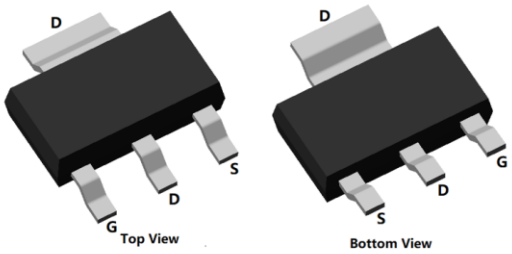
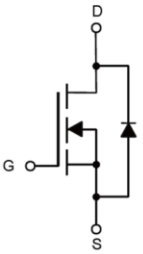
N-Channel Enhancement Mode Field Effect Transistor



SOT-223



Product Summary

- V_{DS} 650V
- I_D 0.5A
- $R_{DS(ON)}$(at V_{GS}=10V) ＜2.5Ω

General Description

- Excellent package for heat dissipation
- High density cell design for low $R_{DS(ON)}$
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free

Applications

- Power switching application
- Uninterruptible power supply
- DC-DC convertor

■ Absolute Maximum Ratings (T_J=25℃ unless otherwise noted)

Parameter			Symbol	Limit	Unit
Drain-source Voltage			V_{DS}	650	V
Gate-source Voltage			V_{GS}	±30	V
Continuous Drain Current (Note 1,2)	Steady-State	T_A=25℃ , V_{GS}= 10V	I_D	0.5	A
		T_A=100℃, V_{GS}= 10V		0.3	
Pulsed Drain Current	T_C=25℃, t_p=100μs		I_{DM}	3	A
Total Power Dissipation (Note 1,2)	Steady-State	T_A=25℃	P_D	1.56	W
		T_A=100℃		0.62	
MOSFET dv/dt ruggedness	V_{DS}=0…325V, Rg=0Ω		dv/dt	8.4	V/ns
Reverse diode dv/dt	V_{DS}=0…325V, ID<=0.5A, di/dt=100A/us		dv/dt	13.7	
Insulation withstand voltage	Vrms, t=5s		V_{ISO}	1000	V
Junction and Storage Temperature Range			T_J ,T_{STG}	-55～+150	℃

■Thermal resistance

Parameter		Symbol	Typ	Max	Units
Thermal Resistance Junction-to-Ambient (Note 2)	Steady-State	$R_{\theta JA}$	65	80	℃/W

■ Ordering Information (Example)

PREFERED P/N	PACKING CODE	Marking	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
M2K5C65BHJ	F2	2K5C65	2500	5000	25000	13“ reel

■ Electrical Characteristics (T_J=25℃ unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}= 0V, I_D=250μA	650	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=650V, V_{GS}=0V	-	-	10	μA
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	2.7	3.5	4.3	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=0.5A	-	2.1	2.5	Ω
Diode Forward Voltage	V_{SD}	I_S=0.5A, V_{GS}=0V	-	-	1.2	V
Gate resistance	R_G	f=1MHz	-	8.5	-	Ω
Maximum Body-Diode Continuous Current	I_S		-	-	0.5	A
Dynamic Parameters						
Input Capacitance	C_{iss}	V_{DS}=325V, V_{GS}=0V, f=1MHz	-	89	-	pF
Output Capacitance	C_{oss}		-	4	-	
Reverse Transfer Capacitance	C_{rss}		-	0.9	-	
Effective output capacitance, energy related	$C_{o(er)}$	V_{DS}=0…325V, V_{GS}=0V, f=1MHz	-	6.6	-	
Effective output capacitance, time related	$C_{o(tr)}$		-	33	-	
Switching Parameters						
Total Gate Charge	Q_g	V_{GS}=10V, V_{DS}=325V, I_D=0.5A	-	3.9	-	nC
Gate-Source Charge	Q_{gs}		-	0.57	-	
Gate-Drain Charge	Q_{gd}		-	2.37	-	
Reverse Recovery Charge	Q_{rr}	I_F=0.5A, di/dt=100A/us	-	225.5	-	nC
Reverse Recovery Time	t_{rr}		-	91.2	-	ns
Peak reverse recovery current	I_{rrm}		-	4.65	-	A
Turn-on Delay Time	$t_{D(on)}$	V_{GS}=10V, V_{DD}=325V, I_D=0.5A R_{GEN}=3Ω	-	19.2	-	ns
Turn-on Rise Time	t_r		-	23.7	-	
Turn-off Delay Time	$t_{D(off)}$		-	21.6	-	
Turn-off fall Time	t_f		-	43.3	-	

