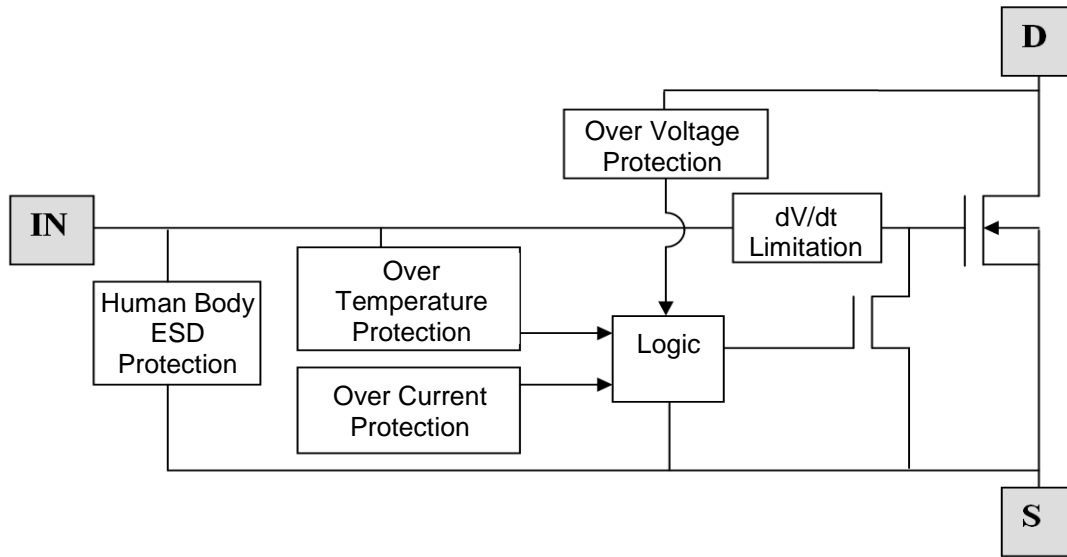


Functional Block Diagram

Absolute Maximum Ratings (@T_A = +25°C, unless otherwise stated.)

Characteristic	Symbol	Value	Unit
Continuous Drain-Source Voltage	V _{DS}	60	V
Drain-Source Voltage for Short Circuit Protection	V _{DS(SC)}	36	V
Continuous Input Voltage	V _{IN}	-0.5 ... +6	V
Continuous Input Current @ -0.2V ≤ V _{IN} ≤ 6V	I _{IN}	No Limit	mA
Continuous Input Current @ V _{IN} < -0.2V or V _{IN} > 6V	I _{IN}	I _{IN} ≤ 2	mA
Pulsed Drain Current @ V _{IN} = 3.3V	I _{DM}	2	A
Pulsed Drain Current @ V _{IN} = 5V	I _{DM}	2.5	A
Continuous Source Current (Body Diode) (Note 6)	I _S	1	A
Pulsed Source Current (Body Diode)	I _{SM}	5	A
Unclamped Single Pulse Inductive Energy, T _J = +25°C, I _D = 0.5A, V _{DD} = 24V	E _{AS}	480	mJ
Electrostatic Discharge (Human Body Model)	V _{ESD}	4000	V
Charged Device Model	V _{CDM}	1000	V

Thermal Characteristics (@T_A = +25°C, unless otherwise stated.)

Characteristic	Symbol	Value	Unit
Power Dissipation at T _A = +25°C (Note 6)	P _D	1.0	W
Linear Derating Factor		8.0	mW/°C
Power Dissipation at T _A = +25°C (Note 7)	P _D	1.6	W
Linear Derating Factor		12.8	mW/°C
Thermal Resistance, Junction to Ambient (Note 6)	R _{θJA}	125	°C/W
Thermal Resistance, Junction to Ambient (Note 7)	R _{θJA}	83	°C/W
Thermal Resistance, Junction to Case (Note 8)	R _{θJC}	39	°C/W
Operating Temperature Range	T _J	-40 to +150	°C
Storage Temperature Range	T _{STG}	-55 to +150	°C

