse current, especially at a low repetition rate. It is offered in a DO-15 leaded package and a DO-214AA surface mount package.

Voltage activation of this solid-state switch is accomplished with peak voltage level of 190–260 V. SIDAC is a silicon bilateral voltage-triggered thyristor switch that switches on through a negative resistance region to a low on-state voltage. Conduction continues until the current is interrupted or lowered below the minimum holding current of the device.

Features

- AC circuit-oriented
- Triggering voltage of 190–260 V
- Unidirectional
- 280 A pulse current capability
- RoHS-compliant

Applications

- High voltage power supplies
- Natural gas igniters
- Xenon flash ignition

Product Summary

Characteristic	Value	Unit
V_{BO}	190 to 260	V
I_{BO}	500	µA
$I_{T(RMS)}$	1	A

Revised: TK.10/24/2024

Maximum Ratings

Symbol	Characteristics	Conditions	Value	Units
$I_{T(RMS)}$	On-state RMS Current	50/ 60 Hz, T_{vj} < 125 °C	1	A
di/dt	Critical Rate of Rise of On-state Current	–	220	A/µs
T_{stg}	Storage Temperature Range	–	–40 to 150	°C
T_{vj}	Virtual Junction Temperature Range	–	–40 to 125	°C

Electrical Characteristics (T_{vj} = 25 °C, unless otherwise specified)

Symbol	Characteristics	Conditions	Value			Units
			Min.	Typ.	Max.	
I_H	Holding Current	R_L = 100 Ω, 50/ 60 Hz Sine Wave	–	–	60	mA
$dv/dt_{(cr)}$	Critical Rate-of-rise of Off-stage Voltage	–	1500	–	–	V/µs
R_S	Switching Resistance	50/ 60 Hz Sine Wave	100	–	–	Ω
I_{BO}	Breakover Current	50/ 60 Hz Sine Wave	–	–	500	µA
V_{BO}	Breakover/ Trigger Voltage	K2000yHU	190	–	210	V
		K2200yHU	210	–	230	
		K2400yHU	230	–	250	
		K2500yHU	240	–	260	
V_{DRM}	Repetitive Peak Off-state Voltage	K2000yHU	180	–	–	V
		K2200yHU	190	–	–	
		K2400yHU	210	–	–	
		K2500yHU	220	–	–	

Note: y = package

Static Characteristics (T_{vj} = 25 °C, unless otherwise specified)

Symbol	Characteristics	Conditions		Maximum Value	Units
V_{TM}	Peak On-state Voltage	I_T = 1 A		1.5	V
I_{TRM}	Peak Repetitive Pulse Current[1]	t_p = 10 µs	60 Hz	120	A
			5 Hz	280	

Note 1: Refer to Figure 4

Thermal Characteristics

Symbol	Characteristics	Conditions	Value	Units
$R_{th(j-l)}$	Thermal Resistance, Junction to Lead	DO-15	18	K/W
		DO-214AA	30	
$R_{th(j-a)}$	Thermal Resistance, Junction to Ambient	DO-15	75	K/W