Note：

1. The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted.
2. The value of $R_{\theta JA}$ is measured with the device mounted on the 40mm*40mm*1.1mm single layer FR-4 PCB board with 1 in^2 pad of 2oz. Copper, in the still air environment with TA =25℃.The maximum allowed junction temperature of 150℃. The value in any given application depends on the user's specific board design.

■Typical Electrical and Thermal Characteristics Diagrams

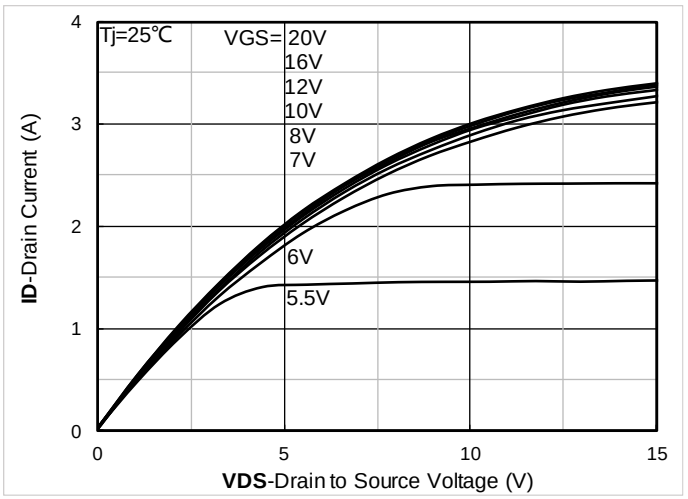


Figure 1. Output Characteristics

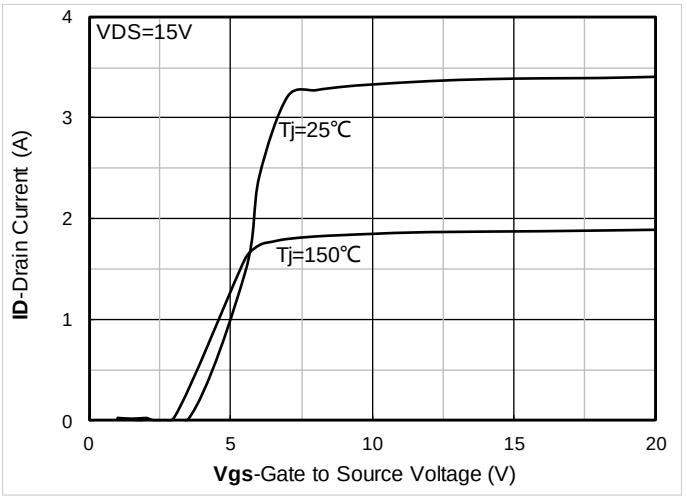


Figure 2. Transfer Characteristics

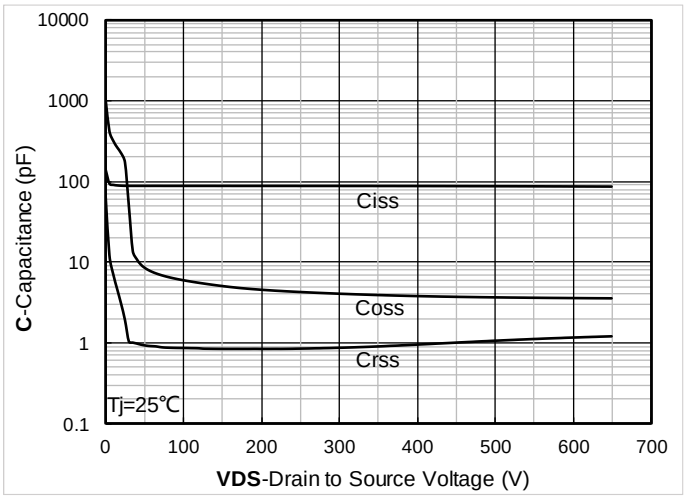


Figure 3. Capacitance Characteristics

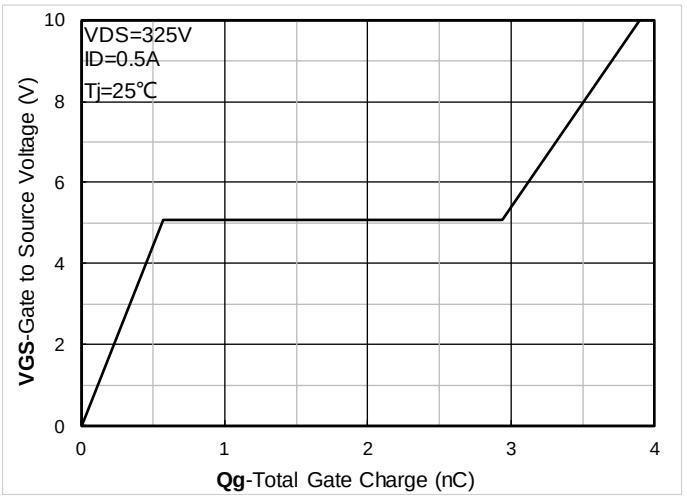


Figure 4. Gate Charge

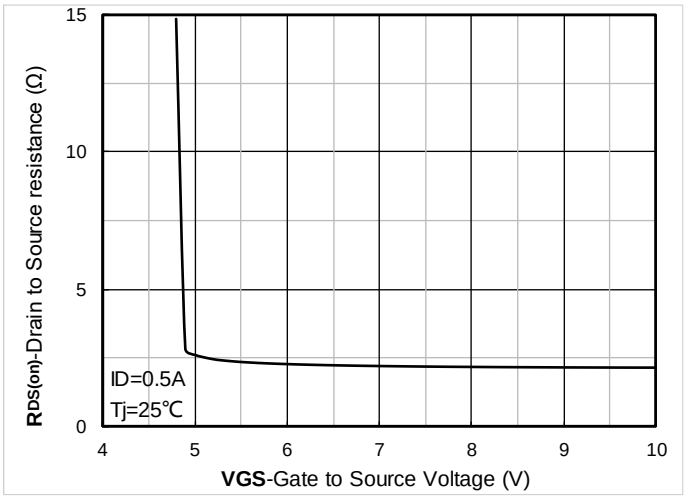


Figure 5. On-Resistance vs Gate to Source Voltage