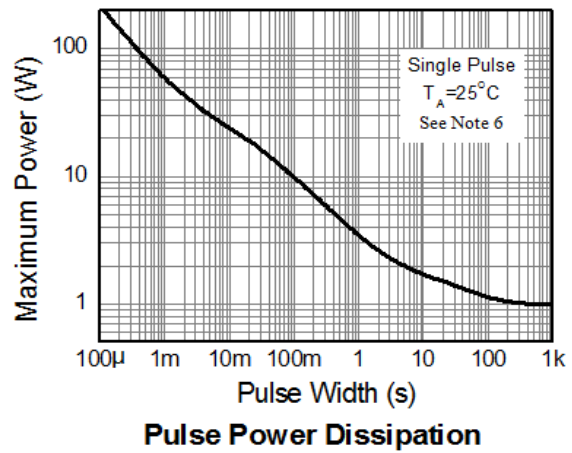
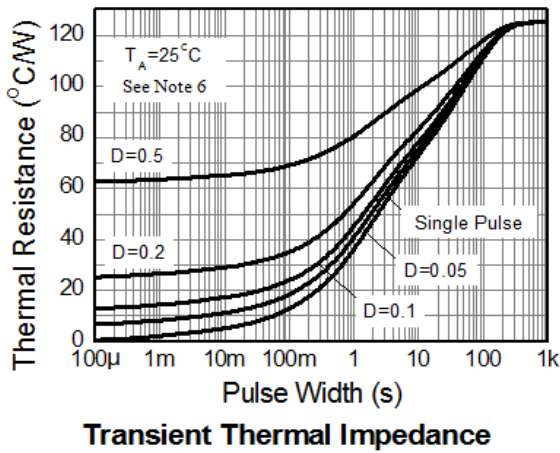
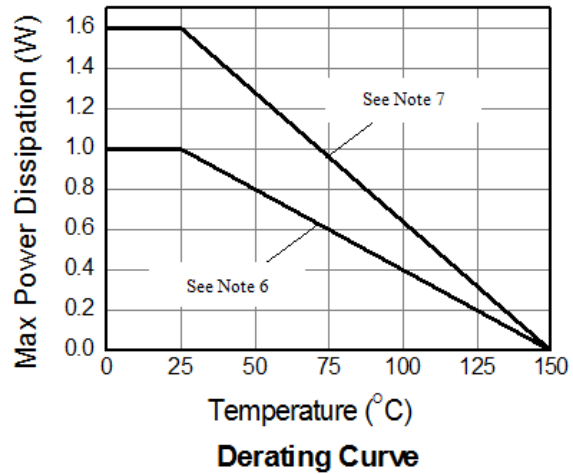
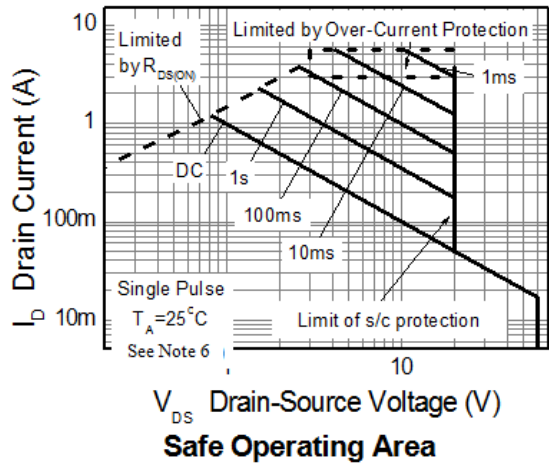
- Notes:
6. For a device surface mounted on 15mm x 15mm single sided 1oz weight copper on 1.6mm FR-4 board, in still air conditions. Sink split drain 80% and source 20% to isolate connections.
 7. For a device surface mounted on 50mm x 50mm single sided 2oz weight copper on 1.6mm FR-4 board, in still air conditions. Sink split drain 80% and source 20% to isolate connections.
 8. Thermal resistance between junction and the mounting surfaces of drain and source pins.

