GK600R65

7AMPS,650VOLTS N-CHANNEL SUPER JUNCTION POWER MOSFET

FEATURE

- Low gate charge
- Low CISS
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability
- RoHS 2.0 Compliant



Parameter	Values	Unit
V_{DSS}	650	V
$R_{DS(on)}$	0.6	Ω
I_D	7	A

Ordering Code	Marking	Package	Packaging
GK600R65	GK600R65	TO-252-2L	Tape and reel

TO-252

UNIT: mm



Dimensions in inches and (millimeters)

Absolute Maximum Ratings(T_C=25℃unless otherwise noted)

Parameter	Symbol	Values Min	Typ	Max	Unit	Note/Test Conditions
Drain-Source Voltage	V_{DSS}	-	-	650	V	-
Gate-Source Voltage	V_{GS}	-30	-	30	V	-
Continuous Drain Current(Package Limited)	I_D	-	-	7	A	T_C=25℃
		-	-	4.2	A	T_C=100℃
Pulsed Drain Current(Note1)	I_{DM}	-	-	20	A	-
Single Pulse Avalanche Energy	E_{AS}	-	-	52	mJ	I_{AS}=2mA,R_G=50Ω, T_J=25℃
Power Dissipation (Note2)	P_D	-	-	52	W	T_C=25℃
Reverse Diode dV/dt (Note3)	dv/dt	-	-	15	V/ns	-
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55	-	150	℃	-
Maximum lead temperature for soldering purposes, 1/8from case for 5 seconds	T_L	-	-	260	℃	-

Thermal Characteristics

Parameter	Symbol	Values Min	Typ	Max	Unit	Note/Test Conditions
Thermal resistance，Channel to Case	$R_{\theta JC}$	-	-	1.95	℃/W	-
Thermal resistance，Channel to Ambient	$R_{\theta JA}$	-	-	62.5	℃/W	-

GK600R65

Electrical Characteristics (T_C=25℃,unless otherwise noted)

Static characteristics

Parameter	Symbol	Values Min	Typ	Max	Unit	Note/Test Conditions
Drain-Source Breakdown Voltage	BV_{DSS}	650	-	-	V	V_{GS}=0V, I_D=250μA
Zero Gate Voltage Drain Current	I_{DSS}	-	-	1	μA	V_{DS}=650V, T_C=25℃
Gate Body Leakage Current,Forward	I_{GSS}	-	-	100	nA	V_{GS}=20V,V_{DS}=0V
Gate Body Leakage Current,Reverse	I_{GSS}	-	-	-100	nA	V_{GS}=-20V,V_{DS}=0V
Gate-Source Threshold Voltage	$V_{GS(th)}$	2.0	-	4.0	V	V_{DS}=V_{GS},I_D=250μA
Drain-Source On-State Resistance	$R_{DS(on)}$	-	0.5	0.6	Ω	V_{GS}=10V,I_D=3.5A
Gate Resistance	R_g	-	1.5	-	Ω	V_{GS}=0V, V_{DS} Open, f=1MHz
Forward Transconductance	g_{fs}	-	3.5	-	S	V_{DS}=50V,I_D=3.5A

Dynamic characteristics

Parameter	Symbol	Values Min	Typ	Max	Unit	Note/Test Conditions
Input Capacitance	C_{iss}	-	450	-	pF	V_{DS}=25V,V_{GS}=0V,f=1MHZ
Output Capacitance	C_{oss}	-	185	-	pF	V_{DS}=25V,V_{GS}=0V,f=1MHZ
Reverse Transfer Capacitance	C_{rss}	-	10	-	pF	V_{DS}=25V,V_{GS}=0V,f=1MHZ
Turn-On Delay Time	$t_{d(on)}$	-	11.4	-	ns	V_{DS}=325V,R_G=25Ω,V_{GS}=10V,
Turn-On Rise Time	t_r	-	8.4	-	ns	V_{DS}=325V,R_G=25Ω,V_{GS}=10V,
Turn-Off Delay Time	$t_{d(off)}$	-	50.8	-	ns	V_{DS}=325V,R_G=25Ω,V_{GS}=10V,
Turn-Off Fall Time	t_f	-	11.2	-	ns	V_{DS}=325V,R_G=25Ω,V_{GS}=10V,

Gate charge characteristics

Parameter	Symbol	Values Min	Typ	Max	Unit	Note/Test Conditions
Total Gate Charge	Q_g	-	14	-	nC	V_{DS}=325V,I_D=7A,V_{GS}=10V
Gate-Source Charge	Q_{gs}	-	4.7	-	nC	V_{DS}=325V,I_D=7A,V_{GS}=10V
Gate-Drain Charge	Q_{gd}	-	7.4	-	nC	V_{DS}=325V,I_D=7A,V_{GS}=10V

Reverse diode

Parameter	Symbol	Values Min	Typ	Max	Unit	Note/Test Conditions
Continuous Diode Forward Current	I_S	-	-	7	A	-
Pulsed Diode Forward Current	I_{SM}	-	-	28	A	-
Diode Forward Voltage	V_{SD}	-	-	1.0	V	V_{GS}=0V,I_S=3A
Reverse Recovery Time	t_{rr}	-	151	-	ns	V_R=100V, dI/dt=100A/μs,Note5
Reverse Recovery Charge	Q_{rr}	-	565.7	-	nC	

Notes

1. Repetitive Rating:pulse width limited by maximum junction temperature.
2. Pulse width ≤300us,duty cycle≤2%.

RATING AND CHARACTERISTIC CURVES (GK600R65)

Figure1 Typical Output Characteristics



Figure2 Typical Gate Charge vs Gate to Source Voltage



Figure3 Typical Body Diode Transfer Characteristics



Figure4 Typical Capacitance vs Drain to Source Voltage



Figure5 Typical Breakdown Voltage vs Junction Temperature



Figure6 Typical Drain to Source on Resistance vs Junction Temperature



RATING AND CHARACTERISTIC CURVES (GK600R65)

Figure7 Maximum Forward Bias Safe Operating Area



Figure8 Typical Drain to Source ON Resistance vs Drain Current

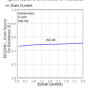


Figure9 Maximum BVdss vs Channel Temperature



Figure10 Typical Threshold Voltage vs Case Temperature

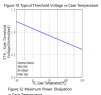


Figure11 Typical Transfer Characteristics



Figure12 Maximum Power Dissipation vs Case Temperature

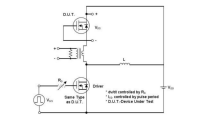


RATING AND CHARACTERISTIC CURVES (GK600R65)

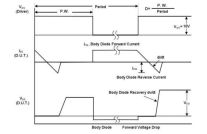
Figure13 Maximum Effective Thermal Impedance , Junction to Case



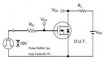
RATING AND CHARACTERISTIC CURVES



Peak Diode Recovery dv/dt Test Circuit



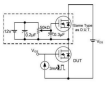
Peak Diode Recovery dv/dt Waveforms



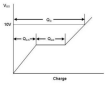
Switching Test Circuit



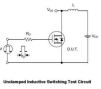
Switching Waveforms



Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms