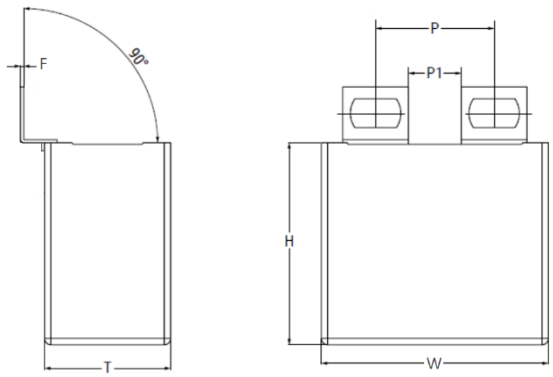
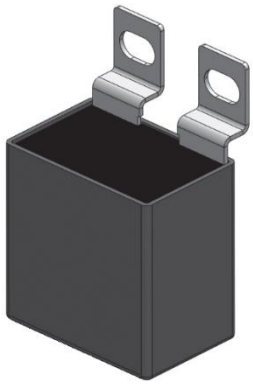
IGBT 吸收電容器 (直接安裝) - SMIT series

IGBT Snubber Capacitors (Direct Mounting)

■ 外形圖 Outline Drawing (For Example)





■ 典型應用 Typical Applications

這些電容器用於高壓、大電流以及高脈衝應用，例如：

IGBT 保護電路和緩衝網絡

電力電子中的能量轉換與控制

開關電源中的保護電路

These capacitors are used in high voltage, high current And high pulse applications such as:

IGBT protection circuits & Snubber networks

Energy conversion and control in power electronics

Protection circuits in SMPS

■ 特徵 Features

延長的雙面金屬化聚酯電極

採用金屬化聚丙烯電介質內部串聯連接

塑料外殼（UL94V-0），環氧樹脂密封

鍍錫黃銅接線片直接安裝 IGBT

Extended double metallised polyester electrodes with metallised polypropylene dielectric internal series connection

UL 94 V-0 plastic case with thermosetting resin-fill

It has a tinned brass lug direct IGBT mounting

■ 規格 Specifications

參考標準 Reference Standard	GB/T 17702 (IEC 61071)				
氣候類別 Climatic Category	40/85/56				
最大允許外殼溫度（T_{case}） Maximum permissible case temperature (T_{case})	-40℃~+85℃				
容值範圍 Capacitance Range	0.047μF ~ 9μF				
額定電壓 Rated Voltage (U_N)	630Vdc	700Vdc	850Vdc	1000Vdc	1200Vdc
	1600Vdc	1700Vdc	2000Vdc	2500Vdc	3000Vdc
容值公差 Capacitance Tolerance	±5%(J)、±10%(K)				
損耗因素 Dissipation Factor	≤ 10 x 10^{-4} at 1kHz, 1Vrms				
絕緣電阻 Insulation Resistance	C_N ≤ 0.33μF, IR ≥ 15 000MΩ C_N > 0.33μF, IR x C_R ≥ 5 000s			25℃, 100Vdc, 60 seconds	

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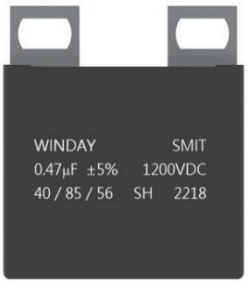
■ 電氣特性 Electrical Characteristics

端子間耐受電壓 Withstanding voltage (V_{TT})		1.5 x U_{NDC} for 10 s, cut off current 10 mA		
絕緣電阻 Insulation Resistance (IR x C_N)		$C_N \leq 0.33\mu F$, IR ≥ 15 000MΩ $C_N > 0.33\mu F$, IR x C_R ≥ 5 000s (25℃, 100Vdc, 60 seconds)		
浪湧電壓 Surge Voltage		1.5 * V_{NDC} for maximum 10 times in lifetime at T = 25°C ±5°C		
過電壓 Over voltage	1.1 x U_N	有負荷時間的 30%	一天內最長持續時間 Maximum duration within one day	30% of on-load duration
	1.15 x U_N	30 分鐘		30 minutes
	1.2 x U_N	5 分鐘		5 minutes
	1.3 x U_N	1 分鐘		1 minutes
自感 Self Inductance (L_S)		< 1nH per mm of lead spacing)		
最大峰值電流 Maximum peak current ↑ (A)		↑ = C x dV/dt		