Characteristic Curves

Figure 1. V-I Characteristics

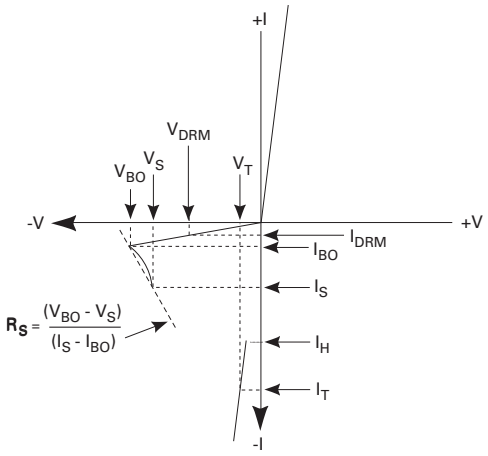


Fig. 2. Typical On-State Current vs. On-state Current

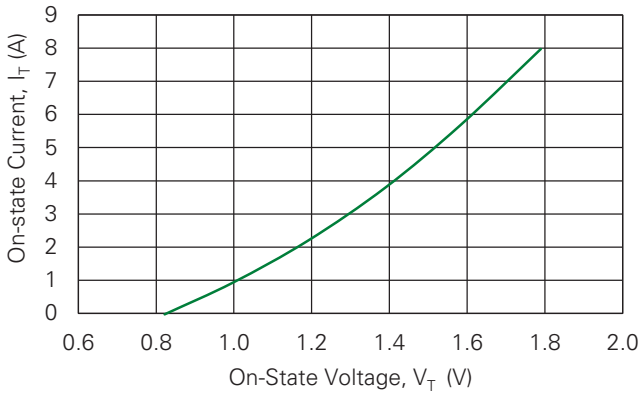


Fig. 3. Power Dissipation vs. Typical On-state Current

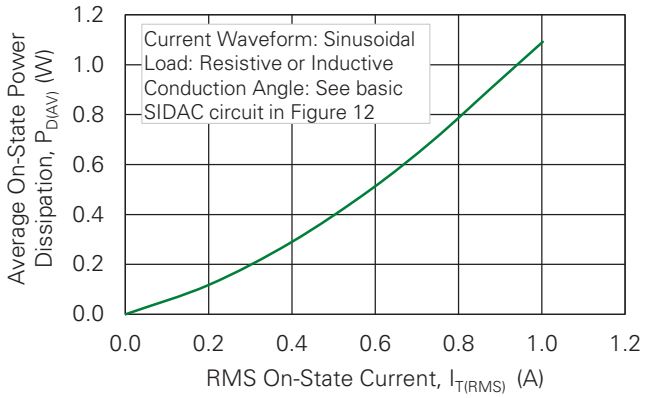


Fig. 4. Repetitive Peak On-state Current vs. Pulse Width at Various Frequencies

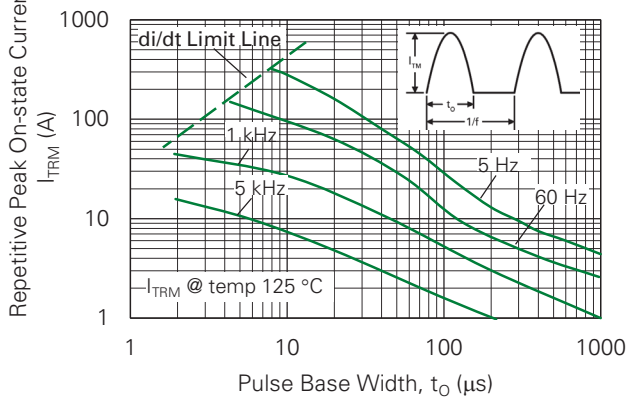


Fig. 5. Surge Peak On-state Current vs. Number of Cycles

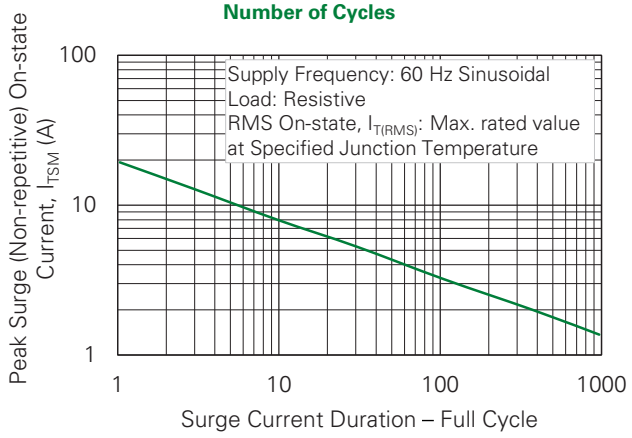
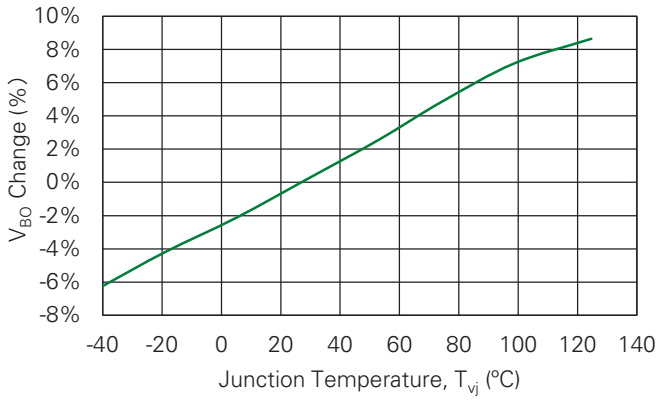


