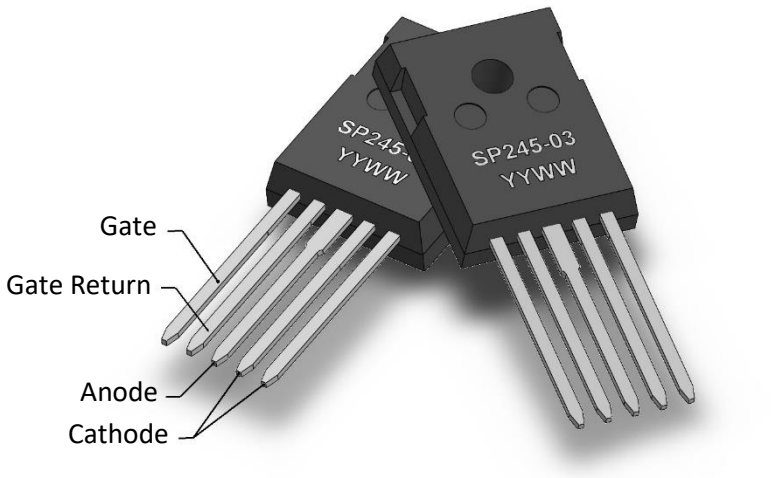
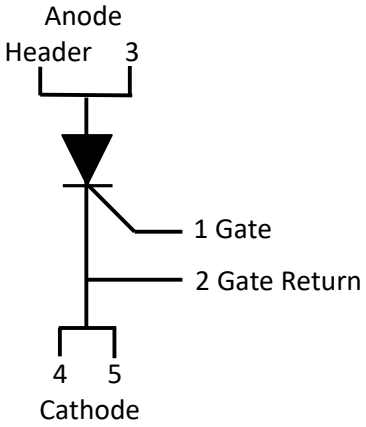
SP245-03

Solidtron™ Solid State Initiator Firing Switch, TO-247

***NOTICE:* This product is export controlled**





Description

The **Solidtron™ SP245-03** is an advanced high-voltage current-controlled thyristor packaged in a **JEDEC TO-247 (5L)** package.

Like all Solidtron™ products, the internal semiconductor employs high cell density and an advanced termination design to achieve high peak current capability, low conduction loss, low off-state leakage, negligible turn-on delay jitter, and most importantly, extremely high turn-on dI/dt capability. It is ideally suited for a wide variety of capacitor discharge applications requiring precise timing and rapid energy transfer capability.

The JEDEC TO-247 (5L) package is an industry standard package in which the semiconductor is attached to a copper header utilizing 92.5Pb/5Sn/2.5Ag solder. The top of the chip is joined to the appropriate leads using a combination of 0.005" and 0.010" aluminum wire bonds. It is than molded with Hysol MG15F-0140 compound and its leads are tinned with 63Sn/10Pb solder.

The SP245-03 is intended to replace triggered spark gaps of similar voltage and current ratings.

Features

- 1400V Repetitive Off-State Voltage
- VGK = 0V = OFF-STATE
- 100 kA/µs dI/dt capability
- Low Turn-on Delay Time
- Low Conduction Loss
- 3.5kA Repetitive Surge Current

Applications

- LEEFI detonators
- Electronic Safe and Arm Devices
- Ignition Safety Devices
- Firing Modules
- Capacitor Discharge Units

