



# **TECS-series**



### Feature

Small and Lightweight High efficiency Harmonic attenuator (Complies with IEC61000-3-2) Universal input (85-264VAC) Built-in inrush current, overcurrent and overvoltage protection circuits ClassII

### Safety agency approvals

UL62368-1, C-UL (equivalent to CAN/CSA-C22.2 No.62368-1), EN62368-1 Complies with DEN-AN

### **5-year warranty** (refer to Instruction Manual)

### CE marking

Low Voltage Directive RoHS Directive

### UKCA marking

Electrical Equipment Safety Regulations RoHS Regulations

### EMI

Complies with CISPR11-B, CISPR32-B, EN55011-B, EN55032-B, FCC Part 15-B, FCC Part 18-B, VCCI-B

### EMS Compliance : EN61204-3, EN61000-6-2

EN61000-4-2 EN61000-4-3 EN61000-4-4 EN61000-4-5 EN61000-4-6 EN61000-4-8 EN61000-4-11



This power supply is manufactured by SMD technology. The stress to PCB like twisting or bending causes the defect of the unit, so handle the unit with care. \*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	TECS45F-5	ECS45F-5 TECS45F-12 T		TECS45F-24	TECS45F-24-H	
MAX OUTPUT WATTAGE[W] *2	40.0	45.6	45.6 (65.4)	45.6	45.6 (66.0)	
DC OUTPUT *2	5V 8.0A	12V 3.8A	12V 3.8 (5.45) A	24V 1.9A	24V 1.9 (2.75) A	