Fig. 6. Normalized V_{BO} Change vs. Junction Temperature



Notes:

1. Blocking capability may be lost during and immediately following surge current interval.
2. Overload should not be repeated until junction temperature has returned to steady-state rated value.

Fig. 7. Normalized DC Holding Current vs. Junction Temperature

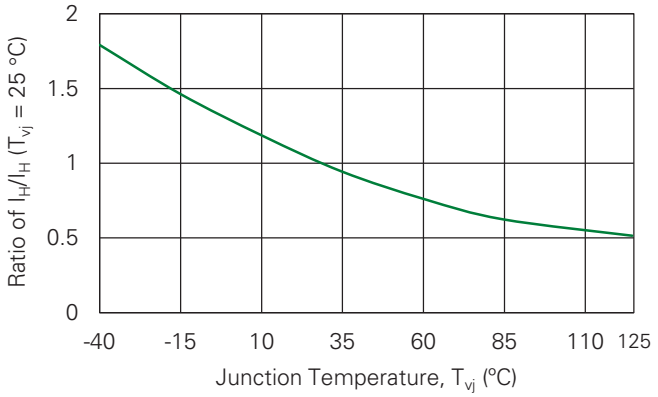


Fig. 8. Maximum Allowable Case Temperature vs. RMS On-state Current

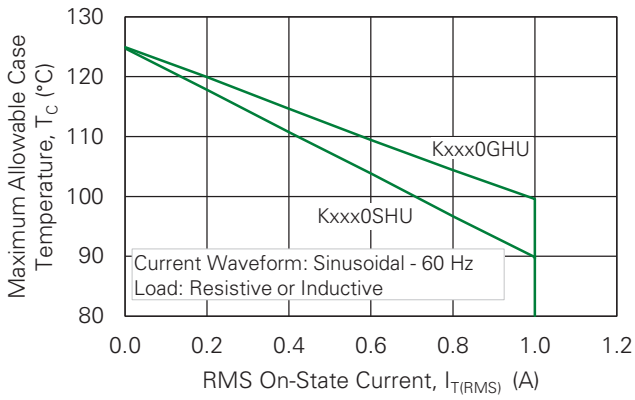


Fig. 9. Maximum Allowable Ambient Temperature vs. RMS On-state Current

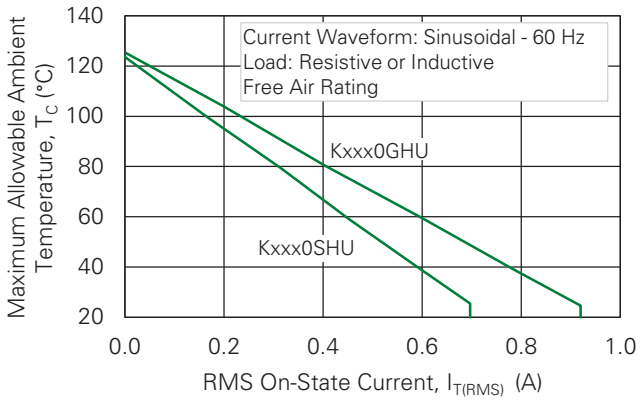


Fig. 10. Normalized I_{BO} Change vs. Junction Temperature

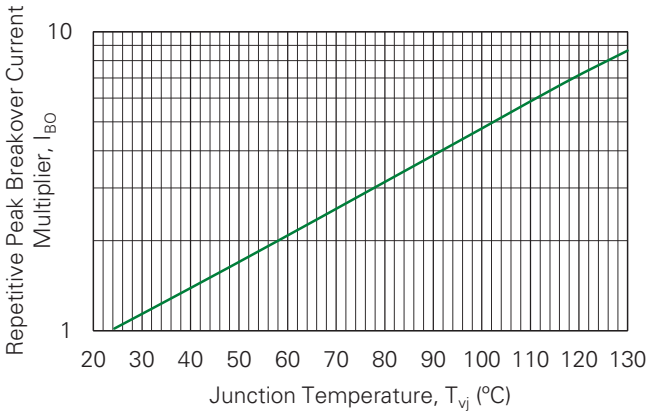


Figure 11. General Gas Ignitor Circuit

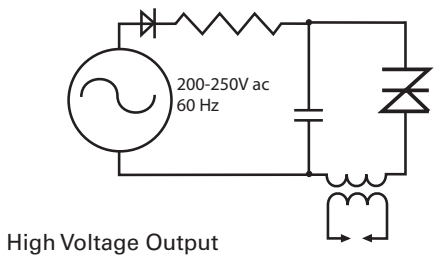
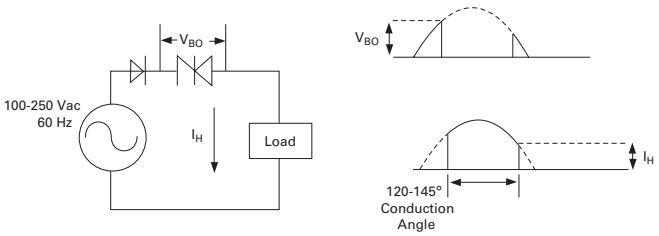


Figure 12. Basic SIDAC Circuit

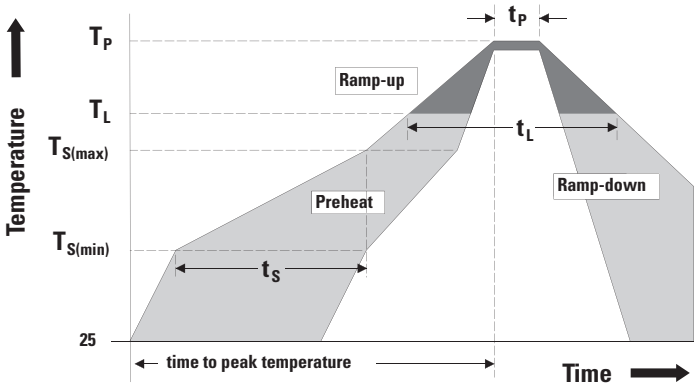


Soldering Parameters

Characteristic		Value
Reflow Condition		Pb – Free assembly
Pre-heat	Temperature Min ($T_{s(min)}$)	150 °C
	Temperature Max ($T_{s(max)}$)	200 °C
	Time (min to max) (t_s)	60–180 secs
Average ramp up rate (Liquidus Temp)(T_L) to peak		5 K/second max