Solidtron™ SP245-03

Table 1 Maximum Ratings	Symbol	Value	Units
Repetitive Peak Off-State Voltage	V_{DRM}	1500	V
Repetitive Peak Reverse Voltage	V_{RRM}	-10	V
Off-State Rate of Change of Voltage Immunity (V_D=1500V)	dv/dt	1000	V/µSec
Peak Non-Repetitive Surge Current (1/2 Sinusoid Pulse Duration =/<300nSec)	I_{TSM}	4000	A
Peak Repetitive Surge Current (1/2 Sinusoid Pulse Duration =/<300nSec)	I_{TRM}	3500	A
Rate of Change of Current	dI/dt	100	kA/µSec
Critical Capacitor Discharge Event Integral (Underdamped LCR Circuit)	$I^2t_{CRITICAL}$	TBD	A^2sec
Repetitive Capacitor Discharge Event Integral (Underdamped LCR Circuit)	$I^2t_{REPETITIVE}$	2	A^2sec
Continuous Gate-Cathode Reverse Voltage	V_{GKS}	-9	V
Forward Peak Gate Current (10□Sec Duration)	I_{GM}	10	A
Required Off-State Gate-Cathode Voltage	V_{GDM}	0	V
Operating Junction Temperature Range	T_J	-55 to +125	°C
Maximum Soldering Installation Temperature *(See Moisture Sensitivity Caution)*		220	°C
Storage Temperature Range *(See Moisture Sensitivity & Solderability Cautions)*		-55 to +150	°C

Table 2 Electrical Characteristics				Measurements			
Parameter	Symbol	Test Conditions		Min	Typ	Max	Units
Anode to Cathode Breakdown Voltage	V_{BR}	V_{GK}= 0V, I_D=100µA, T_C ≤ 125°C		1400			V
Anode-Cathode Forward Off-State Current ***See Figure 2.***	I_{DRM}	V_{GK}= 0V, V_D=1500V	T_C=-55°C			60	nA
			T_C=25°C		11	100	nA
			T_C=85°C		180	1000	nA
			T_C=125°C		5	10	µA
Reverse Bias Gate-Cathode Breakdown Voltage	V_{GRRM}	I_{GM}=150µA, T_C ≤ 125°C		9	10		V
Nine Volt Reverse Bias Gate-Cathode Leakage Current ***See Figure 1.***	I_{GM}	V_{GK}= -9V	T_C=25°C		28		µA
			T_C=85°C		57		µA
			T_C=125°C		80		µA
Two Volt Reverse Bias Gate-Cathode Leakage Current ***See Figure 1.***	I_{GM}	V_{GK}= -2V	T_C=25°C		0.8	2	µA
			T_C=85°C		1.9	4	µA
			T_C=125°C		2.4	6	µA
Gate Trigger Voltage	V_{GT}	V_D= 12V, I_D=1mA	T_C=25°C	450	500		mV
			T_C=85°C	250	350		mV
			T_C=125°C	200	250		mV
Gate Trigger Current	I_{GT}	V_D= 12V, I_D=1mA, T_C ≤ 125°C				100	µA
Turn-on Delay Time	$t_{d(ON)}$	0.15µF Capacitor Discharge, T_C=25°C, I_{GT}= 500mA, V_{DD}=1200V, L_S=15nH, R_S=0.010Ω=CVR			30	60	nSec
Rate of Change of Current	dI/dt				65		kA/µsec
Capacitor Discharge Event Integral	I^2t				1.38		A^2sec
Peak Anode Current	I_{DM}				3.2		kA