### **SPECIFICATIONS**

VOLTAGE[VAC]         els         2564 1 é (Refer to "Derating" and Instruction Manual 1.1)           CURRENT[A]         ACN 100V         0.90typ         0.90typ           FREQUENCY[Hz]         50 / 60 (45 - 66)         0.90typ         90.5typ         91.5typ         91.5typ         91.5typ           EFFICIENCY[%)         ACN 100V         90.0typ         90.5typ         91.5typ         91.5typ         92.5typ         92.5typ           INRUSH CURRENT[A]         ACN 100V         300ty (to=100%) Ta=25C at cold start         ACN 100V         24.4 (24           CUTAGE[V]         5         12         12         24         24           VOLTAGE[V]         5         12         12         24         24           CURRENT[A]         40.0         3.8         3.8 (Peak 5.45)         1.9         1.9 (Peak 2.75)           UNITAGE[V]         6         0.0         3.8         3.8 (Peak 5.45)         1.9         1.9 (Peak 2.75)           UNITAGE[V]         40max         40max         40max         40max         300max         360max         150max           CURRENT[A]         40max         100max         100max         100max         120max         480max         98max         240max         240max         240max		MODEL		TECS45F-5	TECS45F-12	TECS45F-12-H	TECS45F-24	TECS45F-24		
CURRENT[A]         ACN 10W         0.80 kpp         0.90 kpp           FREQUENCY[Hz]         50 / 60 (45 - 66)         0.50 kpp         90.51 kpp         91.51 kpp         91.51 kpp         91.51 kpp           EFFICIENCY[%]         ACN 10W         90.0 kpp         91.51 kpp         92.51		VOLTAGE[VAC]	*2	85 - 264 1 φ (Refer to '	Derating" and Instruction	n Manual 1.1)				
VOLHENT[A]         ACIN 230V         0.45typ         0.50typ           FREQUENCY[Hz]         50 / 60 (45 - 66)         90.5typ         91.5typ         91.5typ         91.5typ         92.5typ         92.5typ<	INPUT		ACIN 100V	0.80typ	0.90yp					
PNPUT         FREQUENCY[Hz]         50 / 60 (45 - 66)           EFFICIENCY[%]         ACIN 100V         90.0typ         90.5typ         91.5typ         91.5typ         92.5typ         92.5typ           INRUSH CURRENT[A]         ACIN 100V         300 typ (lo=100%) Ta=25 C at cold start         ACIN 100V         300 typ (lo=100%) Ta=25 C at cold start           LEAKAGE CURRENT[A]         0.25max (ACIN 240V, 60Hz, lo=100%, According to IEC62368-1, and DEN-AN)         24         24           VOLTAGE[V]         5         12         12         24         24           CURRENT[A]         0.25max (ACIN 240V, 60Hz, lo=100%, According to IEC62368-1, and DEN-AN)         1.9 (Peak 2.75)           LINE REGULATION[mV]         20max         48max         48max         96max           LOAD REGULATION[mV]         20max         48max         300max         360max           RIPPLE [mVp-p]         410±80°c         300max         380max         360max         480max           TEMPRATIVE REGULATION[mV]         40max         120max         120max         240max         240max           INPL VOLTAGE SETTING[MV]         40max         130max         380max         380max         380max         290max           PIPLE NOISE[mVp-p]         40±80°c         300max         380max         1		CORRENT[A]	ACIN 230V	0.45typ 0.50typ						
NPUT         EFFICIENCY[%]         ACM 160V         90.0typ         90.5typ         90.5typ         91.5typ         91.5typ         92.5typ		FREQUENCY[Hz]		50 / 60 (45 - 66)	50 / 60 (45 - 66)					
EFFCLENCT[%]         ACIN 20W         90.5typ         91.5typ         91.5typ         92.5typ         92.5typ           INRUSH CURRENT[A]         ACIN 20W         30.5typ (10=100%) Ta=25°C at cold start			ACIN 100V	90.0typ	90.5typ	90.5typ	91.5typ	91.5typ		
INRUSH CURRENT[A]         ACIN 100V ACIN 200V ACIN 200V 6 Styp (10=100%) Ta=25°C at cold start           LEAKAGE CURRENT[mA]         0.25max (ACIN 240V, 60Hz, 10=100%, According to IEC62368-1, and DEN-AN)           VOLTAGE[V]         5         12         12         24         24           CURRENT[A]         **         8.0         3.8         3.8 (Peak 5.45)         1.9         1.9 (Peak 2.75)           LINE REGULATION[TV]         **         8.0         3.8         3.8 (Peak 5.45)         1.9         1.9 (Peak 2.75)           RIPPLE INDEE[TM/P_P]         **         40max         40max         40max         40max         300max         300max </th <th>EFFICIENCY[%]</th> <th>ACIN 230V</th> <th>90.5typ</th> <th>91.5typ</th> <th>91.5typ</th> <th>92.5typ</th> <th>92.5typ</th>		EFFICIENCY[%]	ACIN 230V	90.5typ	91.5typ	91.5typ	92.5typ	92.5typ		
INNUS         INNUS         Gityp (lo=100%) Ta=25°C at cold start           LEAKAGE CURRENT[MA]         0.25max (ACIN 240V, 60Hz, lo=100%, According to IEC62368-1, and DEN-AN)           VOLTAGE[V]         5         12         24         24           CURRENT[A]         0.25max (ACIN 240V, 60Hz, lo=100%, According to IEC62368-1, and DEN-AN)         1.9 (Peak 2.75)           LINE REGULATION[mV]         9         8.0         3.8         3.8 (Peak 5.45)         1.9         1.9 (Peak 2.75)           LINE REGULATION[mV]         9         20max         48max         48max         96max         96max         96max           RIPPLE[mVp-p]         410+40°c4         300max         300max         300max         360max         150max           RIPPLE NOISE[mVp-p]         410+40°c4         50max         120max         120max         240max         240max           DIFT[mV]         400+40°c4         50max         150max         150max         20max         240max         240max         240max           DIFT[mV]         400+40°c4         50max         150max         150max         20max         240max			ACIN 100V	30typ (lo=100%) Ta=2	25℃ at cold start					
