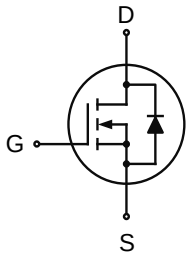
APC65R360FM

Super-junction Power Mosfet

DATA SHEET

Features

- 650V,11A
  $R_{DS(ON)}$ <360mΩ@V_{GS}=10V TYP:280mΩ
- advanced super junction technology
- extremely low on resistance



Schematic Diagram

Applications

- Power faction correction (PFC)
- Switched mode power supplies (SMPS)
- Uninterruptible power supply (UPS)
- LED lighting powe

TO-220F

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
C65R360FM	APC65R360FM	TO-220F	-	-	1000

ABSOLUTE MAXIMUM RATINGS (T_J=25℃ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	650	V
Gate-Source Voltage	V_{GS}	±30	V
Continuous Drain Current (T_c =25℃)	I_D	11	A
Continuous Drain Current (T_c=100℃)	I_D	7	A
Pulsed Drain Current (1)	I_{DM}	33	A
Single Pulsed Avalanche Energy (2)	E_{AS}	80	mJ
Drain Power Dissipation	P_D	23	W
MOSFET dv/dt ruggedness	dv/dt	130	V/ns
Reverse diode dv/dt		33	
Thermal Resistance from Junction to Case	$R_{\theta JC}$	5.4	℃/W
Thermal Resistance- Junction to Ambient	$R_{\theta JA}$	55	℃/W
Junction Temperature	T_J	150	℃
Storage Temperature	T_{STG}	-55~ +150	℃

MOSFET ELECTRICAL CHARACTERISTICS(T_J=25℃ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D =250μA	650	-	-	V
		V_{GS} = 0V, I_D =250μA T_j=150℃	700			V
Zero gate voltage drain current	I_{DSS}	V_{DS} =650V, V_{GS} = 0V	-	-	1	uA
		V_{DS} =650V, V_{GS} = 0V T_j=150℃			100	uA
Gate-body leakage current	I_{GSS}	V_{GS} =±30V, V_{DS} = 0V	-	-	±100	nA
Gate threshold voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =250μA	2.5	3.5	4.5	V
Drain-source on-resistance	$R_{DS(on)}$	V_{GS} =10V, I_D =5.5A	-	280	360	mΩ
Dynamic characteristics						
Input Capacitance	C_{iss}	V_{DS} =100V, V_{GS} =0V, f =1.0MHz	-	841	-	pF
Output Capacitance	C_{oss}		-	45.1	-	
Reverse Transfer Capacitance	C_{rss}		-	2.8	-	
Gate Resistance	Rg	f =1.0MHz		5		Ω
Switching characteristics (3,4)						
Turn-on delay time	$t_{d(on)}$	V_{DD}=520V, I_D=5.5A, R_G=25Ω, V_G=10V	-	18.2	-	ns
Turn-on rise time	t_r		-	25.8	-	
Turn-off delay time	$t_{d(off)}$		-	81.8	-	
Turn-off fall time	t_f		-	26.8	-	
Total Gate Charge	Qg	V_{DS}=520V, I_D=5.5A, V_{GS}=10V	-	23.3	-	nC
Gate-Source Charge	Qgs		-	5.5	-	
Gate-Drain Charge	Qgd		-	9.7	-	
Source-Drain Diode characteristics						
Diode Forward voltage	V_{SD}	T_c=25℃, V_{GS} =0V, I_S=5.5A	-	0.85	1.4	V
Diode Forward current	I_S	T_c =25℃	-	-	11	A
Body Diode Reverse Recovery Time (3)	trr	T_c=25℃，IF=5.5A,di/dt=100A/us		250		ns
Body Diode Reverse Recovery Charge	Qrr	T_c=25℃，IF=5.5A,di/dt=100A/us		2.55		uc

Notes:

1. Pluse width limited by maximum junction temperature
2. L=10mH, IAS=4A, VDD=150V, VG=10V, RG=25Ω, starting TJ=25°C
3. Pulse Test: Pulse width ≤300μs, Duty cycle≤2%
4. Essentially independent of operating temperature