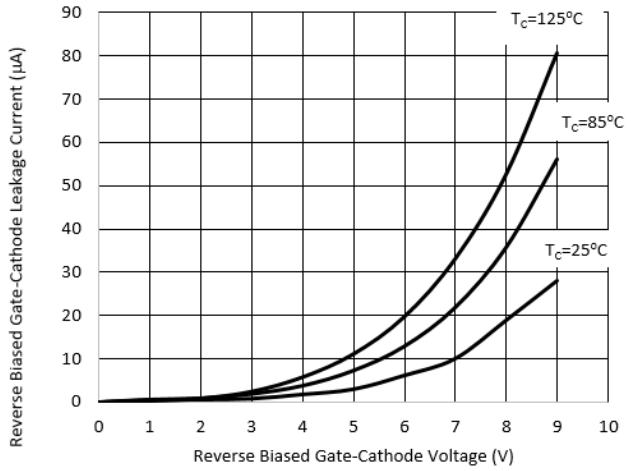


Figure 1 Typical Reverse Biased Gate-Cathode Leakage Characteristic

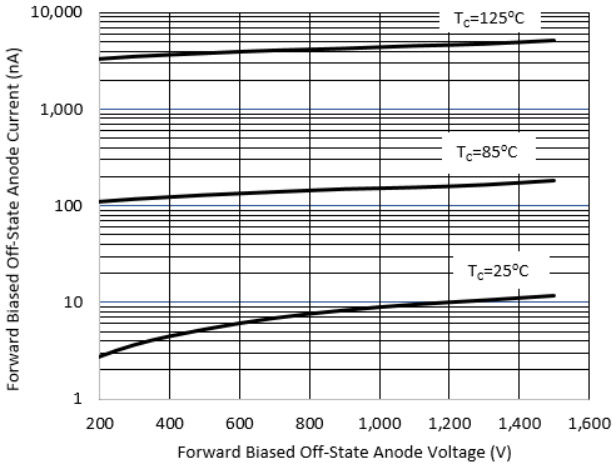


Figure 2 Typical Forward Biased Off-State Anode-Cathode Leakage Characteristic

Usage

The Gate Return lead provides a dedicated connection directly to the cathode of the semiconductor die. This connection consists of a single 0.005" aluminum wire bond. Although it is not mandatory that the Gate Return lead be used as an independent gate return path, its use in this fashion may reduce V=L*dI/dt induced stress on the gate driver components. **CAUTION: Due to the small diameter of its internal bond connection, using PIN 2 as an additional cathode connection is highly discouraged.**

ESD Sensitivity

The **SP245-03** has been tested IAW **MIL-STD-883 ESD-HBM (Human Body Model) to +/-2000V (Class 1C).**

The **SP245-03** has been tested IAW **ANSI/ESDA/JEDEC/JS-002-2014 for ESD-CDM (Charged Device Model) to +/-1500V (Class C5).**

Solderability

The leads of the **SP245-03** are tinned with 63Sn-37Pb solder. Please note that PbSn solder is subject to oxidation growth; however, at a slower rate than the underlying nickel plated leads. Conventional handling and storage practices associated with components having 63Sn-37Pb tinned leads may be applied.

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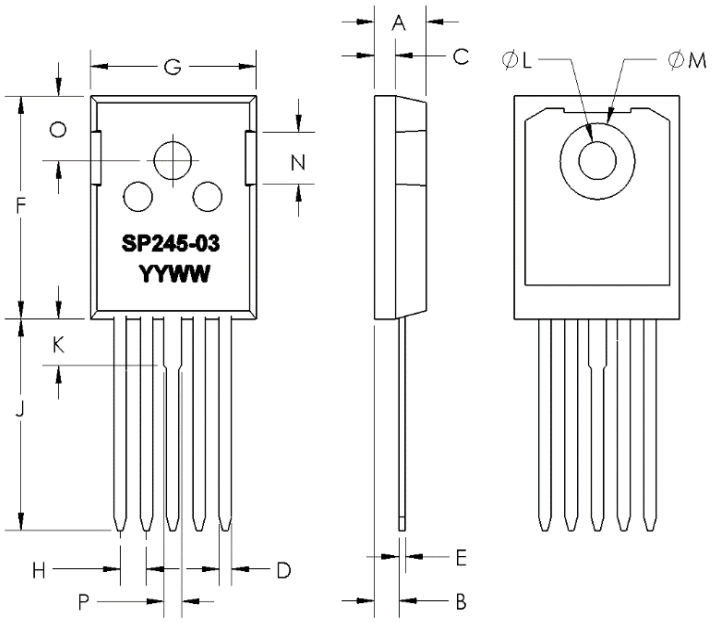
Markings and Dimensions



DIMENSIONS ARE IN INCHES

DIMENSION	MIN.	MAX.
A	0.185	0.209
B	0.087	0.102
C	0.059	0.098
D	0.04	0.055
E	0.016	0.031
F	0.819	0.845
G	0.62	0.64
H	0.096	0.104
J	0.78	0.8
K	0.167	0.177
L	0.138	0.144
M		0.291
N	0.17	0.216
O	0.242	
P	0.065	0.07

PART NUMBER
SP = SOLIDTRON™ PRODUCT
245 = CHIP TYPE
-03 = PACKAGE TYPE

DATE CODE
YY = LAST 2 DIGITS OF CALENDAR YEAR
WW = WORK WEEK

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