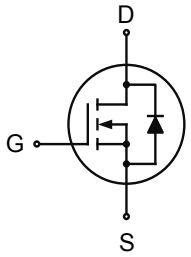
APC65R600KM

Super-junction Power Mosfet

DATA SHEET

Features

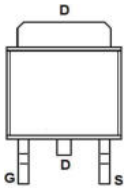
- 650V,7A
  $R_{DS(ON)}$ <600mΩ @V_{GS}=10V TYP:523mΩ
- Advanced Super junction technology
- Extremely Low ON Resistance



Schematic Diagram

Applications

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



TO-252

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
C65R600KM	APC65R600KM	TO-252	-	-	2500

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	7	A
Continuous Drain Current (T_c=100℃)	I_D	4.4	A
Pulsed Drain Current (1)	I_{DM}	28	A
Single Pulsed Avalanche Energy (2)	E_{AS}	190	mJ
Drain Power Dissipation	P_D	30	W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	4.17	℃/W
Thermal Resistance- Junction to Ambient	$R_{\theta JA}$	62.5	℃/W
Junction Temperature	T_J	150	℃
Storage Temperature	T_{STG}	-55~ +150	℃
Maximum Lead temperature for soldering Purpose	T_L	300	℃

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
Zero gate voltage drain current	I_{DSS}	V_{DS} =650V, V_{GS} = 0V	-	-	100	nA
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	2.0	3.3	4.0	V
Forward Transconductance (3)	g_{FS}	V_{DS}=25V, I_D=7A	-	4.9	-	S
Drain-source on-resistance	$R_{DS(on)}$	V_{GS} =10V, I_D =3.5A	-	523	600	mΩ
Dynamic characteristics						
Input Capacitance	C_{iss}	V_{DS} =100V, V_{GS} =0V, f =1.0MHz	-	423	-	pF
Output Capacitance	C_{oss}		-	26	-	
Reverse Transfer Capacitance	C_{rss}		-	1.7	-	
Switching characteristics (3,4)						
Turn-on delay time	$t_{d(on)}$	V_{DD}=325V, I_D=7A, R_G=24Ω, V_G=10V	-	11.2	-	ns
Turn-on rise time	t_r		-	28.6	-	
Turn-off delay time	$t_{d(off)}$		-	46.7	-	
Turn-off fall time	t_f		-	24.4	-	
Total Gate Charge	Qg	V_{DS}=520V, I_D=7A, V_{GS}=10V	-	16.4	-	nC
Gate-Source Charge	Qgs		-	3.5	-	
Gate-Drain Charge	Qgd		-	8.3	-	
Source-Drain Diode characteristics						
Diode Forward voltage	V_{SD}	T_c=25℃, V_{GS} =0V, I_S=7A	-	0.87	1.4	V
Diode Forward current	I_S	T_c =25℃	-	-	7	A
Body Diode Reverse Recovery Time (3)	trr	T_c=25℃，IF=7A,di/dt=100A/us		340		ns
Body Diode Reverse Recovery Charge	Qrr	T_c=25℃，IF=7A,di/dt=100A/us		2.5		uc

Notes:

1. Pluse width limited by maximum junction temperature
2. L=79mH, IAS=2.2A, VDD=100V, 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

