KEPS50500 Electrical Characteristics

Unless otherwise specified: 18V < V_{IN} <50V, 0A < I_{OUT} < 10A, -55°C <T_{CASE} < 100°C

Parameter	Sym	Conditions	Min	Typ	Max	Unit
Input Specifications						
Input Voltage Range	V_{IN}		18	28	50	V_{DC}
Input dV/dt	V_{INDVDT}	V_{IN}=50V			1	V/µS
Input Undervoltage Turn-on	V_{UVON}	I_O=10A	15.4	16.3	17.1	V_{DC}
Input Undervoltage Turn-off	V_{UVOFF}	I_O=10A	14.9	15.8	16.6	V_{DC}
Input Undervoltage hysteresis	V_{UVH}	I_O=10A		0.5		V_{DC}
Input Overvoltage Turn-on	V_{OVON}	I_O=10A	47.3	48.4	49.6	V_{DC}
Input Overvoltage Turn-off	V_{OVOFF}	I_O=10A	48.6	49.8	51	V_{DC}
Input Overvoltage hysteresis	V_{OVH}	I_O=10A		1.4		V_{DC}
Input Quiescent Current	I_Q	V_{IN}=28V, ENABLE=0V				mApp
Input Idling Power	P_{IDLE}	V_{IN}=28V, I_O=10A				W
Input Standby Power	P_{SBY}	V_{IN}=28V, ENABLE=0V				W
Input Current Full Load	I_{IN}	T_{CASE}=100°C, I_O=10A, η=86%typical, V_{IN}=28V				A_{DC}
Input Reflected Ripple Voltage	I_{INRR}	L_{IN}=0.47uH, C_{IN}=100µF 63V electrolytic, + 2x4.7µF 50V X7R				mApp
Recommended Ext Input Cap.	C_{IN}	100µF 63V electrolytic, + 2x4.7µF 50V X7R		109.4		µF
Output Specifications						
Output Voltage Set Point	V_{OUT}	I_{OUT}=5A				V_{DC}
Total Output Accurary	V_{OA}	0°C <T_{CASE} < 100°C				%
		-55°C <T_{CASE} < 0°C				%
Output Voltage Trim Range	V_{OADJ}					%
Output Current Range	I_{OUT}					A_{DC}
Overcurrent Protection	I_{OCP}					A_{DC}
Efficieny - Full Load	η_{FL}	T_{CASE} = 100°C, V_{IN}=28V				%
Efficieny - Half Load	η_{HL}	T_{CASE} = 100°C, V_{IN}=28V				%
Output OVP Setpoint	V_{OVP}	Continuous Control				V_{DC}
Output Ripple Voltage	V_{ORPP}	C_{OUT}=6x10 µF 10V X7R DC-20MHz				mV_{PP}
Switching Frequency	f_{SW}			500		kHz
Output Turn On Delay time	t_{ONDLY}	V_{IN}= V_{UVON} to ENABLE=5V; V_{IN} rise time <1ms				ms
Output Turn Off Delay time	t_{OFFDLY}	V_{IN}= V_{UVOFF} V_{UVON} to ENABLE < 2.35V				µS
Soft Start Ramp Time	t_{SS}					µS
Maximum Load Capacitance	C_{OUT}	C_{OUT} =Al electrolytic				µF
Load Transient Deviation	V_{ODV}	I_{OUT}=%50 step 0.1A/µS C_{OUT}=6x10 µF 10V X7R				mV
Load Transient Recovery Time	T_{OVR}	I_{OUT}=%50 step 0.1A/µS C_{OUT}=6x10 µF 10V X7R V_{OUT}≤%1				µS
Maximum Output Power	P_{OUT}					W

Absolute Maximum Output Ratings	
Name	**Ratings**
+OUT to -OUT	0 to $6V_{DC}$
Continuous Output Current	$10A_{DC}$
Peak Output Current	$20A_{DC}$

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
ENABLE PIN						
DC Voltage reference Output	V_{ERO}		4.9	5	5.1	V_{DC}
Output Current Limit	I_{ECL}					mA_{DC}
Startup CUrrent Limit	I_{ESL}					μA_{DC}
Module Enable Voltage	V_{EME}		2.53			V_{DC}
Module Disable Voltage	V_{EMD}				2.47	V_{DC}
Disable Hysteresis	V_{EDH}			600		mV
Enable Delay Time	t_{ED}					µS
Disable Delay Time	t_{DD}					µS
Maximum Capacitance	C_{EC}			1500		pF
Maximum external Toggle Time	f_{EXT}			1		Hz
TRIM PIN						
Trim VOltage Reference	V_{REF}		1.22	1.25	1.27	V_{DC}
Internal Capacitance	C_{REFI}					°K
External Capacitance	C_{REF}					µF
Internal Resistance	R_{REFI}			8.2		kΩ
TM(Temperature Monitor)						
Temperature Coefficient	TM_{TC}			10		mV/°K
Temperature Full Range Accurary	TM_{ACC}		-5		5	°K
Drive Capability	I_{TM}			1		mA
TM Outpt Setting	V_{TM}	Ambient temperature 273°K		2.73		V
Thermal Specification						
Junction Temperature Shutdown	T_{MAX}		125	129	135	°C
Junction to Case Thermal Impedance	θ_{J-C}					°C/W
Junction to Ambient Thermal Impedance	θ_{J-A}			12		°C/W
Soldering						
Recommended Soldering Temperature					230	°C
Peak Temperature During Reflow						°C