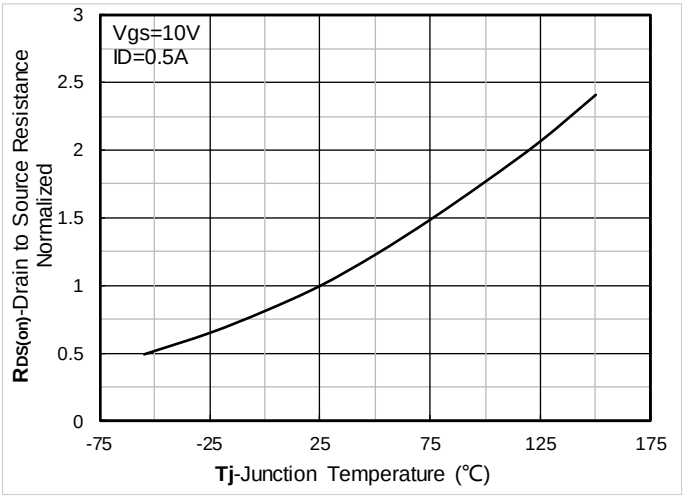


Figure 6. Normalized On-Resistance

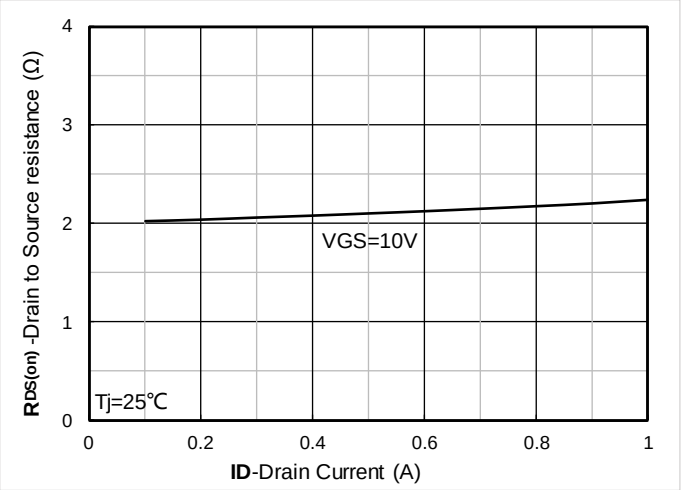


Figure 7. $R_{DS(on)}$ VS Drain Current

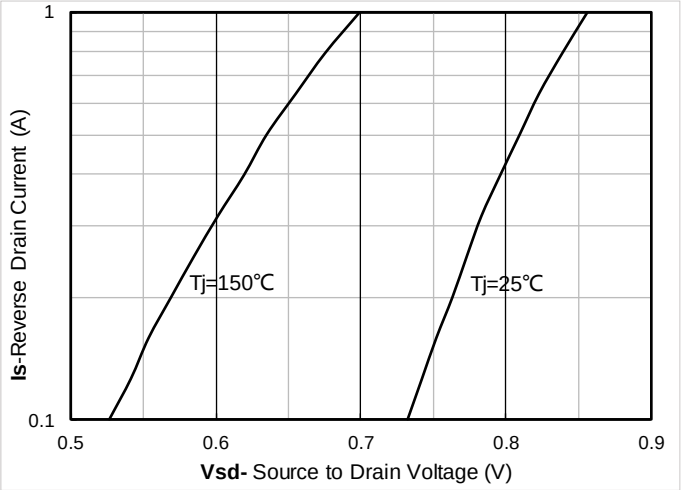


Figure 8. Forward characteristics of reverse diode

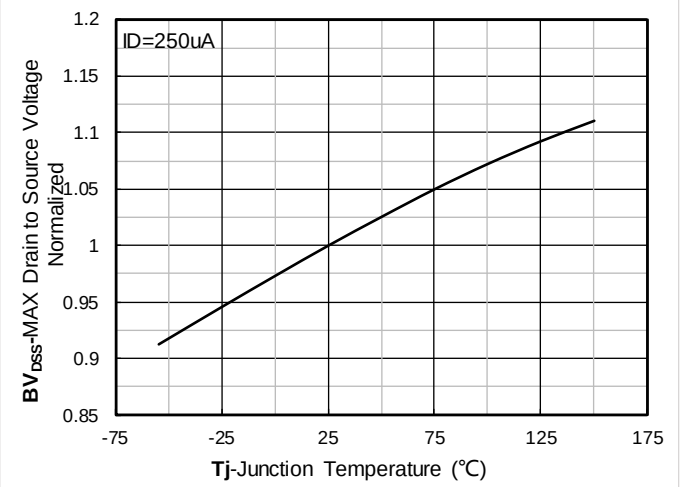


Figure 9. Normalized breakdown voltage

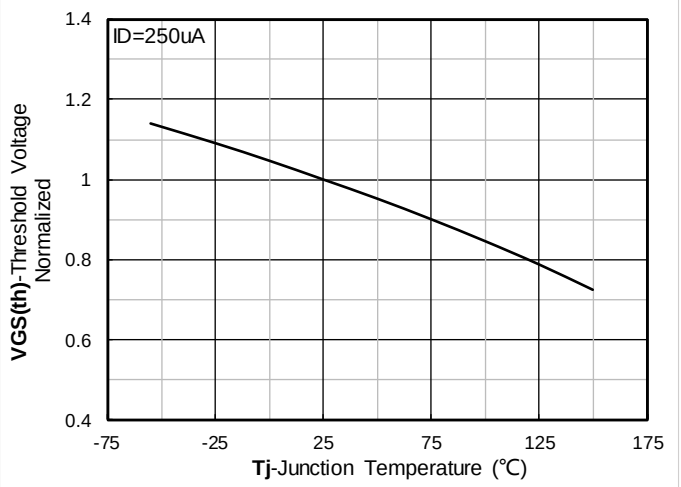