■ 產品代碼構成 Product code system (For Example)

SMIT	I	474	J	1200	D	2	23	DP
型號 Type	內部使用 Internal use	容值 Capacitance	公差 Tolerance	額定電壓 Rated Voltage	交直流 AC/DC	端片樣式 Terminals Style	孔的距離 Distance of hole	內部使用 Internal use
SMIT= IGBT Snubber Capacitors (Boxed)	--	474 =470nF =0.47μF	J=±5% K=±10%	0630=630V 0700=700V 0850=850V 1000=1000V 更多 More...	D=DC	Shown as Table I (表一)	23=23mm 26=26mm 35=35mm 40=40mm	--

■ 標示 Mark (For Example)

Marking


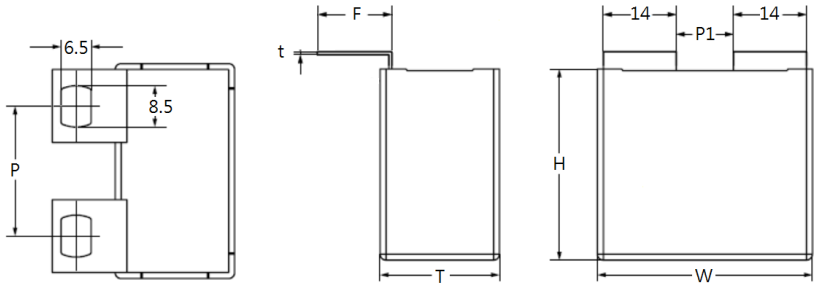
1. Manufacturer's name: WINDAY	2. SMIT: Type Construction
3. Capacitance: 0.47μF	4. Capacitors Tolerance: ±5%
5. Rated Voltage: 1200VDC	6. Climatic Category: 40/85/56
7. Self-Healing in nature such as SH	8. Date Code : 2218, Years = 2022, Weeks = 18

IGBT 吸收電容器 (直接安裝) - SMIT series

IGBT Snubber Capacitors (Direct Mounting)

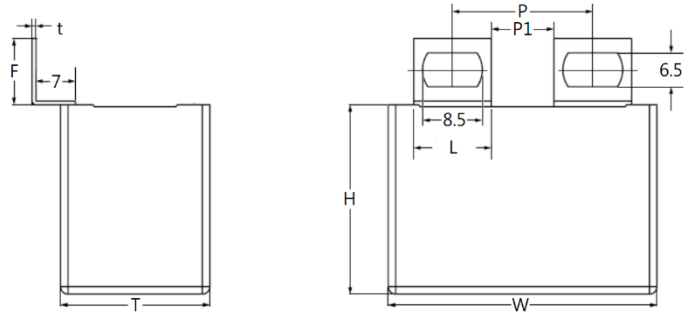
■ **電容器圖紙和端子樣式(表一) Capacitor Drawings and Terminal Styles (Table I)**

Style 1



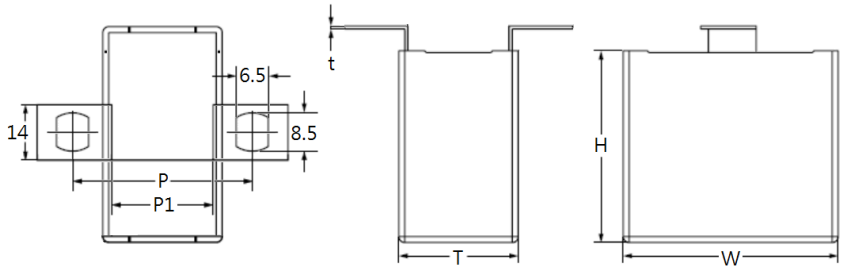
Terminals	Code	F (mm)	t (mm)
Solder slice	DR045	15	1.0
Solder slice	DR433	19	0.8