$T_{S(max)}$ to T_L - Ramp-up Rate		5 K/second max
Reflow	Temperature (T_L) (Liquidus)	217 °C
	Time (t_L)	60 – 150 seconds
Peak Temperature (T_P)		$260^{+0/-5}$ °C
Time within 5 °C of actual peak Temperature (t_p)		20 – 40 seconds
Ramp-down Rate		5 °C/second max
Time 25 °C to peak Temperature (t_P)		8 minutes max
Do Not Exceed		280 °C

Environmental Specifications

Test	Specifications and Conditions
High Temperature Voltage-Blocking	MIL-STD-750, M-1040, Condition A Rated V_{DRM} (VAC-peak),125 °C, 1008 hours
Temperature Cycling	MIL-STD-750, M-1051,100 cycles; -40 °C to +150 °C; 15-min dwell-time
Biased Temperature and Humidity	EIA/JEDEC: JESD22-A101 (VDC), 85 °C, 85 %RH, 1008 hours
High-temperature Storage	MIL-STD-750, M-1031, 1008 hours; 150 °C
Low-temperature Storage	1008 hours; -40 °C
Thermal Shock	MIL-STD-750: Method 1056, 0 °C to 100 °C, 5-minute dwell, 10-second transfer, 10 cycles
Autoclave (Pressure Cooker Test)	EIA/JEDEC: JESD22-A102, 121 °C, 100 %RH, 2 atm, 168 hours
Resistance to Solder Heat	MIL-STD-750: Method 2031, 260 °C, 10 seconds
Solderability	ANSI/J-STD-002: category 3
Repetitive Surge Life Testing	MIL-STD-750, M-2036, Condition E