Typical Performance Characteristics

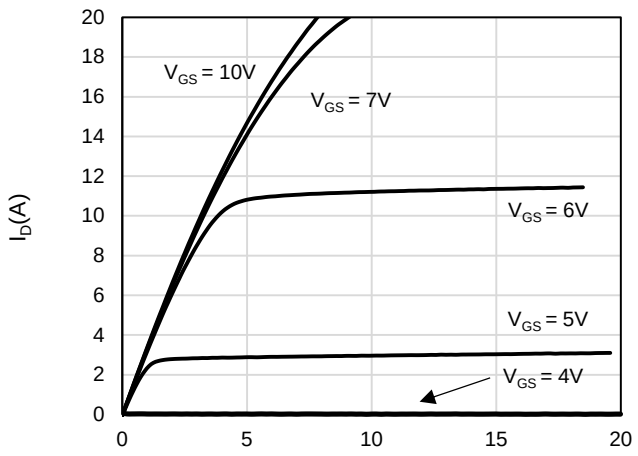


Figure 1: On-Region Characteristics

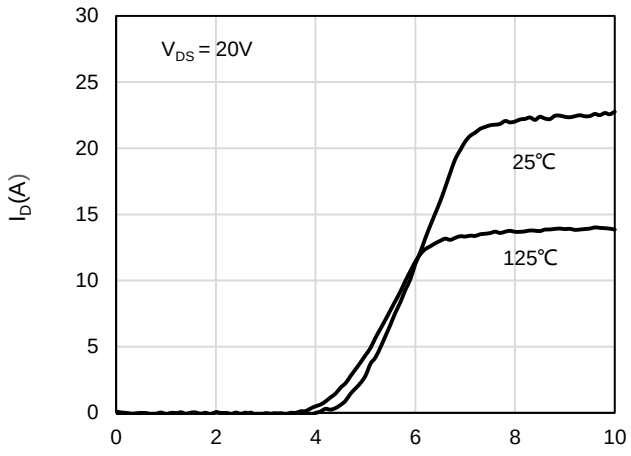


Figure 2: Transfer Characteristics

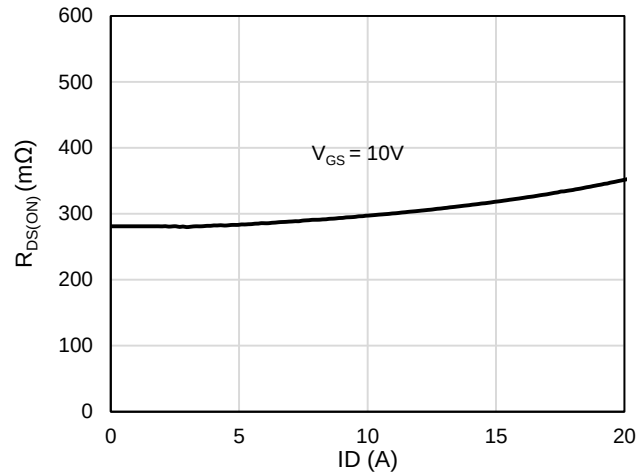


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

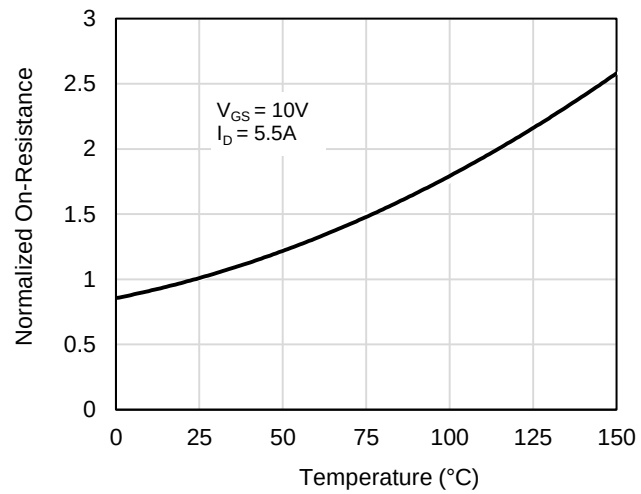


Figure 4: On-Resistance vs. Junction Temperature