Style 2



Terminals	Code	F (mm)	t (mm)
Solder slice	DR044	14	0.8
Solder slice	DR141	13	0.8

Style 3



Terminals	Code	F (mm)	t (mm)
Solder slice	DR045	15	1.0
Solder slice	DR433	19	0.8

IGBT 吸收電容器 (直接安裝) - SMIT series

IGBT Snubber Capacitors (Direct Mounting)

■ Dimensions (mm)

630Vdc/700Vdc (420Vac)									
Cap. μF	$W_{\pm 1.0}$	$H_{\pm 1.0}$	$T_{\pm 1.0}$	dV/dt (V/us)	I_{PEAK} (A)	ESR @100kHz (mΩ)	L_S (nH)	I_{max} @100kHz (A)	Part number
0.68	37	25	15	900	612	5.0	23	9	SMIT_684+0630D*##DP
1.0	37	30	16	900	900	5.0	23	12	SMIT_105+0630D*##DP
1.2	37	30	16	900	1080	4.5	23	14	SMIT_125+0630D*##DP
1.5	37	34	20	900	1350	4.5	23	17	SMIT_155+0630D*##DP
1.8	37	34	20	900	1620	4.5	23	18	SMIT_185+0630D*##DP
2.0	42	40	20	600	1200	4.0	29	18	SMIT_205+0630D*##DP
2.2	42	40	20	600	1320	4.0	29	18.5	SMIT_225+0630D*##DP
2.5	42	40	20	600	1500	4.0	29	19	SMIT_255+0630D*##DP
3.0	42	44	24	600	1800	4.0	29	20	SMIT_305+0630D*##DP
3.3	42	44	24	600	1980	3.5	29	20	SMIT_335+0630D*##DP
4.0	42	44	24	600	2400	3.5	29	21	SMIT_405+0630D*##DP
4.7	42	45	30	600	2820	3.5	29	23	SMIT_475+0630D*##DP
5.0	42	45	30	600	3000	3.0	29	23.5	SMIT_505+0630D*##DP
6.0	42	43	42	600	3600	3.0	29	25	SMIT_605+0630D*##DP
6.5	42	43	42	600	3900	3.0	29	26	SMIT_655+0630D*##DP
6.5	57	45	30	360	2340	2.5	33	24	SMIT_655+0630D*##DP
7.0	57	45	30	360	2520	2.5	33	25	SMIT_705+0630D*##DP
8.0	57	50	35	360	2880	2.5	33	27	SMIT_805+0630D*##DP
9.0	57	50	35	360	3240	2.5	33	29	SMIT_905+0630D*##DP

Notes

(1) The symbol + means capacitance tolerance (J=±5%, K=±10%)

(2) The symbol * means style of solder slice

(3) The symbol ## means distance of hole

(4) Rated voltage pulse slope (dV/dt) at voltage U_{NDC}

(5) Maximum RMS current at 100 kHz, θ_{amb}=70 °C (cooling-air temperature), $\Delta\theta_{case}$=15°C (container temperature rise)

(6) Equivalent series resistance and L_S are typical values at f = 100 kHz

IGBT 吸收電容器 (直接安裝) - SMIT series

IGBT Snubber Capacitors (Direct Mounting)

■ Dimensions (mm)

850Vdc (450Vac)									
Cap. μF	$W_{\pm 1.0}$	$H_{\pm 1.0}$	$T_{\pm 1.0}$	dV/dt (V/us)	I_{PEAK} (A)	ESR @100kHz (mΩ)	L_S (nH)	I_{max} @100kHz (A)	Part number
0.47	37	25	15	1200	564	5.0	23	9	SMIT_474+0850D*##DP
0.68	37	30	16	1200	816	5.0	23	12	SMIT_684+0850D*##DP
1.0	37	34	20	1200	1200	5.0	23	14	SMIT_105+0850D*##DP
1.2	37	34	20	1200	1440	5.0	23	16	SMIT_125+0850D*##DP
1.5	37	34	20	1200	1880	5.0	23	18	SMIT_155+0850D*##DP
1.5	42	40	20	750	1125	4.5	29	18.5	SMIT_155+0850D*##DP
2.0	42	40	20	750	1500	4.5	29	19	SMIT_205+0850D*##DP
2.2	42	40	20	750	1650	4.5	29	19.5	SMIT_225+0850D*##DP
2.5	42	44	24	750	1875	4.5	29	20	SMIT_255+0850D*##DP
3.0	42	44	24	750	2250	4.5	29	21	SMIT_305+0850D*##DP
3.3	42	45	30	750	2475	4.5	29	21.5	SMIT_335+0850D*##DP
4.0	42	43	42	750	3000	4.5	29	22	SMIT_405+0850D*##DP
4.0	57	45	30	450	1800	4.0	33	23	SMIT_405+0850D*##DP
4.7	57	45	30	450	2115	4.0	33	24.5	SMIT_475+0850D*##DP
5.0	57	45	30	450	2250	4.0	33	25	SMIT_505+0850D*##DP
6.0	57	50	35	450	2700	4.0	33	26	SMIT_605+0850D*##DP
6.5	57	50	35	450	2925	4.0	33	27	SMIT_655+0850D*##DP