Physical Specifications

Characteristic	Value
Terminal Finish	100 % Matte Tin-plated
Body Material	UL Recognized compound meeting flammability rating 94V-0
Terminal Material	Copper Alloy

Product Selector

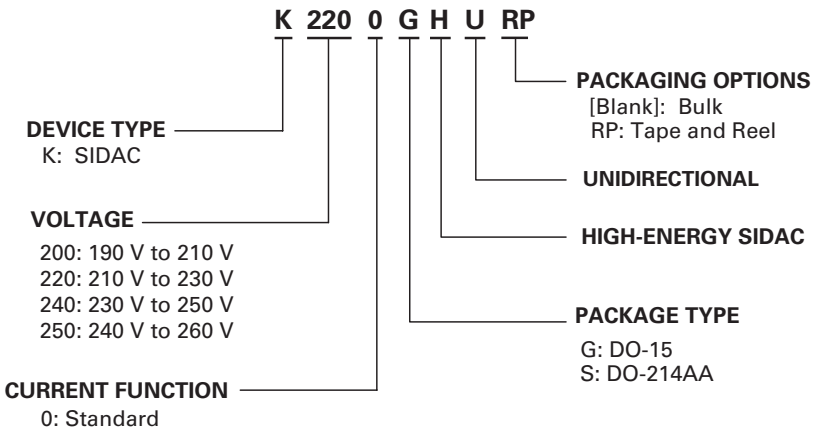
Part Number	Switching Voltage Range		Blocking Voltage	Package
	V_{BO} Minimum	V_{BO} Maximum	V_{DRM}	
K2000GHU	190 V	210 V	180 V	DO-15
K2000SHU	190 V	210 V	180 V	DO-214AA
K2200GHU	210 V	230 V	190 V	DO-15
K2200SHU	210 V	230 V	190 V	DO-214AA
K2400GHU	230 V	250 V	210 V	DO-15
K2400SHU	230 V	250 V	210 V	DO-214AA
K2500GHU	240 V	260 V	220 V	DO-15
K2500SHU	240 V	260 V	220 V	DO-214AA

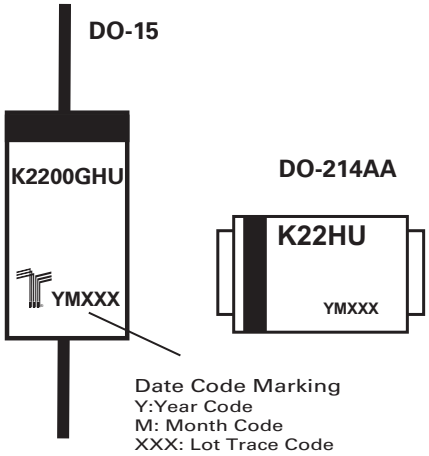
Packing Options

Part Number	Marking	Weight	Packing Mode	Base Quantity
K2xx0GHU	K2xx0GHU	0.38 g	Bulk	1000
K2xx0GHURP	K2xx0GHU	0.38 g	Reel Pack	5000
K2xx0SHURP	KxxHU	0.10 g	Reel Pack	2500