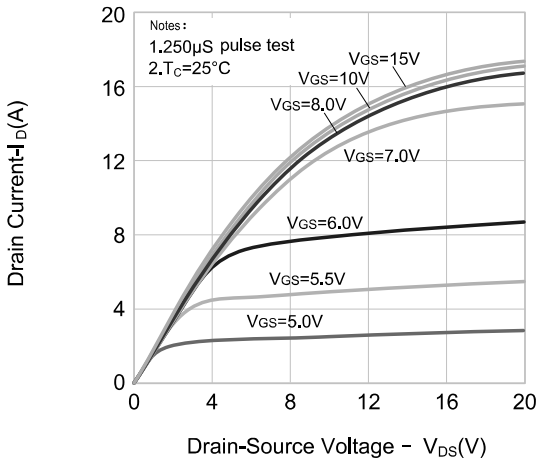


Figure 2.Transfer Characteristics

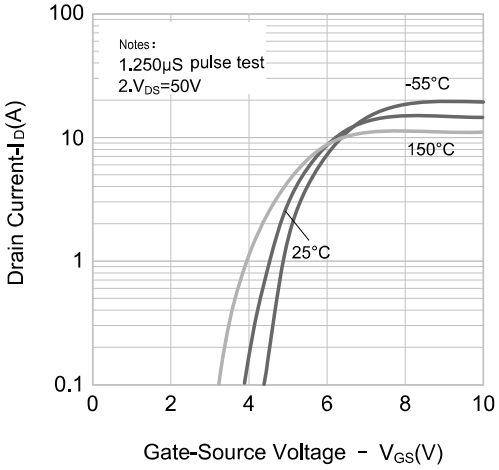


Figure 3.On-Resistance Variation vs. Drain-Current,Gate Voltage

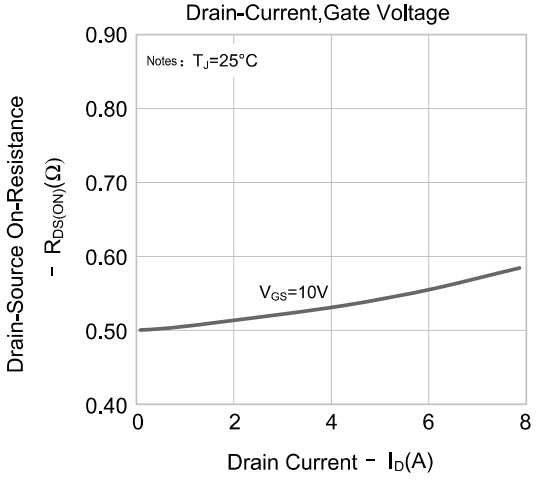


Figure 4.Body Diode Forward Voltage Variation vs.Source Current and Temperature

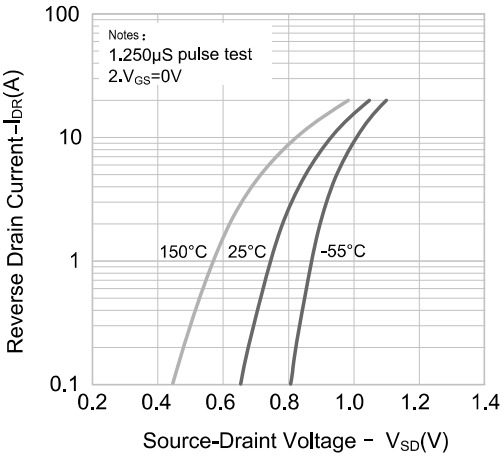


Figure 5.Capacitance Characteristics

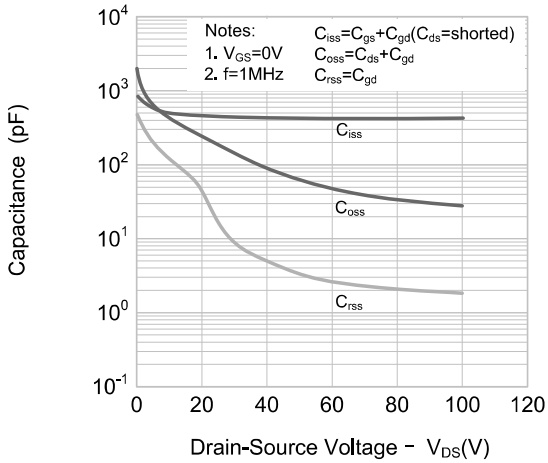
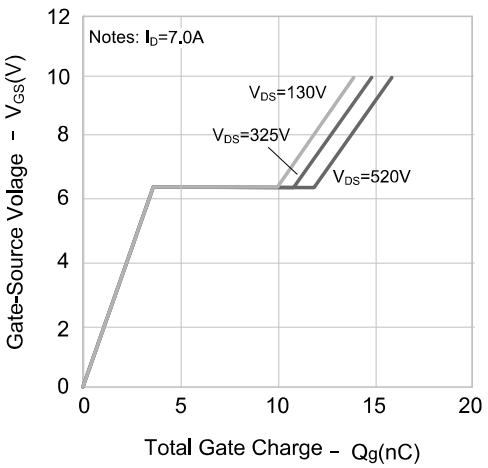