Notes

(1) The symbol + means capacitance tolerance (J=±5%, K=±10%)

(2) The symbol * means style of solder slice

(3) The symbol ## means distance of hole

(4) Rated voltage pulse slope (dV/dt) at voltage U_{NDC}

(5) Maximum RMS current at 100 kHz, θ_{amb}=70 °C (cooling-air temperature), $\Delta\theta_{case}$=15°C (container temperature rise)

(6) Equivalent series resistance and L_S are typical values at f = 100 kHz

IGBT 吸收電容器 (直接安裝) - SMIT series

IGBT Snubber Capacitors (Direct Mounting)

■ Dimensions (mm)

1000Vdc (500Vac)									
Cap. μF	$W_{\pm 1.0}$	$H_{\pm 1.0}$	$T_{\pm 1.0}$	dV/dt (V/us)	I_{PEAK} (A)	ESR @100kHz (mΩ)	L_S (nH)	I_{max} @100kHz (A)	Part number
0.47	37	25	15	1300	611	5.0	23	9	SMIT_474+1000D*##DP
0.68	37	30	16	1300	884	5.0	23	10.5	SMIT_684+1000D*##DP
0.82	37	30	16	1300	1066	5.0	23	12	SMIT_824+1000D*##DP
1.0	37	34	20	1300	1300	4.5	23	15	SMIT_105+1000D*##DP
1.2	37	34	20	1300	1560	4.5	23	17	SMIT_125+1000D*##DP
1.2	42	40	20	850	1020	4.5	29	16	SMIT_125+1000D*##DP
1.5	42	40	20	850	1275	4.5	29	16	SMIT_155+1000D*##DP
2.0	42	44	24	850	1700	4.5	29	17	SMIT_205+1000D*##DP
2.2	42	44	24	850	1870	4.0	29	20	SMIT_225+1000D*##DP
2.5	42	45	30	850	2125	4.0	29	21	SMIT_255+1000D*##DP
3.0	42	45	30	850	2550	4.0	29	21.5	SMIT_305+1000D*##DP
3.3	42	43	42	850	2805	4.0	29	22	SMIT_335+1000D*##DP
3.3	57	45	30	500	1650	4.0	33	20	SMIT_335+1000D*##DP
4.0	57	45	30	500	2000	4.0	33	21	SMIT_405+1000D*##DP
4.7	57	50	35	500	2350	4.0	33	22	SMIT_475+1000D*##DP
5.0	57	50	35	500	2500	4.0	33	23	SMIT_505+1000D*##DP

Notes

(1) The symbol + means capacitance tolerance (J=±5%, K=±10%)

(2) The symbol * means style of solder slice

(3) The symbol ## means distance of hole

(4) Rated voltage pulse slope (dV/dt) at voltage U_{NDC}

(5) Maximum RMS current at 100 kHz, θ_{amb}=70 °C (cooling-air temperature), $\Delta\theta_{case}$=15°C (container temperature rise)

(6) Equivalent series resistance and L_S are typical values at f = 100 kHz

IGBT 吸收電容器 (直接安裝) - SMIT series

IGBT Snubber Capacitors (Direct Mounting)

■ Dimensions (mm)

