

### 3.5.1 Snubber Capacitors – IGBT SMKP2-L series

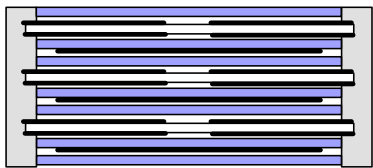
#### Applications :

For protection against voltage and current transients in IGBT modules and applications where high dv/dt is encountered

#### Construction :

- Low inductance construction
- Flame retardant plastic case and Epoxy Resin UL94-V0
- High Current carrying capacity Tinned Terminals for direct mounting the capacitor to IGBT module
- other Terminals also available

**Construction :** SMKP2-series



#### Electrical Characteristics :

Capacitance : 0.1uF - 3uF at 1kHz +25C

Capacitance Tolerance : +/-5%(J), +/-10% (K)

Rated Voltage Ur	1000Vdc	1200Vdc	1600Vdc	2000Vdc
	500Vac	550Vac	630Vac	650Vac

**Test Voltage :** between Terminals :1.6xUr Vdc 60s +85C / +105C  
Terminals to Case: 3kVac 60s at +25C / +105C

**Ripple RMS Current :** up to 32A

**Rated Temperature :** +85C / +105C

**Service Life :** 30,000 hours at rated Vac 70C  
60,000 hours at rated Vdc 70C

**Accelerated Life :** 1.25 x rated Vac at 85C for 3,000 hours  
1.25 x rated Vac at 105C for 2,000 hours

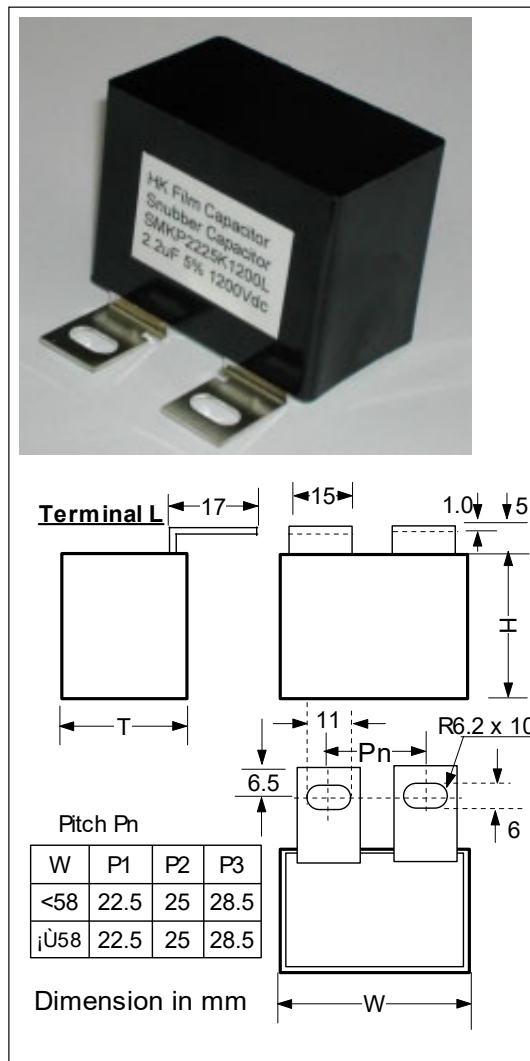
**Equivalent Series Resistance ESR :** see item table

**Equivalent Series Inductance ESL :** < 22nH

**Insulation Resistance :** 250Vdc +25C >= 300,000Mohm  
250Vdc+85C >= 50,000Mohm  
250Vdc+105C >= 5,000Mohm

#### Specifications and Size :

P/N	Cap uF	Voltage		dV/dt V/us	Ipeak A	ESR 100kHz 25C m ohm	Max Amp 55C A	Dimension mm +/-1mm W x H x T
		Vdc	Vac					
SMKP2-154X1000DL	0.15	1000	500	800	120	9.1	8.0	45 x 32 x 22
SMKP2-224X1000DL	0.22			800	170	8.5	9.0	45 x 32 x 22
SMKP2-334X1000DL	0.33			800	260	7.6	11	45 x 32 x 22
SMKP2-474X1000DL	0.47			480	220	7.1	12	45 x 32 x 22
SMKP2-564X1000DL	0.56			480	270	6.9	14	45 x 32 x 22
SMKP2-684X1000DL	0.68			480	320	6.3	14	45 x 32 x 22
SMKP2-754X1000DL	0.75			480	360	5.6	15	45 x 32 x 22
SMKP2-105X1000DL	1.0			480	480	4.4	17	51 x 36 x 25
SMKP2-125X1000DL	1.2			480	570	3.6	19	51 x 36 x 25
SMKP2-155X1000DL	1.5			480	720	2.7	21	51 x 40 x 30
SMKP2-205X1000DL	2.0			320	640	2.5	25	59 x 45 x 35
SMKP2-225X1000DL	2.2			320	700	2.4	27	59 x 45 x 35
SMKP2-305X1000DL	3.0			320	960	2.2	29	59 x 45 x 35



For other Capacitance, Voltage, dv/dt, Peak Current and RMS Current not listed, please contact us for a suggestion.