Figure 6.Gate Charage Characteristics



Typical Performance Characteristics

Figure 7. Breakdown Voltage Variation vs. Temperature

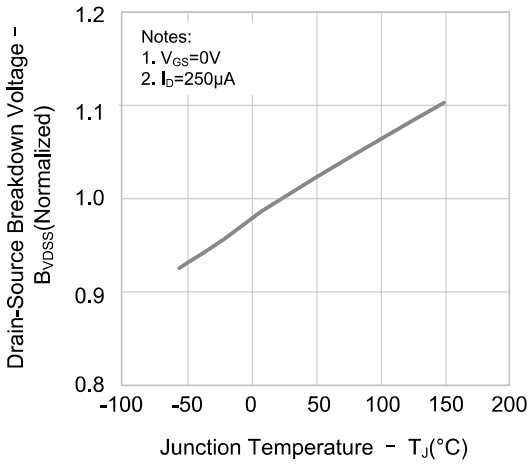


Figure 8. On-resistance Variation vs. Temperature

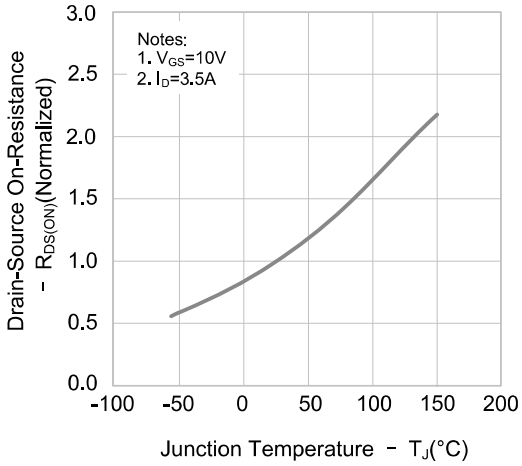
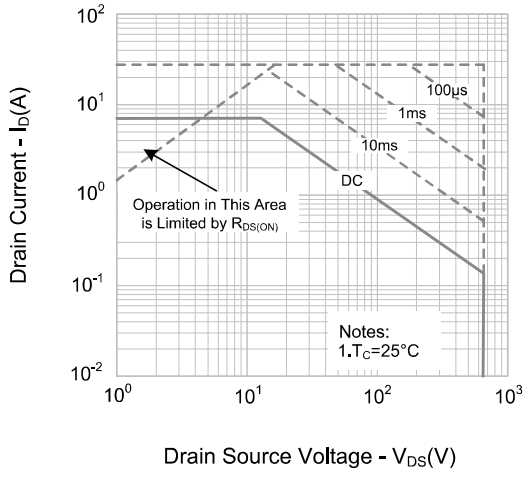
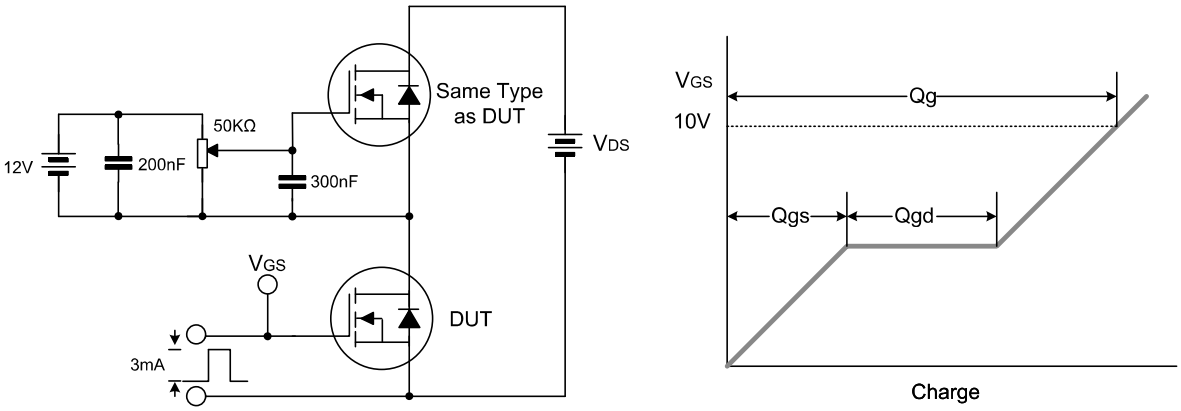