1200Vdc (600Vac)									
Cap. μF	$W_{\pm 1.0}$	$H_{\pm 1.0}$	$T_{\pm 1.0}$	dV/dt (V/us)	I_{PEAK} (A)	ESR @100kHz (mΩ)	L_S (nH)	I_{max} @100kHz (A)	Part number
0.33	37	25	15	1500	495	4.5	23	9	SMIT_334+1200D*##DP
0.47	37	30	16	1500	705	4.5	23	11	SMIT_474+1200D*##DP
0.68	37	34	20	1500	1020	4.5	23	12.5	SMIT_684+1200D*##DP
0.75	37	34	20	1500	1125	4.5	23	13	SMIT_754+1200D*##DP
0.82	42	40	20	950	779	4.0	29	14.5	SMIT_824+1200D*##DP
1.0	42	40	20	950	950	4.0	29	16	SMIT_105+1200D*##DP
1.2	42	44	24	950	1140	4.0	29	19	SMIT_125+1200D*##DP
1.5	42	44	24	950	1425	4.0	29	19.5	SMIT_155+1200D*##DP
2.0	42	45	30	950	1900	4.0	29	20	SMIT_205+1200D*##DP
2.2	42	43	42	950	2090	4.0	29	21	SMIT_225+1200D*##DP
2.5	42	43	42	950	2375	4.0	29	22	SMIT_255+1200D*##DP
2.2	57	45	30	600	1320	3.8	33	20	SMIT_225+1200D*##DP
2.5	57	45	30	600	1500	3.8	33	21	SMIT_255+1200D*##DP
3.0	57	45	30	600	1800	3.8	33	22	SMIT_305+1200D*##DP
3.3	57	50	35	600	1980	3.8	33	23	SMIT_335+1200D*##DP
4.0	57	50	35	600	2400	3.8	33	24	SMIT_405+1200D*##DP

Notes

(1) The symbol + means capacitance tolerance (J=±5%, K=±10%)

(2) The symbol * means style of solder slice

(3) The symbol ## means distance of hole

(4) Rated voltage pulse slope (dV/dt) at voltage U_{NDC}

(5) Maximum RMS current at 100 kHz, θ_{amb}=70 °C (cooling-air temperature), $\Delta\theta_{case}$=15°C (container temperature rise)

(6) Equivalent series resistance and L_S are typical values at f = 100 kHz

IGBT 吸收電容器 (直接安裝) - SMIT series

IGBT Snubber Capacitors (Direct Mounting)

■ Dimensions (mm)

1600Vdc (650Vac)									
Cap. μF	$W_{\pm 1.0}$	$H_{\pm 1.0}$	$T_{\pm 1.0}$	dV/dt (V/us)	I_{PEAK} (A)	ESR @100kHz (mΩ)	L_S (nH)	I_{max} @100kHz (A)	Part number
0.22	37	25	15	1900	418	6.0	23	8	SMIT_224+1600D*##DP
0.33	37	30	16	1900	627	6.0	23	10	SMIT_334+1600D*##DP
0.39	37	34	20	1900	741	5.5	23	12	SMIT_394+1600D*##DP
0.47	37	34	20	1900	893	5.5	23	14	SMIT_474+1600D*##DP
0.68	42	40	20	1250	850	4.0	29	16	SMIT_684+1600D*##DP
0.82	42	44	24	1250	1025	4.0	29	19	SMIT_824+1600D*##DP
1.0	42	45	30	1250	1250	4.0	29	19.5	SMIT_105+1600D*##DP
1.2	42	45	30	1250	1500	4.0	29	20	SMIT_125+1600D*##DP
1.5	42	43	42	1250	1875	4.0	29	21	SMIT_155+1600D*##DP
1.5	57	45	30	750	1125	3.5	33	22	SMIT_155+1600D*##DP
2.0	57	50	35	750	1500	3.5	33	24	SMIT_205+1600D*##DP

Notes

(1) The symbol + means capacitance tolerance (J=±5%, K=±10%)

(2) The symbol * means style of solder slice

(3) The symbol ## means distance of hole

(4) Rated voltage pulse slope (dV/dt) at voltage U_{NDC}

(5) Maximum RMS current at 100 kHz, θ_{amb}=70 °C (cooling-air temperature), $\Delta\theta_{case}$=15°C (container temperature rise)