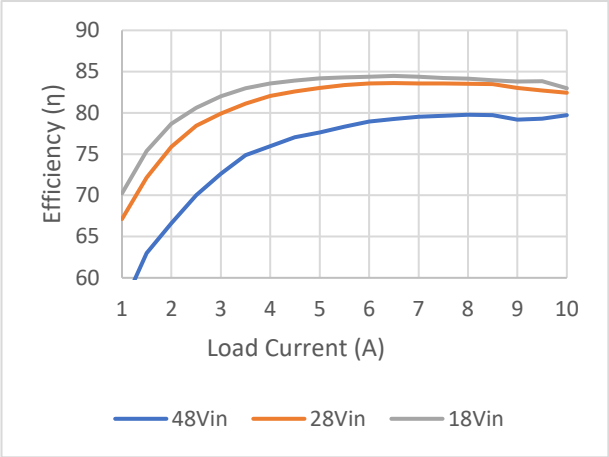

Figure 1 :Conversion Efficiency

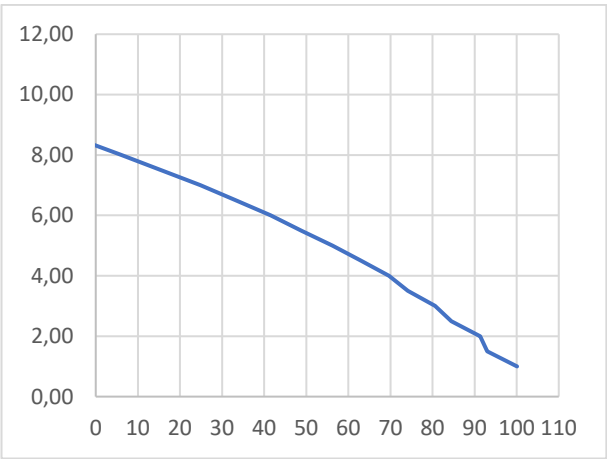

Figure 2 : Load current vs Ambient Temp (Without Heatsink)

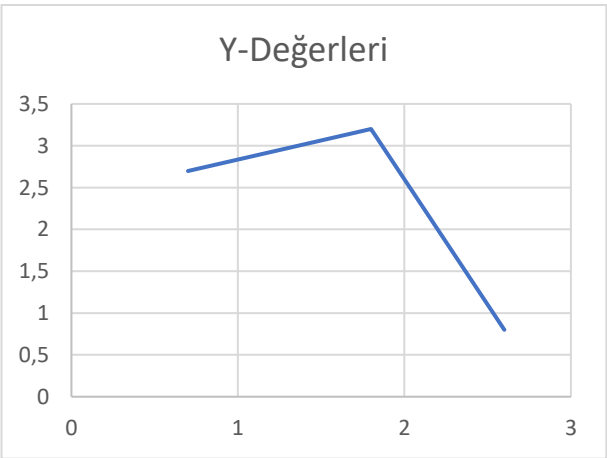

Figure 3: Load current vs Ambient Temp (With 6.33mm Heatsink)

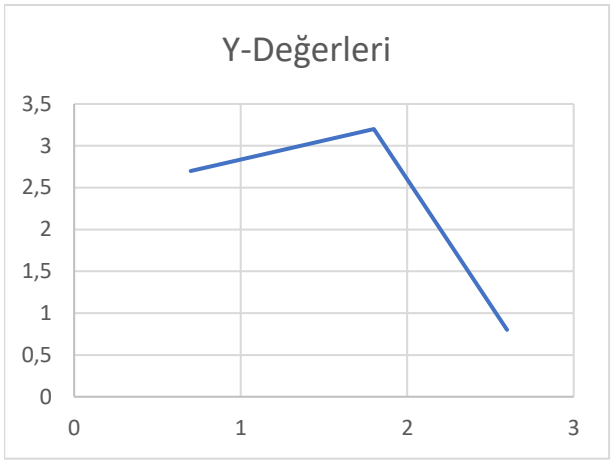

Figure 4: Load current vs Ambient Temp (With 11mm Heatsink)