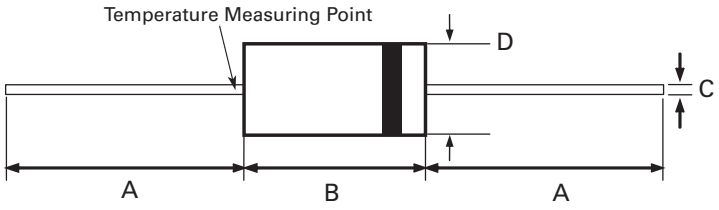
Note: xx = voltage

Part Numbering and Marking



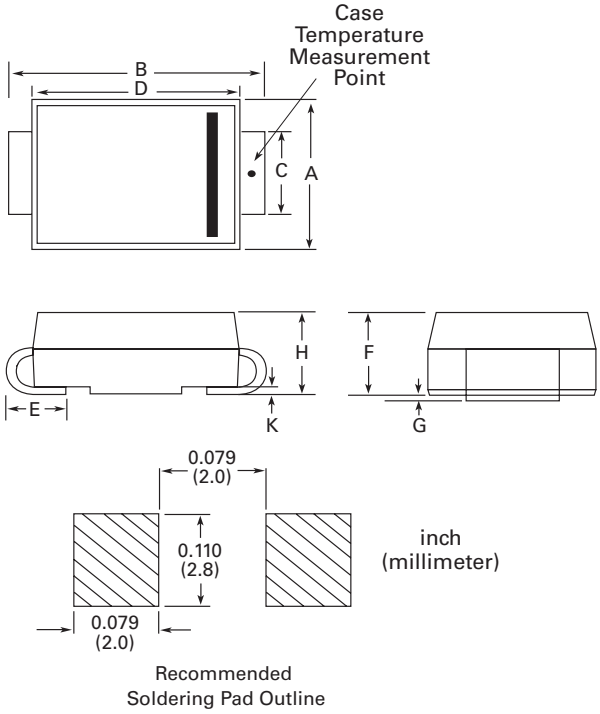


Package Dimensions DO-15



Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max
A	25.40	–	1.000	–
B	5.80	7.60	0.230	0.300
C	0.71	0.86	0.028	0.034
D	2.60	3.60	0.104	0.140

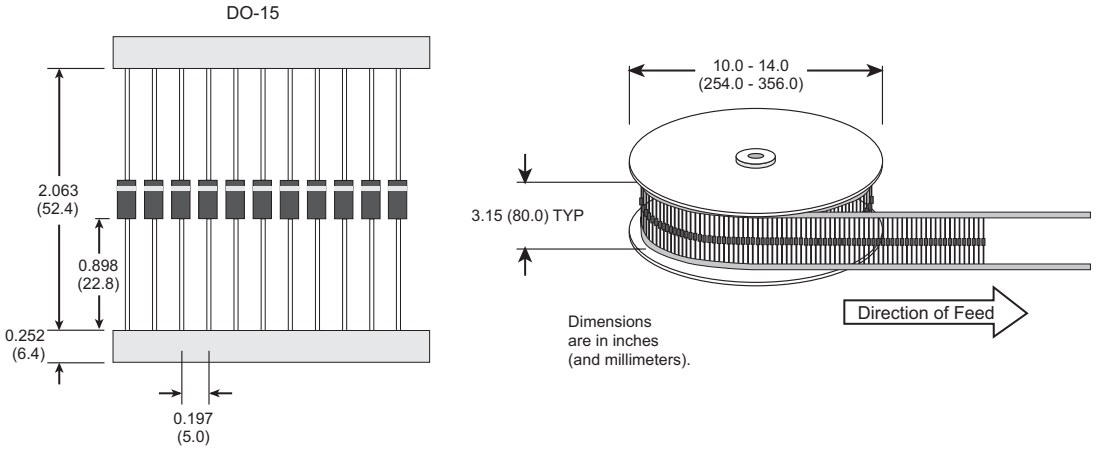
Package Dimensions DO-214AA



Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	3.30	3.95	0.130	0.156
B	5.10	5.60	0.201	0.220
C	1.95	2.20	0.077	0.087
D	4.05	4.60	0.159	0.181
E	0.75	1.60	0.030	0.063
F	1.90	2.45	0.075	0.096
G	0.05	0.20	0.002	0.008
H	1.95	2.65	0.077	0.104
K	0.15	0.41	0.006	0.016

DO-15 Reel Pack (RP) Specifications

Meets all EIA-RS-296 Standards



DO-214AA Embossed Carrier Reel Pack (RP) Specifications

Meets all EIA-481-1 Standards