(6) Equivalent series resistance and L_S are typical values at f = 100 kHz

IGBT 吸收電容器 (直接安裝) - SMIT series

IGBT Snubber Capacitors (Direct Mounting)

■ Dimensions (mm)

1700Vdc (675Vac)									
Cap. μF	$W_{\pm 1.0}$	$H_{\pm 1.0}$	$T_{\pm 1.0}$	dV/dt (V/us)	I_{PEAK} (A)	ESR @100kHz (mΩ)	L_S (nH)	I_{max} @100kHz (A)	Part number
0.15	37	25	15	2000	300	7.0	23	7	SMIT_154+1700D*##DP
0.22	37	30	16	2000	440	6.0	23	9	SMIT_224+1700D*##DP
0.33	37	34	20	2000	660	5.5	23	11.5	SMIT_334+1700D*##DP
0.39	37	34	20	2000	780	5.5	23	13	SMIT_394+1700D*##DP
0.47	42	36	24	1260	592	4.0	29	14	SMIT_474+1700D*##DP
0.56	42	36	24	1260	706	4.0	29	15.5	SMIT_564+1700D*##DP
0.68	42	44	24	1260	857	3.5	29	18	SMIT_684+1700D*##DP
0.82	42	44	24	1260	1033	3.5	29	19	SMIT_824+1700D*##DP
1.0	42	45	30	1260	1260	3.5	29	20	SMIT_105+1700D*##DP
1.2	42	43	42	1260	1512	3.5	29	21	SMIT_125+1700D*##DP
1.0	57	45	25	780	780	3.5	33	18	SMIT_105+1700D*##DP
1.2	57	43.5	29.5	780	936	3.5	33	19	SMIT_125+1700D*##DP
1.5	57	50	35	780	1170	3.0	33	22	SMIT_155+1700D*##DP
2.0	57	50	35	780	1560	3.0	33	24	SMIT_205+1700D*##DP
3.0	57	55	45	780	2340	3.0	33	28	SMIT_305+1700D*##DP

Notes

(1) The symbol + means capacitance tolerance (J=±5%, K=±10%)

(2) The symbol * means style of solder slice

(3) The symbol ## means distance of hole

(4) Rated voltage pulse slope (dV/dt) at voltage U_{NDC}

(5) Maximum RMS current at 100 kHz, θ_{amb}=70 °C (cooling-air temperature), $\Delta\theta_{case}$=15°C (container temperature rise)

(6) Equivalent series resistance and L_S are typical values at f = 100 kHz

IGBT 吸收電容器 (直接安裝) - SMIT series

IGBT Snubber Capacitors (Direct Mounting)

■ Dimensions (mm)

2000Vdc (700Vac)									
Cap. μF	$W_{\pm 1.0}$	$H_{\pm 1.0}$	$T_{\pm 1.0}$	dV/dt (V/us)	I_{PEAK} (A)	ESR @100kHz (mΩ)	L_S (nH)	I_{max} @100kHz (A)	Part number
0.10	37	25	15	2241	224	8.0	23	7	SMIT_104+2000D*##DP
0.15	37	25	15	2241	336	8.0	23	8.5	SMIT_154+2000D*##DP
0.22	37	30	16	2241	493	6.0	23	10	SMIT_224+2000D*##DP
0.33	37	34	20	2241	740	6.0	23	13	SMIT_334+2000D*##DP
0.47	42	40	20	1300	611	4.0	29	15.5	SMIT_474+2000D*##DP
0.56	42	44	24	1300	728	4.0	29	18	SMIT_564+2000D*##DP
0.68	42	44	24	1300	884	3.5	29	18.5	SMIT_684+2000D*##DP
0.82	42	45	30	1300	1066	3.5	29	19	SMIT_824+2000D*##DP
1.0	42	43	42	1300	1300	3.5	29	21	SMIT_105+2000D*##DP
1.0	57	45	30	850	850	4.0	33	24	SMIT_105+2000D*##DP
1.2	57	45	30	850	1020	4.0	33	23	SMIT_125+2000D*##DP
1.5	57	50	35	850	1275	4.0	33	24	SMIT_155+2000D*##DP