LEAKAGE CURRENT[mA]         0.25max (ACIN 240V, 60Hz, lo=100%, According to IEC62368-1, and DEN-AN)           VOLTAGE[V]         5         12         12         24         24           CURRENT[A]         5         12         12         24         24           CURRENT[A]         5         12         12         24         24           CURRENT[A]         5         0.3.8         3.8 (Peak 5.45)         1.9         1.9 (Peak 2.75)           LINE REGULATION[mV]         40max         40max         100max         150max         150max           RIPLE [mVp-p]         40m40%         240max         300max         380max         380max         360max         360max           RIPLE NOSE[mVp-p]         40m40%         300max         380max         380max         290max         290max         290max           DRIFT[mV]         €         20max         48max         48max         96max         96max           START-UP TIME[ms]         10typ (ACIN 100V, Io=80%) / 60typ (ACIN 230V, Io=100%)         0000%         23.00 to 25.00         23.00 to 25.00 <th></th> <th>INRUSH CORRENT[A]</th> <th>ACIN 230V</th> <th>65typ (lo=100%) Ta=2</th> <th>25℃ at cold start</th> <th></th> <th></th> <th></th>		INRUSH CORRENT[A]	ACIN 230V	65typ (lo=100%) Ta=2	25℃ at cold start					
VOLTAGE[V]         5         12         12         24         24           CURRENT[A]         ±2         8.0         3.8         3.8 (Peak 5.45)         1.9         1.9 (Peak 2.75)           LINE REGULATION[mV]         ±2         8.0 max         48max         48max         96max         96max           LOAD REGULATION[mV]         ±2         40max         100max         100max         150max         150max           RIPPLE[mVp-p]         ±4         40max         300max         300max         360max         360max           RIPPLE[mVp-p]         ±4         40±%0.5         50max         120max         120max         240max         240max           TEMPERATURE REGULATION[m]         ±6         60max         150max         150max         290max         290max           TEMPERATURE REGULATION[m]         ±6         20max         48max         48max         96max         96max           START-UP TIME[ms]         200ty (ACIN 100V, Io=100%)         100mp(ACIN 100V, Io=100%)         11.50 to 12.50         23.00 to 25.00         23.00 to 25.00           VERCURENT PROTECTION         VOLTAGE SETTING[V]         4.90 to 5.30         11.50 to 12.50         23.00 to 25.00         26.40 to 31.20           VIPPOTUTOLTAGE SETTING[V]		LEAKAGE CURREN	T[mA]	0.25max (ACIN 240V,	60Hz, lo=100%, Accore	ding to IEC62368-1, an	d DEN-AN)			
CURRENT[A]         *2         8.0         3.8         3.8 (Peak 5.45)         1.9         1.9 (Peak 2.75)           LINE REGULATION[mV]         *2         20max         48max         48max         96max         96max           LOAD REGULATION[mV]         *4         40max         100max         100max         150max         150max           RIPPLE [mVp-p]         *140±400*         240max         300max         380max         380max         480max         480max           RIPPLE NOISE[mVp-p]         *140±400*         240max         300max         380max         240max         240max           TEMPEATURE REGULATION[mV]         00±400*         50max         120max         120max         240max         240max           DBIFT[mV]         *6         20max         48max         48max         96max         290max         290max           DRIFT[mV]         *6         20max         48max         48max         96max         96max           START-UP TIME[ms]         200ty (ACIN 100V, Io=100%)         00trput / 000%)         00trput / 000%)         23.00 to 25.00         24.00 to 31.20         26.40 to 31.20		VOLTAGE[V]		5	12	12	24	24		
LINE REGULATION[mV]         *2         20max         48max         48max         96max         96max           LOAD REGULATION[mV]         *3         40max         100max         100max         150max         150max           RIPPLE[mVp-p]         *4         40max         300max         360max         360max         360max           RIPPLE NOISE[mVp-p]         *4         40max         300max         380max         480max         480max           TEMPERATURE REGULATION[mV]         *4         40max         300max         380max         480max         480max           TEMPERATURE REGULATION[mV]         *4         40max         300max         380max         240max         240max           TEMPERATURE REGULATION[mV]         *0%         50max         120max         120max         290max         290max           TEMPERATUP TIME[ms]         200typ (ACIN 100V, Io=100%)          60max         96max         96max         96max           START-UP TIME[ms]         10typ (ACIN 100V, Io=80%) / 60typ (ACIN 230V, Io=100%)          00mox         23.00 to 25.00         23.00 to 25.00           OVERCURARENT PROTECTION         Works over 105% of rating (works over 101% of peak current at option -H) and recovers automatically           OVERATUR TEMP.HUMIDAND ALI		CURRENT[A]	*2	8.0	3.8	3.8 (Peak 5.45)	1.9	1.9 (Peak 2.75)		
DUTPUT         LOAD REGULATION[mV]         ***         40max         100max         100max         150max         360max           RIPPLE[mVPp]         ***         40max         300max         300max         360max         360max           RIPPLE[mVPp]**         40max         240max         300max         380max         480max         480max           RIPPLE[mVPp]**         40max         240max         240max         240max         240max           TEMPERATURE REGULATION[mV]         40max         120max         120max         240max         240max           TEMPERATURE REGULATION[mV]         ***         60max         150max         120max         240max         240max           TEMPERATURE REGULATION[mV]         ***         60max         150max         150max         290max         290max           TEMPERATURE REGULATION[mV]         ***         20max         48max         48max         96max         290max           TEMPERATURE REGULATION[mV]         ***         20max         48max         48max         96max         290max           TEMPERATURE INSTIME[ms]         200ty (ACIN 100V, lo=100%)         10.50 to 12.50         23.00 to 25.00         23.00 to 25.00         23.00 to 25.00         23.00 to 25.00         23.00 to 25.00 </th <th></th> <th>LINE REGULATION</th> <th>mV] *3</th> <th>20max</th> <th>48max</th> <th>48max</th> <th>96max</th> <th>96max</th>		LINE REGULATION	mV] *3	20max	48max	48max	96max	96max		