## Specifications and Size

P/N	Cap	Voltage		dV/dt	Ipeak	ESR 100kHz 25C	Max Amp 55C	Dimension mm +/-1mm
	uF	Vdc	Vac	V/us	A	m ohm	A	W x H x T
SMKP2-154X1200DL	0.15	1200	550	900	130	9.1	8	45 x 32 x 22
SMKP2-224X1200DL	0.22			900	200	8.5	11	45 x 32 x 22
SMKP2-334X1200DL	0.33			900	300	7.6	11	45 x 32 x 22
SMKP2-474X1200DL	0.47			550	250	7.1	13	45 x 32 x 22
SMKP2-564X1200DL	0.56			550	300	6.9	14	45 x 32 x 22
SMKP2-684X1200DL	0.68			550	370	6.3	15	45 x 32 x 22
SMKP2-754X1200DL	0.75			550	410	5.6	17	51 x 36 x 25
SMKP2-105X1200DL	1.0			550	550	4.4	18	51 x 36 x 25
SMKP2-125X1200DL	1.2			550	660	3.6	21	51 x 40 x 30
SMKP2-155X1200DL	1.5			550	820	2.7	23	51 x 40 x 30
SMKP2-205X1200DL	2.0			350	700	2.5	28	59 x 45 x 35
SMKP2-225X1200DL	2.2			350	770	2.4	29	59 x 45 x 35
SMKP2-305X1200DL	3.0			350	1000	2.1	32	59 x 45 x 35
SMKP2-104X1600DL	0.1			1600	630	1000	100	10
SMKP2-154X1600DL	0.15	1000	150			8	11	45 x 32 x 22
SMKP2-224X1600DL	0.22	1000	220			7.5	13	45 x 32 x 22
SMKP2-334X1600DL	0.33	800	260			7.0	14	51 x 36 x 25
SMKP2-474X1600DL	0.47	800	370			6.6	16	51 x 36 x 25
SMKP2-564X1600DL	0.56	800	450			6.2	18	58 x 37 x 32
SMKP2-684X1600DL	0.68	800	540			6.0	19	58 x 37 x 32
SMKP2-754X1600DL	0.75	500	370			5.8	20	58 x 37 x 32
SMKP2-105X1600DL	1.0	500	500			3.2	24	58 x 37 x 32
SMKP2-125X1600DL	1.2	500	600			2.8	25	59 x 45 x 35
SMKP2-104X2000DL	0.1	2000	650	1100	110	8	10	45 x 32 x 22
SMKP2-154X2000DL	0.15			1100	160	7.5	11	45 x 32 x 22
SMKP2-224X2000DL	0.22			850	180	7	14	45 x 32 x 22
SMKP2-334X2000DL	0.33			850	280	6.4	17	51 x 36 x 25
SMKP2-474X2000DL	0.47			850	400	6	19	51 x 40 x 30
SMKP2-564X2000DL	0.56			600	330	5.5	21	58 x 37 x 32
SMKP2-684X2000DL	0.68			600	400	5.0	24	59 x 45 x 35
SMKP2-754X2000DL	0.75			600	450	4.2	25	59 x 45 x 35

Where X is for Capacitance tolerance : J for +/-5%, K for +/-10% and M for +/-20%

For other Capacitance, Voltage, dv/dt, Peak Current and RMS Current not listed, please contact us for a suggestion.

### 3.5.2 High Voltage IGBT Snubber Capacitors

SMKP2-N series

**Applications :**

For protection against voltage and current transients in IGBT modules and applications where high dv/dt is encountered

**Construction :**

- Low inductance construction
- Flame retardant plastic case and Epoxy Resin UL94-V0
- High Current carrying capacity Tinned Terminals for direct mounting the capacitor to IGBT module
- other Terminals also available

**Electrical Characteristics :**

Capacitance : 0.056uF – 0.75uF at 1kHz +25C

Capacitance Tolerance : +/-5%(J), +/-10% (K)

Rated Voltage : Ur

Vac	850	1000	1200	1300
Vdc	1700	2000	2500	3200

**Test Voltage :** between Terminals :1.6xUr Vdc 60s +85C / +105C

Terminals to Case: 3kVac 60s at +25C / +105C

**Ripple RMS Current :** up to 17A

**Rated Temperature :** +70C / +85C / +105C

**Service Life :** 30,000 hours at rated Vac 70C

60,000 hours at rated Vdc 70C

**Accelerated Life :** 1.25 x rated Vac at 85C for 3,000 hours

1.25 x rated Vac at 105C for 2,000 hours

**Equivalent Series Resistance ESR :** see item table

Support Ultra Low ESR requirement

**Equivalent Series Inductance ESL :** < 22nH

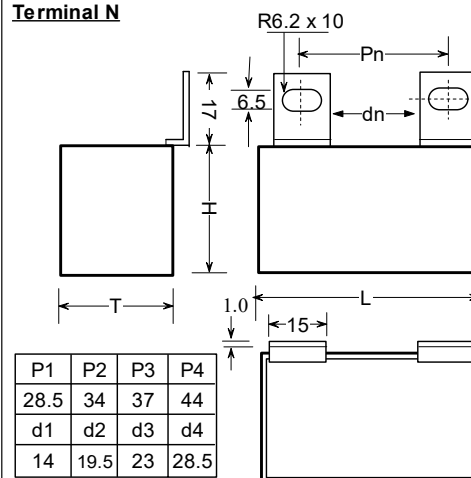
**Insulation Resistance :** 250Vdc +25C >= 300,000Mohm