Recommended Operating Conditions

The ZXMS6004SGQ is optimized for use with μC operating from 3.3V and 5V supplies.

Characteristic	Symbol	Min	Max	Unit
Input Voltage Range	V_{IN}	0	5.5	V
Ambient Temperature Range	T_{A}	-40	+125	$^{\circ}\text{C}$
High Level Input Voltage for MOSFET to be on	V_{IH}	3	5.5	V
Low Level Input Voltage for MOSFET to be off	V_{IL}	0	0.7	V
Peripheral Supply Voltage (Voltage to Which Load is Referred)	V_{P}	0	36	V

Thermal Characteristics

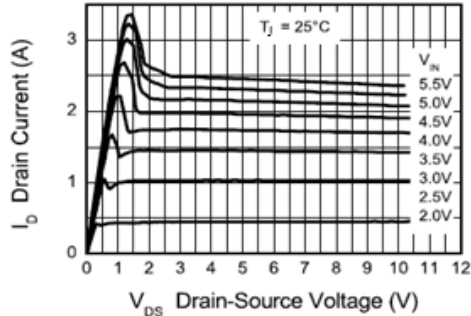


Electrical Characteristics (@T_A = +25°C, unless otherwise stated.)

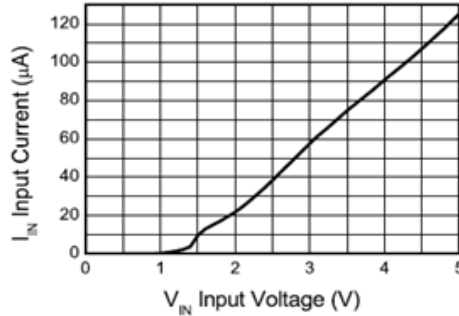
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Static Characteristics						
Drain-Source Clamp Voltage	V _{DS(AZ)}	60	65	70	V	I _D = 10mA
Off State Drain Current	I _{DSS}	–	–	0.5	μA	V _{DS} = 12V, V _{IN} = 0V
		–	–	1		V _{DS} = 36V, V _{IN} = 0V
Input Threshold Voltage	V _{IN(TH)}	0.7	1.2	1.5	V	V _{DS} = V _{GS} , I _D = 1mA
Input Current	I _{IN}	–	60	100	μA	V _{IN} = 3V
		–	120	200		V _{IN} = 5V
Input Current While Over Temperature Active	–	–	–	400	μA	V _{IN} = 5V
Static Drain-Source On-State Resistance	R _{DS(ON)}	–	400	600	mΩ	V _{IN} = 3V, I _D = 0.5A
		–	350	500		V _{IN} = 5V, I _D = 0.5A
Continuous Drain Current (Note 6)	I _D	0.9	–	–	A	V _{IN} = 3V; T _A = +25°C
		1	–	–		V _{IN} = 5V; T _A = +25°C
Continuous Drain Current (Note 7)		1.2	–	–		V _{IN} = 3V; T _A = +25°C
		1.3	–	–		V _{IN} = 5V; T _A = +25°C
Current Limit (Note 9)	I _{D(LIM)}	0.7	1.7	–	A	V _{IN} = 3V
		1	2.2	–		V _{IN} = 5V
Dynamic Characteristics						
Turn On Delay Time	t _{D(ON)}	–	5	–	μs	V _{DD} = 12V, I _D = 0.5A, V _{GS} = 5V
Rise Time	t _R	–	10	–		
Turn Off Delay Time	t _{D(OFF)}	–	45	–		
Fall Time	t _F	–	15	–		
Over-Temperature Protection						
Thermal Overload Trip Temperature (Note 10)	T _{JT}	+150	+175	–	°C	–
Thermal Hysteresis (Note 10)	–	–	+10	–	°C	–

- Notes:
9. The drain current is restricted only when the device is in saturation (see graph 'typical output characteristic'). This allows the device to be used in the fully on state without interference from the current limit. The device is fully protected at all drain currents, as the low power dissipation generated outside saturation makes current limit unnecessary.
 10. Over-temperature protection is designed to prevent device destruction under fault conditions. Fault conditions are considered as "outside" normal operating range, so this part is not designed to withstand over-temperature for extended periods.