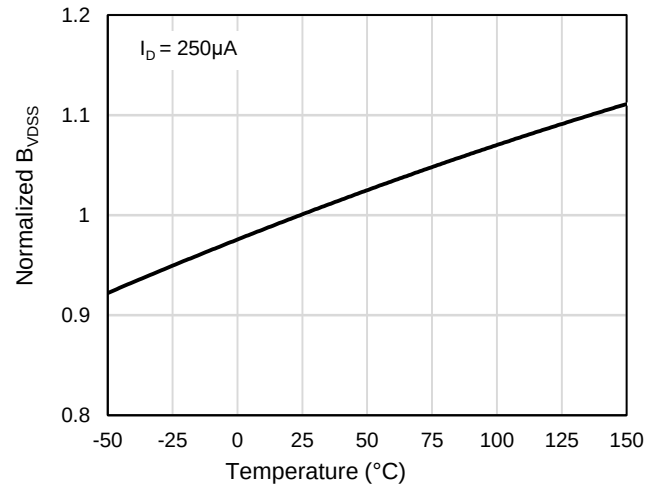


Figure 5: Breakdown Voltage vs. Junction Temperature

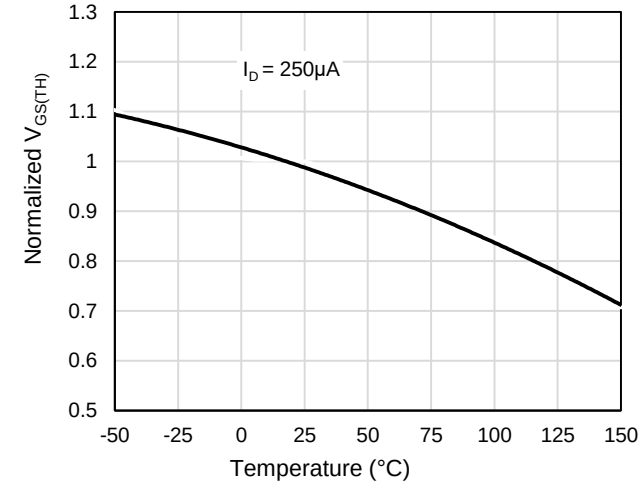


Figure 6: Threshold Voltage vs. Junction Temperature

Typical Performance Characteristics

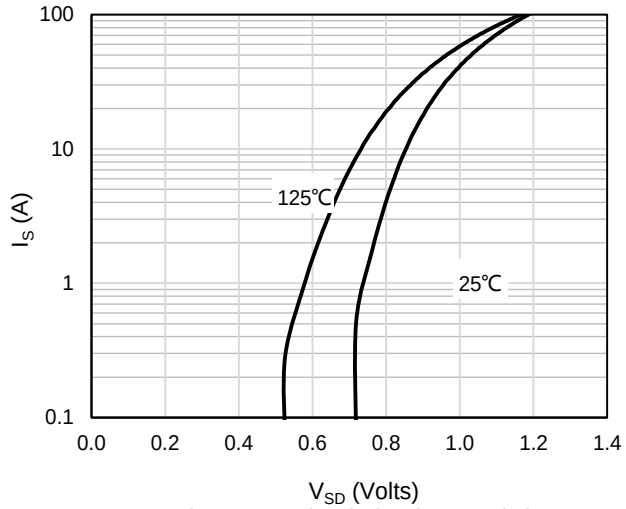


Figure 7: Body-Diode Characteristics

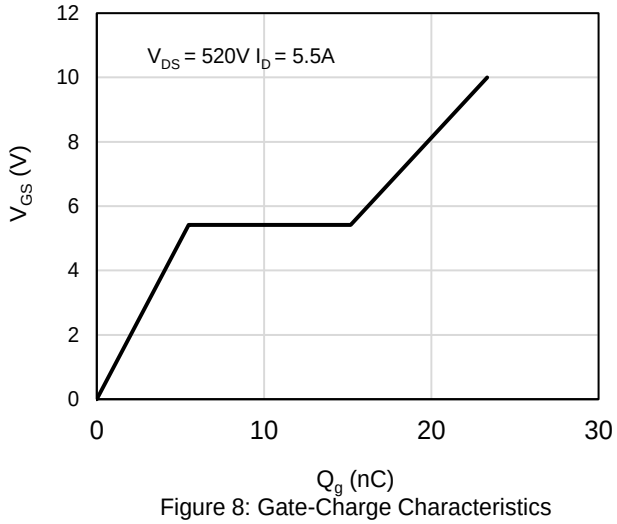