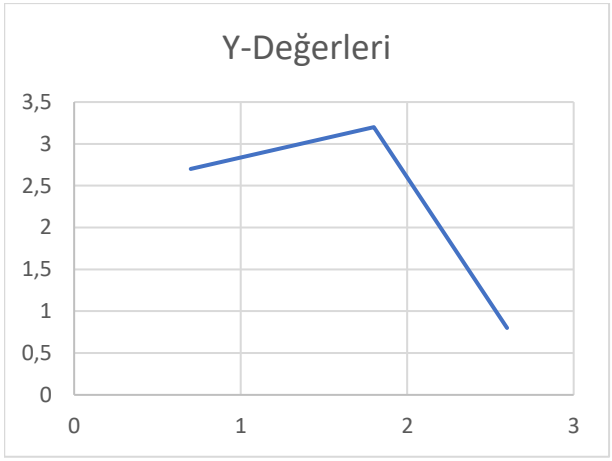

Figure 5 :Start up, VIN=16V, IOUT=10A, COUT 6x10uF X7R Ceramic

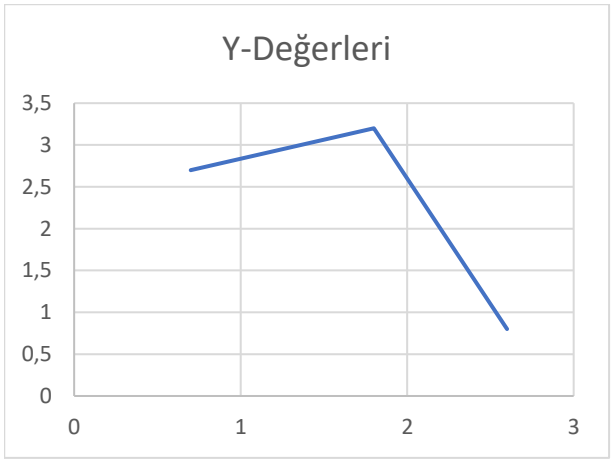

Figure 6 :Start up, VIN=28V, IOUT=10A, COUT 6x10uF X7R Ceramic

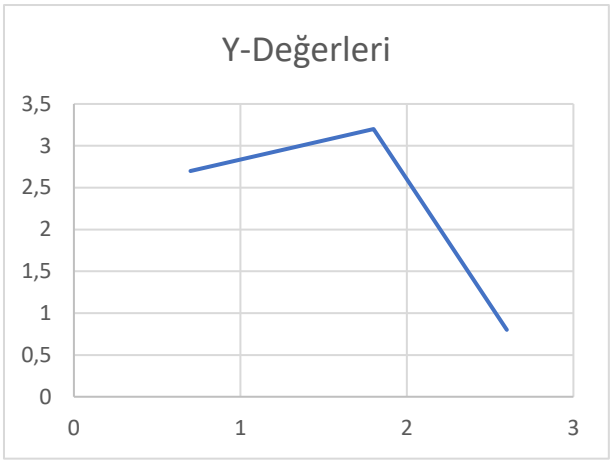

Figure 7 ::Start up, VIN=50V, IOUT=10A, COUT 6x10uF X7R Ceramic

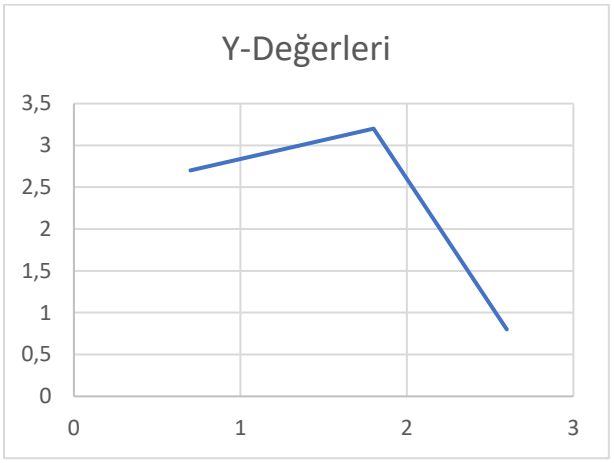

Figure 8 :Transient Response (VIN=28V, IOUT= 5-10A, 0.1A/us, COUT=6x10uF X7R Ceramic)

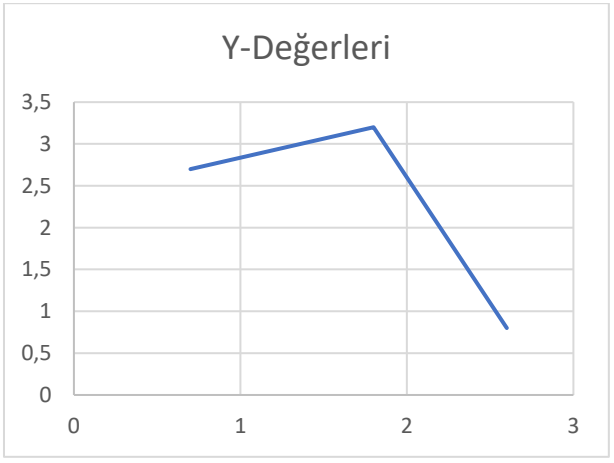

Figure 9 :Output ripple (VIN=28V, IOUT=10A, CR,COUT=6x10uF X7R Ceramic)