RIPPLE[mVp-p]         *         410± %0% ±         240max         300max         300max         360max         360max         360max         480max         240max		LOAD REGULATION	[mV] *3	40max	100max	100max	150max	150max		
PUTPUT         RIPPLE NOISE[mVp-p]*4         ····································		RIPPLE[mVp-p] *4	-10 to +50°C *5	240max	300max	300max	360max	360max		
TEMPERATURE REGULATION[MI]         Ib +50° ± 50max         120max         120max         240max         240max         240max           DRIFT[mV]         ±0         60max         150max         150max         290max         96max         <		RIPPLE NOISE[mVp-p]*4	-10 to +50°C *5	300max	380max	380max	480max	480max		
International Induction Induction       International Induction       Internatindin       International Induction </th <th rowspan="2">COTFOT</th> <th>TEMPERATURE REGULATION(mV)</th> <th>0 to +50°C *5</th> <th>50max</th> <th>120max</th> <th>120max</th> <th>240max</th> <th>240max</th>	COTFOT	TEMPERATURE REGULATION(mV)	0 to +50°C *5	50max	120max	120max	240max	240max		
DRIFT[mV]         **         20max         48max         48max         96max         96max           START-UP TIME[ms]         200typ (ACIN 100V, Io=100%)   <			-10 to +50°C *5	60max	150max	150max	290max	290max		
START-UP TIME[ms]         200typ (ACIN 100V, lo=100%)           HOLD-UP TIME[ms]         10typ (ACIN 100V, lo=80%) / 60typ (ACIN 230V, lo=100%)           OUTPUT VOLTAGE SETTING[V]         4.90 to 5.30         11.50 to 12.50         23.00 to 25.00         23.00 to 25.00           PROTECTION         OVERCURRENT PROTECTION         Works over 105% of rating (works over 101% of peak current at option -H) and recovers automatically           OVERVOLTAGE PROTECTION[V]         5.50 to 6.50         13.20 to 15.60         26.40 to 31.20         26.40 to 31.20           OPERATING INDICATION         Not provided           REMOTE SENSING         Not provided           SOLATION         INPUT-OUTPUT         3,000VAC 1minute, Cutoff current = 10mA, 500VDC 50MΩ min (At Room Temperature)           OPERATING TEMP,HUMID.AND ALITITUDE *2         -10 to +70°C, 20 - 90% RH (Non condensing), (Refer to "Derating"), 5,000m (16,500feet) max           STORAGE TEMP,HUMID.AND ALITITUDE *2         -10 to +75°C, 20 - 90% RH (Non condensing), 9,000m (30,000feet) max           STORAGE TEMP,HUMID.AND ALITITUDE *2         -10 to +75°C, 20 - 90% RH (Non condensing), 9,000m (30,000feet) max           STORAGE TEMP,HUMID.AND ALITITUDE *2         -10 to +75°C, 20 - 90% RH (Non condensing), 9,000m (30,000feet) max           STORAGE TEMP,HUMID.AND ALITITUDE *2         -10 to +75°C, 20 - 90% RH (Non condensing), 9,000m (30,000feet) max           IMPACT         196.1m/s² (20G), 11ms, once each X, Y and Z a		DRIFT[mV]	*6	20max	48max	48max	96max	96max		
HOLD-UP TIME[ms]         10typ (ACIN 100V, lo=80%) / 60typ (ACIN 230V, lo=100%)           OUTPUT VOLTAGE SETTING[V]         4.90 to 5.30         11.50 to 12.50         13.00 to 25.00         23.00 to 25.00           OVERCURRENT PROTECTION         Works over 105% of rating (works over 101% of peak current at option -H) and recovers automatically           OVERVOLTAGE PROTECTION[V]         5.50 to 6.50         13.20 to 15.60         26.40 to 31.20         26.40 to 31.20           OVERVOLTAGE PROTECTION[V]         5.50 to 6.50         13.20 to 15.60         13.20 to 15.60         26.40 to 31.20         26.40 to 31.20           OPERATING INDICATION         Not provided         The provided         The provided         The provided           SOLATION         INPUT-OUTPUT         3,000VAC 1minute, Cutoff current = 10mA, 500VDC 50MΩ min (At Room Temperature)         The provided           OPERATING TEMP,HUMID.AND ALTITUDE *2         -10 to +70°C, 20 - 90% RH (Non condensing), (Refer to "Derating"), 5,000m (16,500feet) max           STORAGE TEMP,HUMID.AND ALTITUDE *2         -10 to +75°C, 20 - 90% RH (Non condensing), 9,000m (30,000feet) max         The provided           STORAGE TEMP,HUMID.AND ALTITUDE *2         -10 to +75°C, 20 - 90% RH (Non condensing), 9,000m (30,000feet) max         The provided           STORAGE TEMP,HUMID.AND ALTITUDE *2         -10 to +75°C, 20 - 90% RH (Non condensing), 9,000m (30,000feet) max         The provided           STORAGE		START-UP TIME[ms]		200typ (ACIN 100V, Io=100%)						
OUTPUT VOLTAGE SETTING[V]         4.90 to 5.30         11.50 to 12.50         11.50 to 12.50         23.00 to 25.00         23.00 to 25.00           PROTECTION CIRCUIT AND DTHERS         OVERCURRENT PROTECTION[V]         5.50 to 6.50         13.20 to 15.60         13.20 to 15.60         26.40 to 31.20         26.40 to 31.20           OPERATING INDICATION DTHERS         Not provided         REMOTE SENSING         Not provided           SOLATION         INPUT-OUTPUT         3,000VAC 1minute, Cutoff current = 10mA, 500VDC 50MΩ min (At Room Temperature)         26.40 to 31.20           OPERATING TEMP, HUMID.AND ALTITUDE         *2         -10 to +70°C, 20 - 90% RH (Non condensing), (Refer to "Derating"), 5,000m (16,500feet) max           STORAGE TEMP, HUMID.AND ALTITUDE         *2         -10 to +75°C, 20 - 90% RH (Non condensing), 9,000m (30,000feet) max           INVIRONMENT         MPACT         196.1m/s² (20G), 3minutes period, 60minutes each along X, Y and Z axis           IMPACT         196.1m/s² (20G), 11ms, once each X, Y and Z axis           GONDUCTED NOISE         *7         Complies with CISPR11-B, CISPR32-B, EN55031-B, EN55032-B, FCC Part 15-B, FCC Part 18-B, VCCI-B           IEGULATION         LIC6308-1, C-UL (equivalent to CAN/CSA-C22.2No.62368-1), EN62368-1, Complies with DEN-AN           ONSE         Complies with LISC61000-3-2 (Class A) (No built-in power factor correction)           CASE SIZE/WEIGHT         2576 cmm [1 00 X0 93X 3 00 inc		HOLD-UP TIME[ms]		10typ (ACIN 100V, lo=80%) / 60typ (ACIN 230V, lo=100%)						