Figure 8: Gate-Charge Characteristics

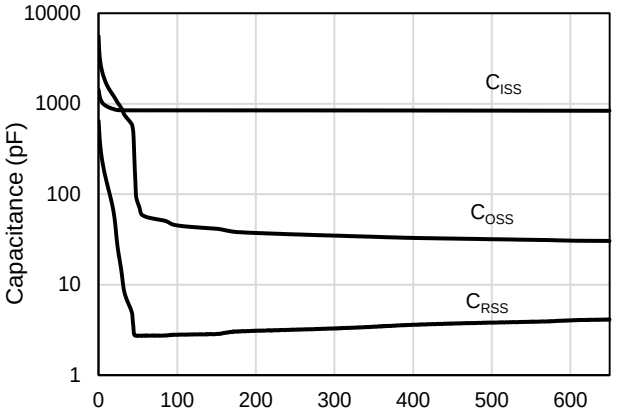


Figure 9: Capacitance Characteristics

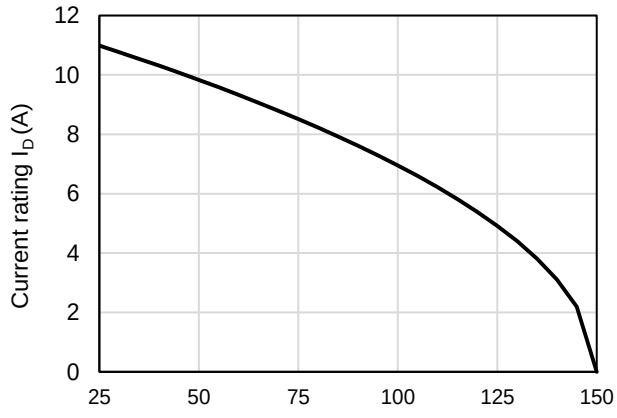


Figure 10: Current De-rating(Note 1)

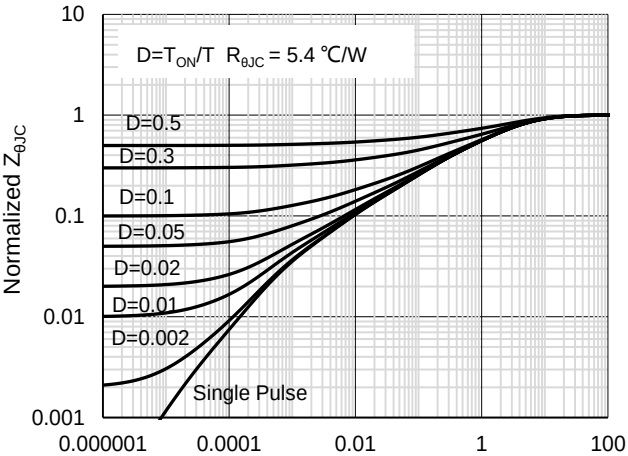


Figure 11: Normalized Maximum Transient Thermal Impedance

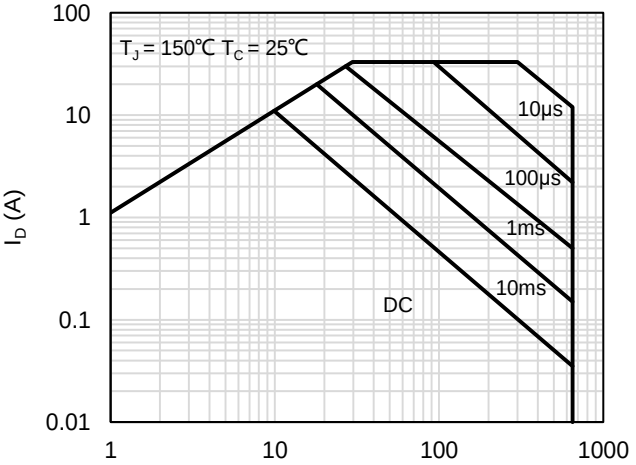
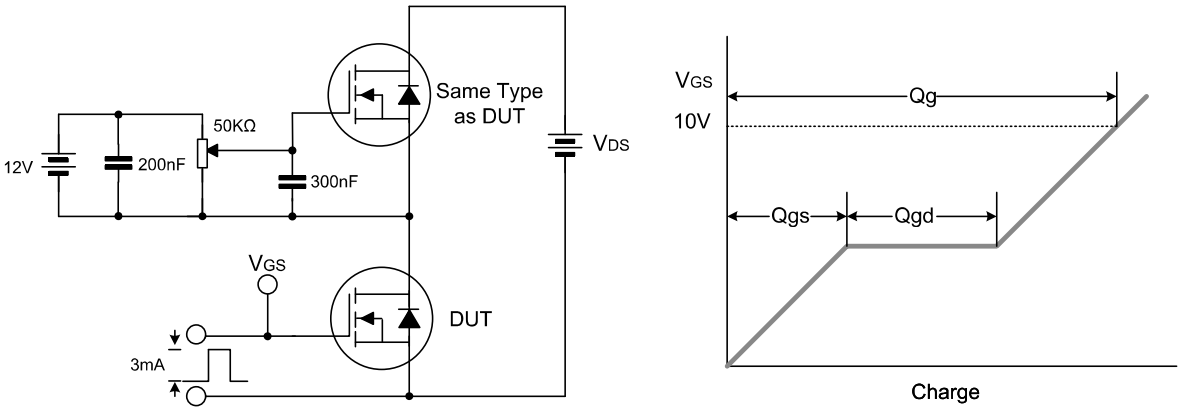