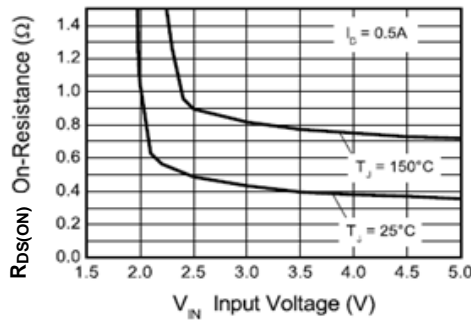
Typical Characteristics



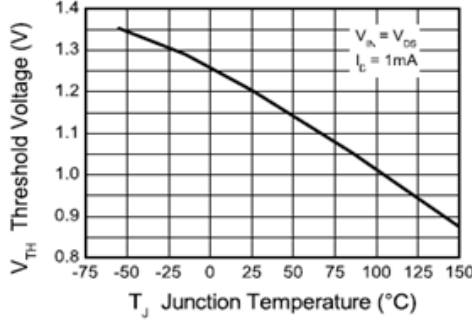
Typical Output Characteristic



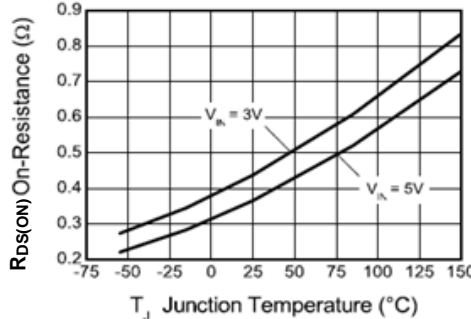
Input Current vs Input Voltage



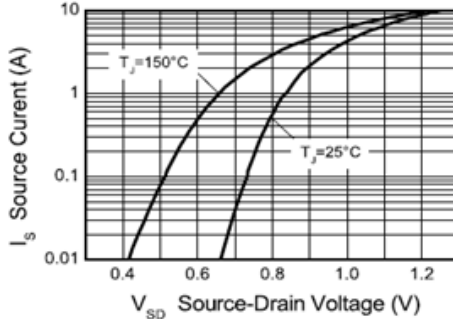
On-Resistance vs Input Voltage



Threshold Voltage vs Temperature

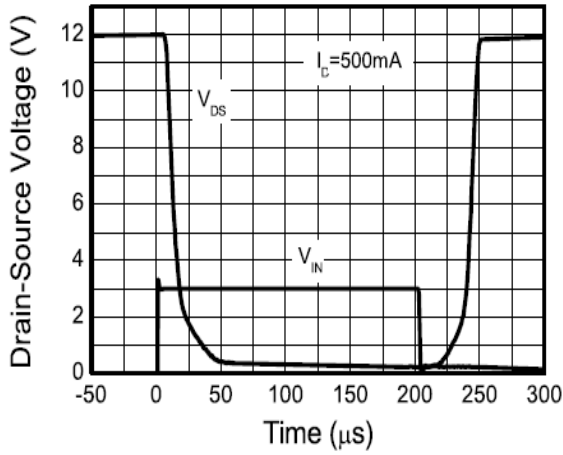


On-Resistance vs Temperature

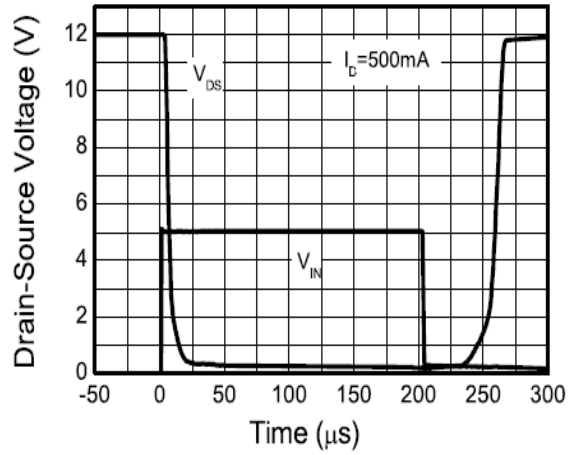


Reverse Diode Characteristic

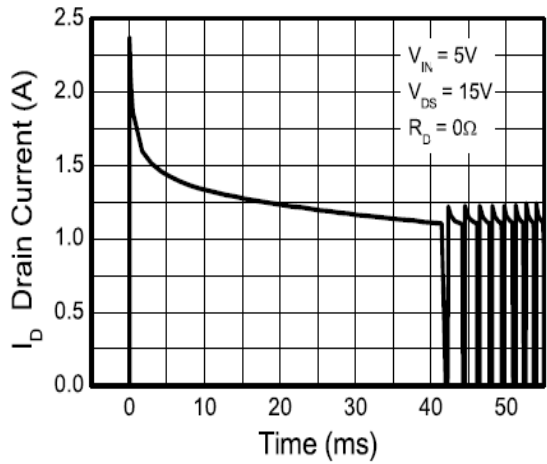
Typical Characteristics (Cont.)



Switching Speed



Switching Speed

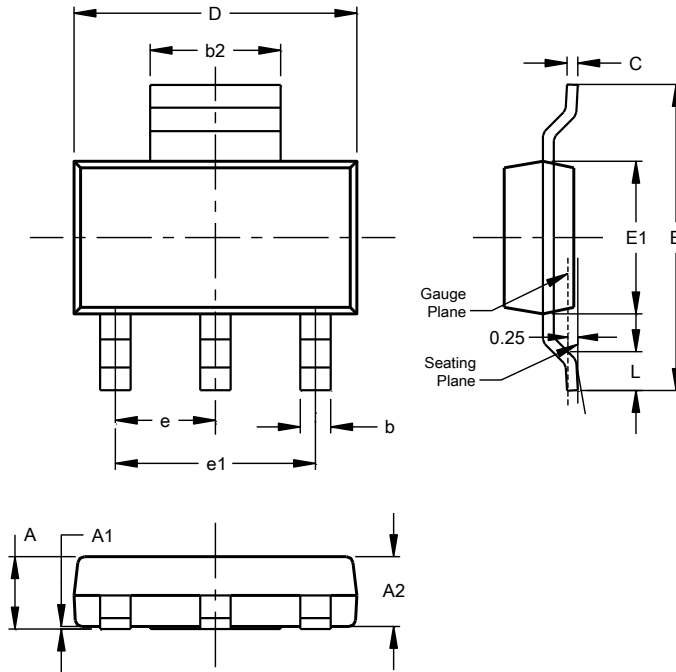