Figure 9 Max. Safe Operating Area

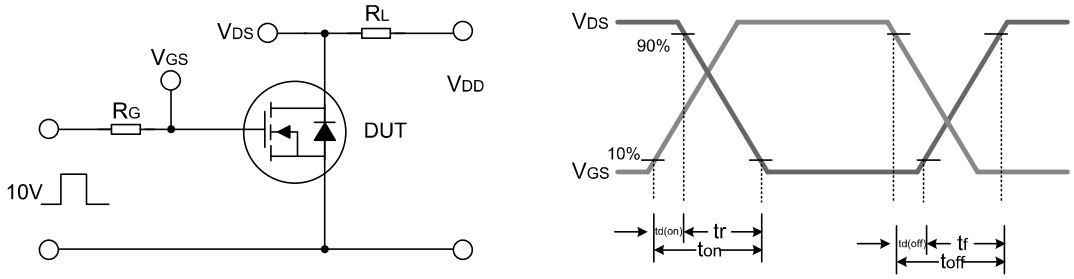


Test Circuit

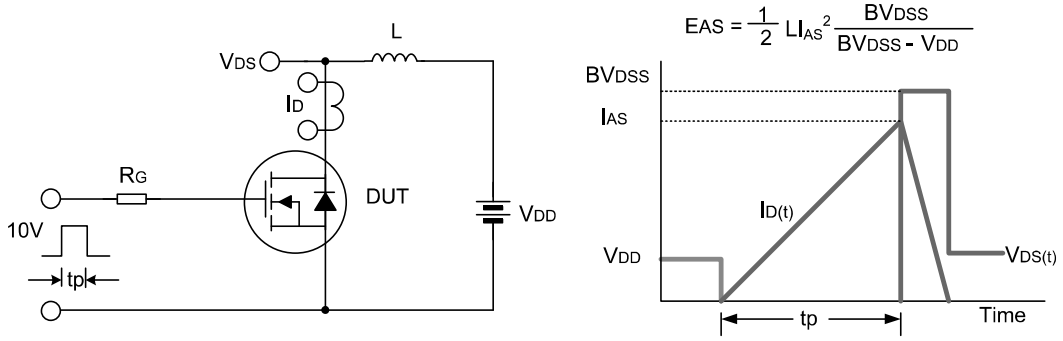
Gate Charge Test Circuit & Waveform



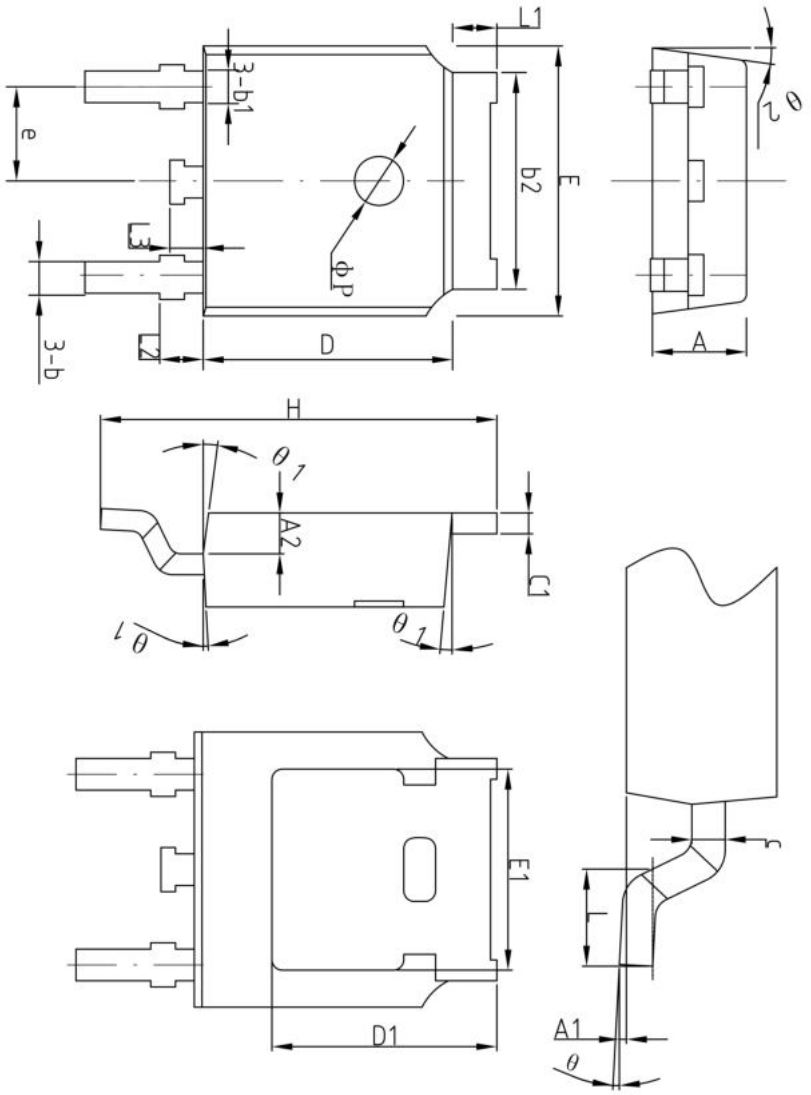
Resistive Switching Test Circuit & Waveform



Unclamped Inductive Switching Test Circuit & Waveform



Package Dimensions of TO-252



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	2.2	2.30	2.38
A1	0	–	0.10
A2	0.90	1.01	1.10
b	0.71	0.76	0.86
b1		0.76	
b2	5.13	5.33	5.46
c	0.47	0.50	0.60
c1	0.47	0.50	0.60
D	6.0	6.10	6.20
D1	–	5.30	–
E	6.50	6.60	6.70
E1	–	4.80	–
e		2.286BSC	
H	9.70	10.10	10.40
L	1.40	1.50	1.70
L1	0.90	–	1.25
L2		1.05	
L3		0.8	
ΦP		1.2	
θ	0°	–	8°
θ1	5°	7°	9°
θ2	5°	7°	9°

Revision History

Revision	Release	Remark
V1.0	2023/11/16	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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