OVERCURRENT PROTECTION         Works over 105% of rating (works over 101% of peak current at option -H) and recovers automatically           OVERCURRENT PROTECTION[V]         5.50 to 6.50         13.20 to 15.60         26.40 to 31.20         26.40 to 31.20           OVERATING INDICATION         Not provided         26.40 to 31.20         26.40 to 31.20         26.40 to 31.20           OPERATING INDICATION         Not provided         3,000VAC 1minute, Cutoff current = 10mA, 500VDC 50MΩ min (At Room Temperature)         0           OPERATING TEMP, HUMIDAND ALTITUDE         3,000VAC 1minute, Cutoff current = 10mA, 500VDC 50MΩ min (At Room Temperature)         0           ENVIRONMENT         OPERATING TEMP, HUMIDAND ALTITUDE *2         -10 to +70°C, 20 - 90% RH (Non condensing), (Refer to "Derating"), 5,000m (16,500feet) max           STORAGE TEMP, HUMIDAND ALTITUDE         -20 to +75°C, 20 - 90% RH (Non condensing), 9,000m (30,000feet) max         3000VAC           NVIRONMENT         STORAGE TEMP, HUMIDAND ALTITUDE         -20 to +75°C, 20 - 90% RH (Non condensing), 9,000m (30,000feet) max         3000VAC           STORAGE TEMP, HUMIDAND ALTITUDE         -20 to +75°C, 20 - 90% RH (Non condensing), 9,000m (30,000feet) max         3000VAC           STORAGE TEMP, HUMIDAND ALTITUDE         -20 to +75°C, 20 - 90% RH (Non condensing), 9,000m (30,000feet) max         3000VAC           STORAGE TEMP, HUMIDAND ALTITUDE         -20 to +75°C, 20 - 90% RH (Non condensing), 9,000m (30,000feet) max         3000		OUTPUT VOLTAGE SETTING[V]		4.90 to 5.30	11.50 to 12.50	11.50 to 12.50	23.00 to 25.00	23.00 to 25.00		
INSTRUCTION INTEGRATING INDICATION       5.50 to 6.50       13.20 to 15.60       26.40 to 31.20       26.40 to 31.20         OPERATING INDICATION       Not provided         REMOTE SENSING       Not provided         SOLATION       INPUT-OUTPUT       3,000VAC 1minute, Cutoff current = 10mA, 500VDC 50MΩ min (At Room Temperature)         PREATING TEMP, HUMID.AND ALTITUDE *2       -10 to +70°C, 20 - 90%RH (Non condensing), (Refer to "Derating"), 5,000m (16,500feet) max         STORAGE TEMP, HUMID.AND ALTITUDE *2       -10 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max         INVIRONMENT       STORAGE TEMP, HUMID.AND ALTITUDE *2         AGENCY APPROVALS       10 - 55Hz, 19.6m/s² (2G), 3minutes period, 60minutes each along X, Y and Z axis         IMPACT       196.1m/s² (20G), 11ms, once each X, Y and Z axis         CONDUCTED NOISE *7       Complies with CISPR11-B, CISPR32-B, EN55031-B, EN55032-B, FCC Part 15-B, FCC Part 18-B, VCCI-B         EGULATION       423 54 23 54 76 2mm [1 00 X0 93 X 3 00 inches] (M X H X D) / 600 max (with convert : 800 max)	PROTECTION	OVERCURRENT PROT	ECTION	Works over 105% of ra	ating (works over 101%	of peak current at option	on -H) and recovers aut	omatically		
OPERATING INDICATION         Not provided           REMOTE SENSING         Not provided           SOLATION         INPUT-OUTPUT         3,000VAC 1minute, Cutoff current = 10mA, 500VDC 50MΩ min (At Room Temperature)           OPERATING TEMP,HUMID.AND ALTITUDE *2         -10 to +70°C, 20 - 90%RH (Non condensing), (Refer to "Derating"), 5,000m (16,500feet) max           INVIRONMENT         STORAGE TEMP,HUMID.AND ALTITUDE *2         -10 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max           INVIRONMENT         VIBRATION         10 - 55Hz, 19.6m/s² (2G), 3minutes period, 60minutes each along X, Y and Z axis           IMPACT         196.1m/s² (20G), 11ms, once each X, Y and Z axis           SAFETY AND         AGENCY APPROVALS         UL62368-1, C-UL (equivalent to CAN/CSA-C22.2No.62368-1), EN62368-1, Complies with DEN-AN           IOISE         CONDUCTED NOISE *7         Complies with CISPR11-B, CISPR32-B, EN55011-B, EN55032-B, FCC Part 15-B, FCC Part 18-B, VCCI-B           IEGULATION         LEC61000-3-2 (Class A) (No built-in power factor correction)           CASE SIZE/WEIGHT         254 × 235 × 76 cmm [1 00 × 0.93 × 3.00 inches] (W × H × D) / 600 max (with cover : 800 max)	CIRCUIT AND	OVERVOLTAGE PROTE	CTION[V]	5.50 to 6.50	13.20 to 15.60	13.20 to 15.60	26.40 to 31.20	26.40 to 31.20		
REMOTE SENSING         Not provided           SOLATION         INPUT-OUTPUT         3,000VAC 1minute, Cutoff current = 10mA, 500VDC 50MΩ min (At Room Temperature)           PRENTING TEMP,HUMID.AND ALTITUDE *2         -10 to +70°C, 20 - 90%RH (Non condensing), (Refer to "Derating"), 5,000m (16,500feet) max           INVIRONMENT         STORAGE TEMP,HUMID.AND ALTITUDE *2         -10 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max           INVIRONMENT         STORAGE TEMP,HUMID.AND ALTITUDE / 20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max           IMPACT         10 - 55Hz, 19.6m/s² (2G), 3minutes period, 60minutes each along X, Y and Z axis           IMPACT         196.1m/s² (20G), 11ms, once each X, Y and Z axis           CONDUCTED NOISE         70           CONDUCTED NOISE *7         Complies with CISPR11-B, CISPR32-B, EN55031-B, EN55032-B, FCC Part 15-B, FCC Part 18-B, VCCI-B           REGULATION         HARMONIC ATTENUATOR*8         Complies with IEC61000-3-2 (Class A) (No built-in power factor correction)           CASE SIZE/WEIGHT         254 A2 35 X76 arm [1 00 X0 93 X3 00 inches] (W X H X D) / 600 max (with cover : 800 max)	OTHERS	OPERATING INDICA	TION	Not provided						
SOLATION         INPUT-OUTPUT         3,000VAC 1minute, Cutoff current = 10mA, 500VDC 50MΩ min (At Room Temperature)           NVIRONMENT         OPERATING TEMP,HUMID.AND ALTITUDE *2         -10 to +70°C, 20 - 90%RH (Non condensing), (Refer to "Derating"), 5,000m (16,500feet) max           INVIRONMENT         STORAGE TEMP,HUMID.AND ALTITUDE *2         -10 to +70°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max           INVIRONMENT         STORAGE TEMP,HUMID.AND ALTITUDE *2         -20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max           INPACT         10 - 55Hz, 19.6m/s² (2G), 3minutes period, 60minutes each along X, Y and Z axis           IMPACT         196.1m/s² (20G), 11ms, once each X, Y and Z axis           CONDUCTED NOISE         *7           CONDUCTED NOISE *7         Complies with CISPR11-B, CISPR32-B, EN55031-B, EN55032-B, FCC Part 15-B, FCC Part 18-B, VCCI-B           IEGULATIONS         HARMONIC ATTENUATOR*8         Complies with IEC61000-3-2 (Class A) (No built-in power factor correction)           CASE SIZE/WEIGHT         254 × 23 5 × 76 cmm [1 00 × 0 93 × 3 00 inches] (W × H × D) / 600 max (with cover : 800 max)		REMOTE SENSING		Not provided						