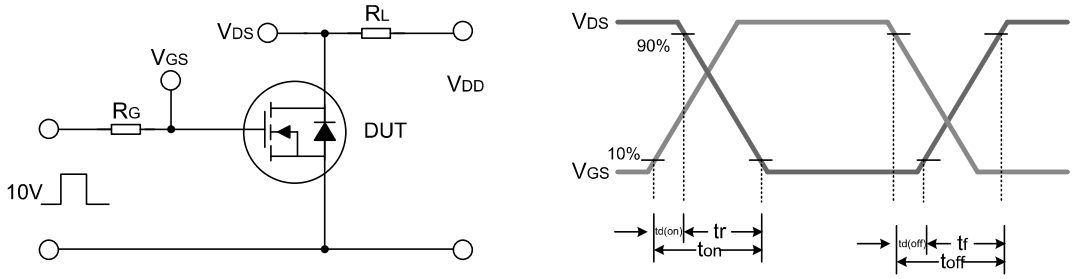
Figure 12: Maximum Forward Biased Safe Operating Area

Test Circuit

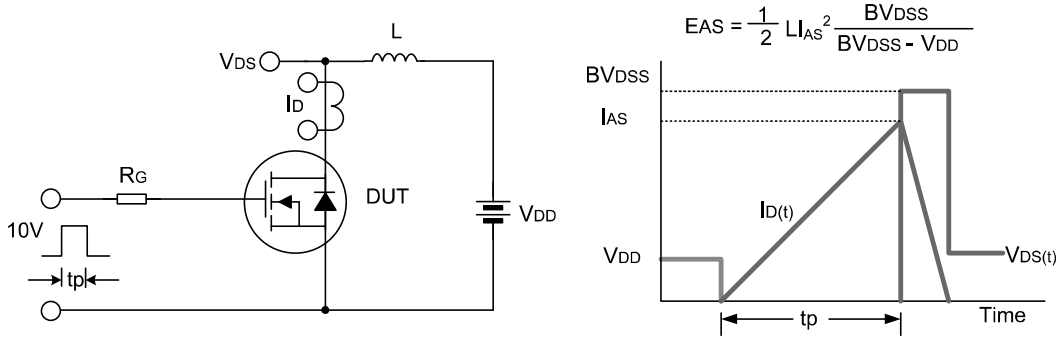
Gate Charge Test Circuit & Waveform



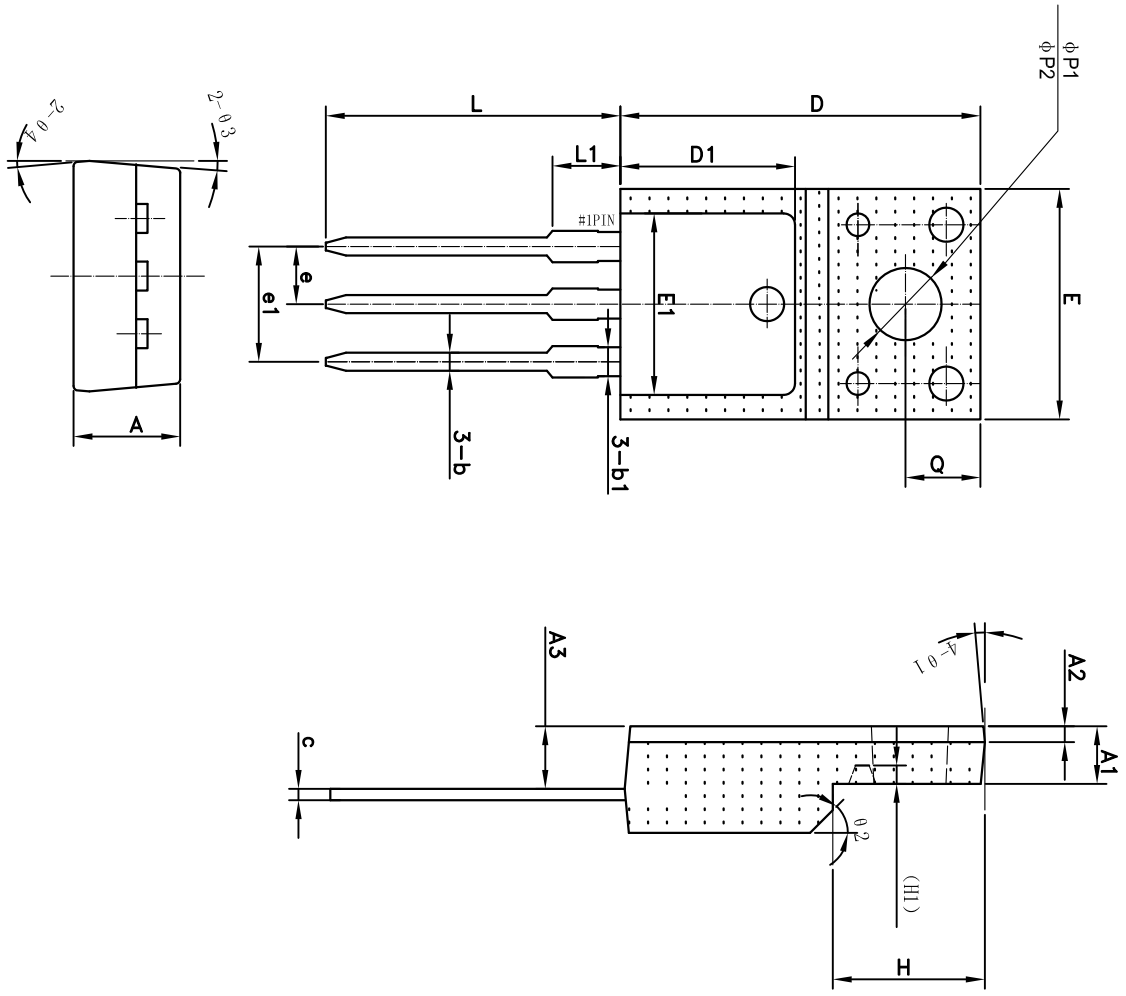
Resistive Switching Test Circuit & Waveform



Unclamped Inductive Switching Test Circuit & Waveform



Package Dimensions of TO-220F



Symbol	Dechanical Dimension(mm)		
	Min	Typ	Max
A	4.50	4.70	4.90
A1	2.44	2.54	2.64
A2	0.60	0.70	0.80
A3	2.56	2.76	2.96
b	0.70	0.80	0.95
b1		1.28	
c	0.45	0.50	0.65
D	15.67	15.87	16.07
D1		7.70	
E	9.96	10.16	10.36
E1		8.00	
e		2.54	
e1		5.08	
H	6.50	6.70	6.90
(H1)		(0.81)	
L	12.48	12.98	13.20
L1		2.93	
ϕP1	2.98	3.18	3.38
ϕP2	3.20	3.40	3.60
Q	3.10	3.30	3.50
θ1		5°	
θ2		45°	
θ3		5°	
θ4		5°	

Revision History

Revision	Release	Remark
V1.0	2023/02/16	Initial Release

Disclaimer

The information given in this document describes the independent performance of the product,but similar performance is not guaranteed under other working conditions,and cannot be guaranteed when installed with other products or equipment.To achieve the required performance of the product in actual scenarios,the customer should conduct a complete application test to assess the functionality of the product.

Allpower assumes no responsibility for equipment failures result from using products at values that exceed the ratings,operating conditions,or other parameters listed in the product specifications.

The product described in this specification is not applicable for aerospace or other applications which requires high reliability.Customers using or selling these products for use in medical,life-saving,or life-sustaining applications do so at their own risk and agree to fully indemnify.

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