Notes

(1) The symbol + means capacitance tolerance (J=±5%, K=±10%)

(2) The symbol * means style of solder slice

(3) The symbol ## means distance of hole

(4) Rated voltage pulse slope (dV/dt) at voltage U_{NDC}

(5) Maximum RMS current at 100 kHz, θ_{amb}=70 °C (cooling-air temperature), $\Delta\theta_{case}$=15°C (container temperature rise)

(6) Equivalent series resistance and L_S are typical values at f = 100 kHz

IGBT 吸收電容器 (直接安裝) - SMIT series

IGBT Snubber Capacitors (Direct Mounting)

■ Dimensions (mm)

2500Vdc (725Vac)									
Cap. μF	$W_{\pm 1.0}$	$H_{\pm 1.0}$	$T_{\pm 1.0}$	dV/dt (V/us)	I_{PEAK} (A)	ESR @100kHz (mΩ)	L_S (nH)	I_{max} @100kHz (A)	Part number
0.068	37	25	15	3230	220	8.5	23	6.5	SMIT_683+2500D*##DP
0.10	37	30	16	3230	323	8.5	23	8	SMIT_104+2500D*##DP
0.15	37	34	20	3230	485	8.0	23	11	SMIT_154+2500D*##DP
0.18	37	34	20	3230	581	7.5	23	12.5	SMIT_184+2500D*##DP
0.22	42	40	20	2100	462	4.0	29	14	SMIT_224+2500D*##DP
0.33	42	44	24	2100	693	4.0	29	15.5	SMIT_334+2500D*##DP
0.47	42	45	30	2100	987	3.5	29	18	SMIT_474+2500D*##DP
0.68	42	43	42	2100	1428	3.5	29	18.5	SMIT_684+2500D*##DP
0.68	57	45	30	1200	816	3.5	33	19	SMIT_684+2500D*##DP
1.0	57	50	35	1200	1200	3.5	33	19.5	SMIT_105+2500D*##DP

3000Vdc (750Vac)									
Cap. μF	$W_{\pm 1.0}$	$H_{\pm 1.0}$	$T_{\pm 1.0}$	dV/dt (V/us)	I_{PEAK} (A)	ESR @100kHz (mΩ)	L_S (nH)	I_{max} @100kHz (A)	Part number
0.047	37	25	15	3361	158	8.5	23	7.5	SMIT_473+3000D*##DP
0.068	37	30	16	3361	229	8.0	23	9	SMIT_683+3000D*##DP
0.10	37	34	20	3361	336	7.5	23	10.5	SMIT_104+3000D*##DP
0.15	37	34	20	3361	504	7.0	23	12	SMIT_154+3000D*##DP
0.22	42	40	20	2050	451	5.0	29	13	SMIT_224+3000D*##DP
0.33	42	45	30	2050	677	4.5	29	16.5	SMIT_334+3000D*##DP
0.47	42	43	42	2050	964	4.0	29	18	SMIT_474+3000D*##DP
0.47	42	45	30	1200	564	4.0	33	18.5	SMIT_474+3000D*##DP
0.68	57	50	35	1200	816	4.0	33	19	SMIT_684+3000D*##DP
0.82	57	50	35	1200	984	3.5	33	20	SMIT_824+3000D*##DP

IGBT 吸收電容器 (直接安裝) - SMIT series

IGBT Snubber Capacitors (Direct Mounting)