Figure 10. Normalized Threshold voltage

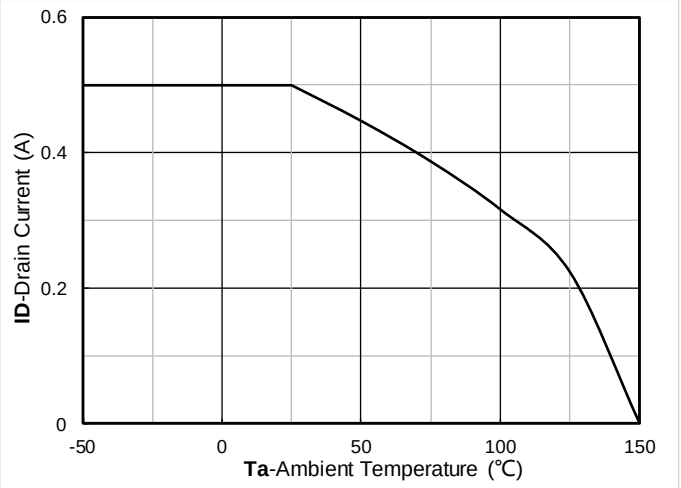


Figure 11. Current dissipation

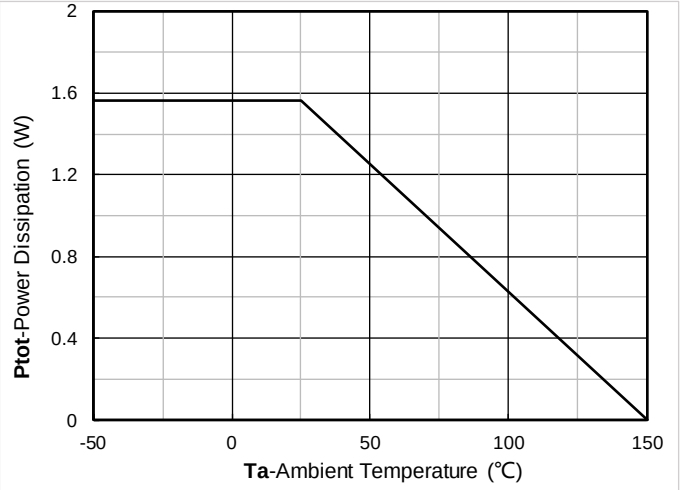


Figure 12. Power dissipation

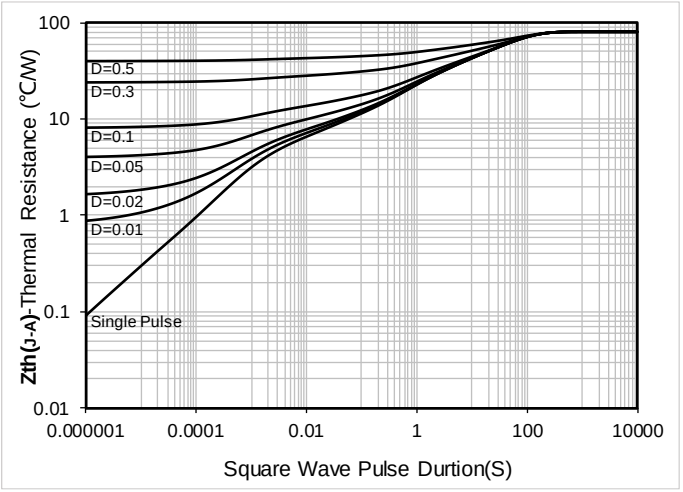


Figure 13. Maximum Transient Thermal Impedance

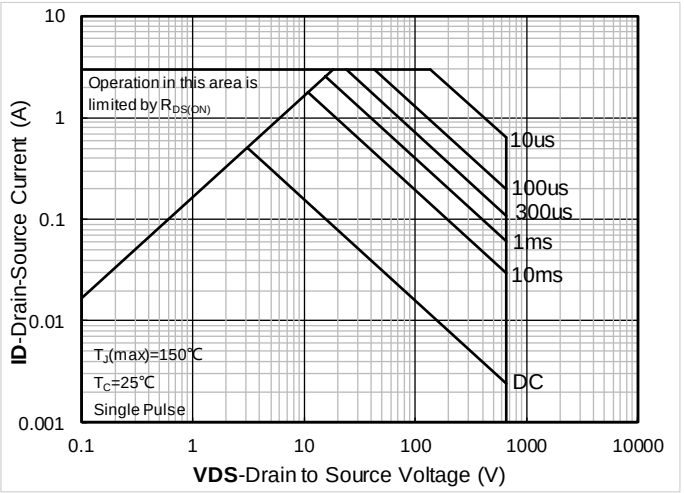
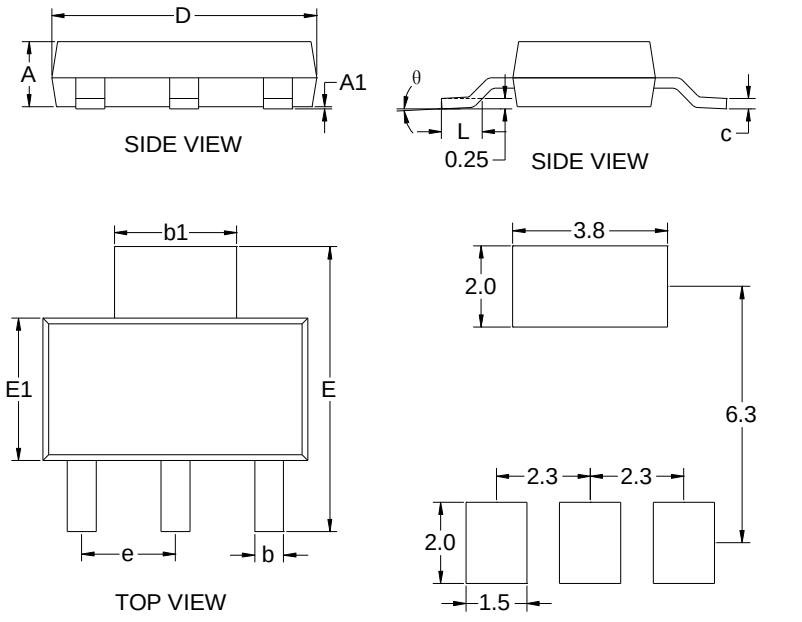


Figure 14. Safe Operation Area

■ SOT-223 Package information



DIMENSIONS				
DIM	INCHES		MM	
	MIN	MAX	MN	MAX
A	0.0591	0.0670	1.5000	1.7000
A1	0.0008	0.0039	0.0200	0.1000
b	0.0259	0.0330	0.6600	0.8400
b1	0.1140	0.1220	2.9000	3.1000
c	0.0090	0.0138	0.2300	0.3500
D	0.2480	0.2640	6.3000	6.7000
E	0.2637	0.2874	6.7000	7.3000
E1	0.1290	0.1460	3.3000	3.7000
e	0.0866	0.0945	2.2000	2.4000
L	0.0295	0.0492	0.7500	1.2500
θ	0°	10°	0°	10°

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