OPERATING TEMP, HUMID.AND ALTITUDE *2         -10 to +70°C, 20 - 90% RH (Non condensing), (Refer to "Derating"), 5,000m (16,500feet) max           STORAGE TEMP, HUMID.AND ALTITUDE         -20 to +75°C, 20 - 90% RH (Non condensing), 9,000m (30,000feet) max           VIBRATION         10 - 55Hz, 19.6m/s² (2G), 3minutes period, 60minutes each along X, Y and Z axis           IMPACT         196.1m/s² (20G), 11ms, once each X, Y and Z axis           SAFETY AND         AGENCY APPROVALS         UL62368-1, C-UL (equivalent to CAN/CSA-C22.2No.62368-1), EN62368-1, Complies with DEN-AN           OISE         CONDUCTED NOISE *7         Complies with CISPR11-B, CISPR32-B, EN55011-B, EN55032-B, FCC Part 15-B, FCC Part 18-B, VCCI-B           IEGULATION         254 x23 5 x76 arm [1 00 x0 93 x3 00 inches] (W X H X D) / 600 max (with convert 800 max)	ISOLATION	INPUT-OUTPUT		3,000VAC 1minute, Cu	utoff current = 10mA, 50	DOVDC 50MΩ min (At I	Room Temperature)			
STORAGE TEMP, HUMID.AND ALTITUDE         -20 to +75°C, 20 - 90% RH (Non condensing), 9,000m (30,000feet) max           VIBRATION         10 - 55Hz, 19.6m/s² (2G), 3minutes period, 60minutes each along X, Y and Z axis           IMPACT         196.1m/s² (20G), 11ms, once each X, Y and Z axis           SAFETY AND         AGENCY APPROVALS         UL62368-1, C-UL (equivalent to CAN/CSA-C22.2No.62368-1), EN62368-1, Complies with DEN-AN           VIORE         CONDUCTED NOISE         77         Complies with CISPR11-B, CISPR32-B, EN55011-B, EN55032-B, FCC Part 15-B, FCC Part 18-B, VCCI-B           REGULATIONS         Complies with IEC61000-3-2 (Class A) (No built-in power factor correction)         Complies with correction		OPERATING TEMP., HUMID.AND	ALTITUDE *2	-10 to +70°C, 20 - 90%RH (Non condensing), (Refer to "Derating"), 5,000m (16,500feet) max						
VIBRATION         10 - 55Hz, 19.6m/s² (2G), 3minutes period, 60minutes each along X, Y and Z axis           IMPACT         196.1m/s² (20G), 11ms, once each X, Y and Z axis           SAFETY AND         AGENCY APPROVALS         UL62368-1, C-UL (equivalent to CAN/CSA-C22.2No.62368-1), EN62368-1, Complies with DEN-AN           KOISE         CONDUCTED NOISE         7         Complies with CISPR11-B, CISPR32-B, EN55011-B, EN55032-B, FCC Part 15-B, FCC Part 18-B, VCCI-B           REGULATIONS         HARMONIC ATTENUATOR**         Complies with IEC61000-3-2 (Class A) (No built-in power factor correction)           CASE SIZE/WEIGHT         25 A 23 5 X 62 mm [1 00 X0 93 X3 00 inches] (W X H X D) / 600 max (with cover : 800 max)	ENVIRONMENT	STORAGE TEMP., HUMID.AND	ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max						
IMPACT         196.1m/s² (20G), 11ms, once each X, Y and Z axis           SAFETY AND         AGENCY APPROVALS         UL62368-1, C-UL (equivalent to CAN/CSA-C22.2No.62368-1), EN62368-1, Complies with DEN-AN           VOISE         CONDUCTED NOISE         *7         Complies with CISPR11-B, CISPR32-B, EN55011-B, EN55032-B, FCC Part 15-B, FCC Part 18-B, VCCI-B           REGULATIONS         HARMONIC ATTENUATOR**         Complies with IEC61000-3-2 (Class A) (No built-in power factor correction)           CASE SIZE/WEIGHT         25.4 × 23.5 × 76.2 mm (1.00 × 0.93 × 3.00 inches) (W × H × D) / 600 max (with cover : 800 max)		VIBRATION		10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis						
AGENCY APPROVALS         UL62368-1, C-UL (equivalent to CAN/CSA-C22.2No.62368-1), EN62368-1, Complies with DEN-AN           IOISE         CONDUCTED NOISE         *7         Complies with CISPR11-B, CISPR32-B, EN55011-B, EN55032-B, FCC Part 15-B, FCC Part 18-B, VCCI-B           REGULATIONS         HARMONIC ATTENUATOR *8         Complies with IEC61000-3-2 (Class A) (No built-in power factor correction)           CASE SIZE/WEIGHT         25.4 X 23.5 X 76.2mm (1.00 X 0.93 X 3.00 inches) (WX H X D) / 600 max (with cover : 800 max)		IMPACT		196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis						
NOISE         CONDUCTED NOISE         *7         Complies with CISPR11-B, CISPR32-B, EN55011-B, EN55032-B, FCC Part 15-B, FCC Part 18-B, VCCI-B           REGULATIONS         HARMONIC ATTENUATOR **         Complies with IEC61000-3-2 (Class A) (No built-in power factor correction)           CASE SIZE/WEIGHT         25.4 X 23.5 X 76.2mm [1.00 X 0.93 X 3.00 inches] (WX H X D) / 600 max (with cover : 800 max)	SAFETY AND	AGENCY APPROVAL	LS	UL62368-1, C-UL (equ	uivalent to CAN/CSA-C	22.2No.62368-1), EN62	2368-1, Complies with D	DEN-AN		
HEGULATIONS         HARMONIC ATTENUATOR **         Complies with IEC61000-3-2 (Class A) (No built-in power factor correction)           CASE SIZE/WEIGHT         25.4 X 23.5 X 76.2mm [1.00 X 0.93 X 3.00 inches] (W(X H X D) / 600 max (with cover : 800 max)	NOISE	CONDUCTED NOISE	*7	Complies with CISPR11-B, CISPR32-B, EN55011-B, EN55032-B, FCC Part 15-B, FCC Part 18-B, VCCI-B						
<b>CASE SIZE/WEIGHT</b> 254X235X762mm [100X093X300 inches] (WXHXD) / 60g max (with cover : 80g max)	REGULATIONS	HARMONIC ATTENU	JATOR *8	Complies with IEC610	00-3-2 (Class A) (No bi	uilt-in power factor corre	ection)			
OTHERS DECISION CONTRACT 23.5772.37772.1111 [1:0070.3570.000 Inches] (WATAD) / OUT Indx (Will Cover 1.000 Indx)	OTHERS	CASE SIZE/WEIGHT		25.4×23.5×76.2mm	[1.00×0.93×3.00 inch	es] (W×H×D) / 60g m	ax (with cover : 80g ma	x)		
COOLING METHOD       *2 Convection/Forced air (Requires external fan) (Refer to "Derating")		COOLING METHOD	*2	Convection/Forced air	(Requires external fan)	) (Refer to "Derating")				