Typical Short Circuit Protection

Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOT223 (Type DN)

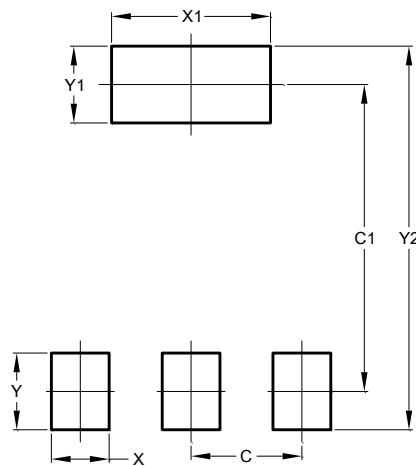


SOT223 (Type DN)			
Dim	Min	Max	Typ
A	--	1.70	--
A1	0.01	0.15	--
A2	1.50	1.68	1.60
b	0.60	0.80	0.70
b2	2.90	3.10	--
c	0.20	0.32	--
D	6.30	6.70	--
E	6.70	7.30	--
E1	3.30	3.70	--
e	--	--	2.30
e1	--	--	4.60
L	0.85	--	--
All Dimensions in mm			

Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOT223 (Type DN)



Dimensions	Value (in mm)
C	2.30
C1	6.40
X	1.20
X1	3.30
Y	1.60
Y1	1.60
Y2	8.00

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