■ 檢驗要求 Inspection requirements

測試項目 Test item	性能要求 Performance requirements	試驗條件 Conditions of test
例行試驗 Routine test		
外觀檢查 External inspection	按規定清晰的標記 Legible marking as specified	--
尺寸 Dimensions	見規格圖紙 See specification drawing	--
電容量 Capacitance	在規定公差內 Within the tolerance specified	室溫 1 kHz at room temperature
損耗因素 tan δ Dissipation Factor	≤ 10 x 10^{-4} at 1kHz, 1Vrms	室溫 1 kHz at room temperature
端子間的電壓試驗 Voltage test between terminal	無可見損傷或刺穿，沒有閃絡 No visible damage or puncture, No flashover	1.5 x U_{NDC} 持續時間 Duration 10 seconds
絕緣電阻 Insulation resistance	C_N ≤ 0.33μF, IR ≥ 15 000MΩ C_N > 0.33μF, IR x C_R ≥ 5 000s	25℃, 100Vdc, 60 seconds
型式試驗 Type Tests		
振動 Vibration	沒有可見的損壞 No visible damage (1) ▵C/C ≤ 0.5% of the initial value (2) Increase of tan δ ≤ 0.005	頻率 F=10 Hz to 55 Hz 振幅 Amplitude±0.35mm 測試持續時間 Test duration: 10 frequency cycles 3 個軸向互成 90° 3 axes offset from each other by 90° 1 倍頻程/分钟 1 octave/min
端子間的電壓試驗 Voltage test between terminals	(1) ▵C/C ≤ 0.5% of the initial value (2) Increase of tan δ ≤ 1.2 x initial tan δ + 0.0001 (3) IR ≥ 50 % of specified values	1.5 x U_{NDC} at T_{amb} 持續時間 Duration 60 s
衝擊放電試驗 Surge discharge test	(1) ▵C/C ≤ 1.0% of the initial value (2) tan δ ≤ 1.2 x initial tan δ + 0.0001	1.1 x U_{NDC} 放電次數 Number of discharges: 5 時間推移 Time lapse: every 2 min (10 min total) 在衝擊放電試驗之後的 5 分鐘內 Within 5 min after the surge discharge test 1.5 x U_{NDC} at T_{amb}，持續時間 Duration 60 s
自愈性試驗 Self-healing test	(1) ▵C/C ≤ 0.5% of the initial value (2) tan δ ≤ 1.2 x initial tan δ + 0.0001	1.5 x U_{NDC}，持續時間 Duration 10 s 自愈性擊穿次數 Number of clearings ≤ 5, 以 100V/s 升壓直到 5 次自愈或 2.5 x U_{NDC}, 持續 10 s Increase the voltage at 100 V/s till 5 clearings occur or until voltage reach max. of 2.5 x U_{NDC} for a duration of 10 s

■ 檢驗要求 Inspection requirements

測試項目 Test item	性能要求 Performance requirements	試驗條件 Conditions of test
溫度變化 Change of temperature	無擊穿或閃絡 No puncturing or flashover 允許自愈擊穿 Self healing punctures are permitted (1) $\triangle C/C \leq 2.0\%$ of the initial value (2) Increase of tan $\delta \leq 0.015$	Test Nb 上限溫度 $T_{max.}$ = +85°C 下限溫度 $T_{min.}$ = -40°C 過渡時間 Transition time: 1h, 5 cycles
恒定濕熱試驗 Damp heat steady state		Test Ca T = 40°C ±2°C RH = 93% ±3% 持續時間 Duration 56 days
端子間的電壓試驗 Voltage test between terminals		1.5 x U_{NDC} at T_{amb} 持續時間 Duration 60 s
熱穩定性試驗 Thermal stability test under overload conditions	溫升 Temperature rise < 1°C (1) $\triangle C/C \leq 2.0\%$ of the initial value (2) Increase of tan $\delta \leq 1.2$ x initial $\delta + 0.015$	自然冷卻 Natural cooling T_{amb} ±5°C 1.21 x Pmax. = $(U_2/2)$ x W_2 x C x tan δ = 1.21 x $(I^2_{max.} / W_2 \times C)$ x tan δ_2 with $W_2 = 2 \times p \times f_2$ For I_{RMS} 見參考資料 see specific reference data f_2 = 10 kHz 持續時間 Duration 48 h 在試驗的最後 6 h，每 1.5 h 測量一次溫度 Measure the temperature every 1.5 h during the last 6 h
端子間的耐久性試驗 Endurance test between terminals	(1) $\triangle C/C \leq 3.0\%$ of the initial value (2) Increase of tan $\delta \leq 0.015$	Sequence: 1.3 x U_{NDC} at $T_{max.}$= 85°C 持續時間 Duration 500 h 1000 x discharge at 1.4 x Î (最大峰值電流 Maximum peak current) 1.3 x U_{NDC} at $T_{max.}$= 85°C 持續時間 Duration 500 h