The listed options may affect the published standard specifications. Please contact us for detailed product specifications

\*2 Derating is required. () means peak current. There is a possibility that an internal device is damaged when the specification is exceeded. Please contact us about the detail.

\*3 At low load conditions, the burst mode operation will start. To check load regulation, you will need to measure the characteristics at average mode with instruments

\*4 This is the value that measured on measuring board with capacitor of 22 µ F and 0.1 µ F at 150mm from output terminal. (Refer to Instruction Manual) 5V output product, the maximum temperature of 35 °C. 12V output product, the maximum temperature of 40 °C.

\*5

\*6 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25 °C, with the input voltage held constant at the rated input/output.

\*7 When secondary circuit will be connected to earth, the spec will be changed. (Refer to Instruction Manual 2)

\*8 Please contact us about another class. When two or more units are operating it may not comply with the IEC61000-3-2. Please contact us for details.

To meet the specification, do not operate overload condition.

Parallel operation is not possible.

Sound noise may be emitted from the power supply depending on operating conditions.



Name plate

⊕

] -Vout

] +Vout

CN2

1 c 2 c 3 c

4 0

اها



### **External view**



#### Mating connector and terminal of CN1, CN2

I/O Connector		Mating connector	Terminal	Mfr.
CN1	B2P3-VH	VHR-3N	Chain : SVH-21T-P1.1 Loose : BVH-21T-P1.1	J.S.T.
CN2	B4P-VH	VHR-4N	Chain : SVH-21T-P1.1 Loose : BVH-21T-P1.1	J.S.T.

С

cok

2-\$\,\$3.4 [\$\\$0.13]

Mounting Hole

راهار

69.8±0.5

[2.75]

80.3

[3.16]

Dimensions in mm, [ ]=inches
Tolerance : ±1.5 [±0.06]
Weight : 60g max (with cover : 80g max)
PCB Material / thickness : FR-4 / 1.1mm [0.04]
Optional Case Material : PBT

※ Maximum current per contact at CN2 is 5A.

※ There are two mounting holes.



This power supply is manufactured by SMD technology. The stress to PCB like twisting or bending causes the defect of the unit, so handle the unit with care. \*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	TECS65F-5	TECS65F-12	TECS65F-12-H	TECS65F-24	TECS65F-24-H
MAX OUTPUT WATTAGE[W] *2	50.0	65.4	65.4 (90.0)	66.0	66.0 (90.0)
DC OUTPUT *2	5V 10.0A	12V 5.45A	12V 5.45 (7.50) A	24V 2.75A	24V 2.75 (3.75) A

### **SPECIFICATIONS**

	MODEL		TECS65F-5	TECS65F-12	TECS65F-12-H	TECS65F-24	TECS65F-24-H		
	VOLTAGE[VAC]	*2	85 - 264 1 φ (Refer to "Derating" and Instruction Manual 3.1)						
INPUT		ACIN 100V	1.00typ	.00typ 1.25typ					
	ACIN 230V		0.55typ	0.70typ					
	FREQUENCY[Hz]		50 / 60 (45 - 66)						
		ACIN 100V	90.0typ	91.5typ	91.5typ	92.5typ	92.5typ		
		ACIN 230V	91.5typ	93.0typ	93.0typ	93.5typ	93.5typ		
		ACIN 100V	30typ (lo=100%) Ta=2	5℃ at cold start					
	INRUSH CURRENT[A]	ACIN 230V	65typ (lo=100%) Ta=2	5℃ at cold start					
	LEAKAGE CURREN	T[mA]	0.25max (ACIN 240V,	60Hz, lo=100%, Accore	ding to IEC62368-1, an	d DEN-AN)			
	VOLTAGE[V]		5	12	12	24	24		
	CURRENT[A] *2		10.0	5.45	5.45 (Peak 7.50)	2.75	2.75 (Peak 3.75)		
	LINE REGULATION	mV] *3	20max	48max	48max	96max	96max		
	LOAD REGULATION	[mV] *3	40max	100max	100max	150max	150max		
	RIPPLE[mVp-p] *4	-10 to 45°C *5	240max	300max	300max	360max	360max		
OUTPUT	RIPPLE NOISE[mVp-p]*4	-10 to 45°C *5	300max	380max	380max	480max	480max		
	TEMPERATURE REGULATION(mV)	0 to +45℃ *5	50max	120max	120max	240max	240max		
		-10 to +45℃*5	60max	150max	150max	290max	290max		
	DRIFT[mV]	*6	20max	48max	48max	96max	96max		
	START-UP TIME[ms]		500typ (ACIN 100V, Io=100%)						
	HOLD-UP TIME[ms]		10typ (ACIN 100V, Io=80%) / 60typ (ACIN 230V, Io=100%)						
	OUTPUT VOLTAGE SETTING[V]		4.90 to 5.30	11.50 to 12.50	11.50 to 12.50	23.00 to 25.00	23.00 to 25.00		
PROTECTION	OVERCURRENT PROT	ECTION	Works over 105% of ra	ating (works over 101%	of peak current at option	on -H) and recovers aut	omatically		
	OVERVOLTAGE PROTE	CTION[V]	5.50 to 6.50	13.20 to 15.60	13.20 to 15.60	26.40 to 31.20	26.40 to 31.20		
OTHERS	OPERATING INDICA	TION	Not provided						
	REMOTE SENSING		Not provided	Not provided					
ISOLATION	INPUT-OUTPUT		3,000VAC 1minute, Cu	utoff current = 10mA, 50	00VDC 50MΩ min (At I	Room Temperature)			
	OPERATING TEMP., HUMID.AND A	ALTITUDE *2	-10 to +70°C, 20 - 90%RH (Non condensing), (Refer to "Derating"), 5,000m (16,500feet) max						
ENVIRONMENT	STORAGE TEMP., HUMID.AND	ALTITUDE	-20 to +75℃, 20 - 90%	RH (Non condensing),	9,000m (30,000feet) m	lax			
	VIBRATION		10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis						
	ІМРАСТ		196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis						
SAFETY AND	AGENCY APPROVAL	LS	UL62368-1, C-UL (equivalent to CAN/CSA-C22.2No.62368-1), EN62368-1, Complies with DEN-AN						
NOISE	CONDUCTED NOISE	*7	Complies with CISPR	Complies with CISPR11-B, CISPR32-B, EN55011-B, EN55032-B, FCC Part 15-B, FCC Part 18-B, VCCI-B					
REGULATIONS	HARMONIC ATTENU	JATOR *8	Complies with IEC610	00-3-2 (Class A) (No bi	uilt-in power factor corre	ection)			
OTHERS	CASE SIZE/WEIGHT		25.4×27.0×76.2mm	[1.00×1.06×3.00 inch	es] (W×H×D) / 70g m	ax (with cover : 90g ma	x)		
	COOLING METHOD	*2	Convection/Forced air	(Requires external fan)	) (Refer to "Derating")	1			
1 The list	ad antiona may affect the n	entione may affect the published standard energifications. Disease context up for detailed product energifications							

\*2 Derating is required. () means peak current. There is a possibility that an internal device is damaged when the specification is exceeded. Please contact us about the detail.