250Vdc+85C >= 50,000Mohm

250Vdc+105C >= 5,000Mohm



**Terminal N**



**Specifications and Size :**

**SMKP2-N : Vac = 850Vac / Vndc = 1700Vdc / Vpeak = 1100V 10s / Vsurge = 2750V 30s/day**

P/N :	Cn uF	Width W mm	Height H mm	Thickess L mm	dv/dt v/us	Peak Current I <sub>p-p</sub> A	ESL nH	ESR (mohm) 100KHz	Max. Amp 70C	Max. Amp 85C	Max. Amp 105C
SMKP2-254K850AN	0.25	59	47	39	1800	450	12	3.6	11	9	7
SMKP2-354K850AN	0.3	59	47	39	1800	540	12	3.6	13	11	9
SMKP2-334K850AN	0.33	59	47	39	1800	594	12	3.2	15	13	10
SMKP2-474K850AN	0.47	59	47	39	1800	846	12	2.8	15	13	10
SMKP2-564K850AN	0.56	59	55	45	1080	604	16.5	2.8	15	13	10
SMKP2-684K850AN	0.68	59	55	45	1080	734	16.5	2.4	17	15	12
SMKP2-754K850AN	0.75	59	55	45	1080	810	16.5	2.4	17	15	12

**SMKP2-N : Vac = 1000Vac / Vndc = 2000Vdc / Vpeak = 1250V 10s / Vsurge = 3200V 30s/day**

P/N :	Cn uF	Width W mm	Height H mm	Thickess L mm	dv/dt v/us	Peak Current I <sub>p-p</sub> A	ESL nH	ESR (mohm) 100KHz	Max. Amp 70C	Max. Amp 85C	Max. Amp 105C
SMKP2-154K1000AN	0.15	59	47	39	2800	420	12	4.0	9	8	6
SMKP2-204K1000AN	0.2	59	47	39	2800	560	12	4.0	12	11	8
SMKP2-224K1000AN	0.22	59	47	39	2800	616	12	4.0	12	11	8
SMKP2-254K1000AN	0.25	59	47	39	2800	700	12	3.6	15	13	10
SMKP2-334K1000AN	0.33	59	55	45	1680	554	16.5	3.2	12	11	8
SMKP2-474K1000AN	0.47	59	55	45	1680	789	16.5	2.8	16	14	11

For other Capacitance, Voltage, dv/dt, Peak Current and RMS Current not listed, please contact us for a suggestion.

**SMKP2-N : Vac = 1200Vac / Vndc = 2500Vdc / Vpeak = 1500V 10s / Vsurge = 4000V 30s/day**

P/N :	Cn uF	Width W mm	Height H mm	Thickness L mm	dv/dt v/us	Peak Current I <sub>p-p</sub> A	ESL nH	ESR (mohm) 100KHz	Max. Amp 70C	Max. Amp 85C	Max. Amp 105C
SMKP2-104K1200AN	0.1	59	47	39	4000	400	12	3.6	8	7	5
SMKP2-124K1200AN	0.12	59	47	39	4000	480	12	3.2	8	7	5
SMKP2-154K1200AN	0.15	59	47	39	4000	600	12	3.2	11	9	7
SMKP2-224K1200AN	0.22	59	55	45	2400	528	16.5	3.2	11	9	7
SMKP2-254K1200AN	0.25	59	55	45	2400	600	16.5	2.8	11	9	7
SMKP2-334K1200AN	0.33	59	55	45	2400	792	16.5	2.8	15	13	11

**SMKP2-N : Vac = 1300Vac / Vndc = 3200Vdc / Vpeak = 1600V 10s / Vsurge = 5100V 30s/day**

P/N :	Cn uF	Width W mm	Height H mm	Thickness L mm	dv/dt v/us	Peak Current I <sub>p-p</sub> A	ESL nH	ESR (mohm) 100KHz	Max. Amp 70C	Max. Amp 85C	Max. Amp 105C
SMKP2-563K1300AN	0.056	59	47	39	6180	346	12	5.2	5	4	3
SMKP2-683K1300AN	0.068	59	47	39	6180	420	12	4.8	6	5	4
SMKP2-104K1300AN	0.1	59	47	39	6180	618	12	4.0	9	8	6
SMKP2-124K1300AN	0.12	59	47	39	6180	740	12	4.0	11	10	7
SMKP2-154K1300AN	0.15	59	55	45	3720	558	17	3.6	8	8	6
SMKP2-224K1300AN	0.22	59	55	45	3720	818	17	3.6	12	11	8

For other Capacitance, Voltage, dv/dt, Peak Current and RMS Current not listed, please contact us for a suggestion.