\*3 At low load conditions, the burst mode operation will start. To check load regulation, you will need to measure the characteristics at average mode with instruments

\*4 This is the value that measured on measuring board with capacitor of 22 µ F and 0.1 µ F at 150mm from output terminal. (Refer to Instruction Manual) 5V, 12V output product, the maximum temperature of 40°C.

\*5

\*6 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25 °C, with the input voltage held constant at the rated input/output.

\*7

When secondary circuit will be connected to earth, the spec will be changed. (Refer to Instruction Manual 2) Please contact us about another class. When two or more units are operating it may not comply with the IEC61000-3-2. Please contact us for details. \*8

To meet the specification, do not operate overload condition.

Parallel operation is not possible.

Sound noise may be emitted from the power supply depending on operating conditions.





### **External view**



### Mating connector and terminal of CN1, CN2

I/O Connector Mating connector		Mating connector	Terminal	Mfr.
CN1	B2P3_\/H	VHR-3N	Chain : SVH-21T-P1.1	J.S.T.
CINT	D21 0-V11	VTIIX-SIN	Loose : BVH-21T-P1.1	
CNID			Chain : SVH-21T-P1.1	іст
UNZ	D4F-VH	VIIK-4N	Loose : BVH-21T-P1.1	0.0.1.

- Dimensions in mm, []=inches
  Tolerance : ±1.5 [±0.06]
  Weight : 70g max (with cover : 90g max)
  PCB Material / thickness : FR-4 / 1.1mm [0.04]
  Optional Case Material : PBT
  Maximum current per contact at CN2 is 5A.
  There or two moviting holes of the sector of the s

\* There are two mounting holes.

## **CO\$EL** | TECS-series

### Assembling and Installation Method

### Installation method

This power supply is manufactured by SMD technology. Do not touch any SMD components on the unit. Be especially careful when handling.

■If using a metal chassis, keep proper insulation between the component and metal chassis, use the spacer of 8mm or more between bottom of power supply and metal chassis (except -N model).

If d1 and/or d2 are less than the value mentioned in right figure, insert an insulating sheet with reinforced insulation between the power supply unit and metal chassis (except -N model).

The following distance is not satisfactory for cooling condition. Please refer to "Derating" and Instruction Manual 4 for cooling method.



Power supply

the power supply is used by the sealing up space as showing in right figure. Please use it after confirming the temperature of points ① of Instraction Manual 4.

There is a possibility that it is not possible to cool enough when

Standard model can be mounted in the mounting position shown in the figure below.



■ Option-N model can be mounted in the mounting position shown in the figure below. The installation of (F) possible only forced air cooling.



TECS-series | COSEL

### **Mounting Area**

The mounting screw should be M3. The hatched area shows the allowance of mounting area.



The mounting area (primary side) must be insulated from areas that user accessible parts of the final product, so if the enclosure is metal and the mounting components and spacers are metal, be careful to insulate them.

When installing, be careful to avoid contact with mounted components.

This product uses SMD technology. Please avoid the PCB installation method which includes the twisting stress or the bending stress.

Do not touch any SMD components on the unit and soldering points.

### Derating





### TECS45F Ambient temperature derating curve at rated input (Reference value)



Cooling mothod	Output voltage	Installation condition			
Cooling method	Output voltage	A,B,C,D,E	F		
	5V	1	1		
Convection	12V	2	1		
	24V	(4)	3		
Forced air (0.5m <sup>3</sup> /min)	5V,12V,24V	(5)			

### TECS65F Ambient temperature derating curve at rated input (Reference value)



Cooling mothed	Output voltage	Installation condition			
Cooling method	Output voltage	A,B,C,E	D	F	
	5V	3	3	2	
Convection	12V	3	3	1	
	24V	4	3	3	
Forced air (0.5m <sup>3</sup> /min)	5V,12V,24V		5		

### **COŞEL** | TECS-series

**TECS45F-N** Ambient temperature derating curve at rated input (Reference value)



Cooling mothed	Output voltage	Installation condition		
Cooling method	Oulput voltage	A,B,C,D,E	F	
	5V	1		
Convection	12V	1	-	
	24V	2		
Forced air (0.5m³/min)	5V,12V,24V	3		

In case of forced air cooling, ventilation must be uniform.





Cooling mothod	Output voltage	Installation condition		
Cooling method	Output voltage	A,B,C,D,E	F	
	5V	1		
Convection	12V	1	-	
	24V	2		
Forced air (0.5m³/min)	5V,12V,24V	3		

In case of forced air cooling, ventilation must be uniform.

### **Instruction Manual**

Please see catalog and instructionmanual before you use.

Instruction Manual	https://www.cosel.co.jp/redirect/catalog/en/TECS/
Before using our product	https://en.cosel.co.jp/technical/caution/index.html



### **Basic Characteristics Data**

Model	Circuit method fre	Switching frequency [kHz]Input current [A] * 1	Inrush	PCB/Pattern			Series/Parallel operation availability		
			protection	Material	Single sided	Double sided	Series operation	Parallel operation	
TECS45F	Flyback converter	20 to 250	0.9	Thermistor	FR-4		Yes	Yes	No
TECS65F	Flyback converter	20 to 800	1.25	Thermistor	FR-4		Multilayer	Yes	No

\*1 The value of input current is at ACIN 100V and rated load.

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 CQM1IPS01
 SP-300-5
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