DESCRIPTION

The MX0103A uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. It can be used in a wide variety of applications.

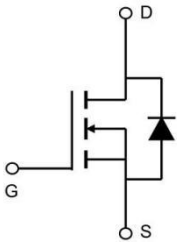
GENERAL FEATURES

- V_{DS}=100V, I_D=2.5A
  $R_{DS(ON)}$(Typ.)=140mΩ @ V_{GS}=10V
- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package

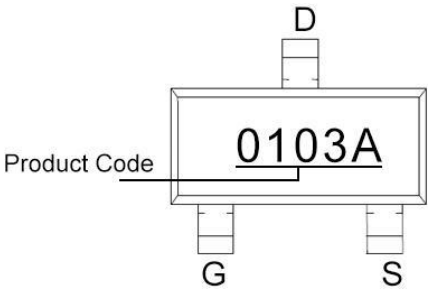
APPLICATION

- Battery management
- Motor controller and driver
- PWM applications
- Load switch

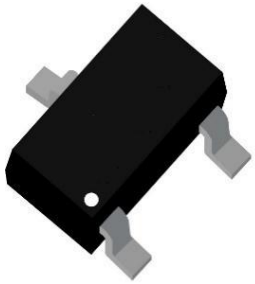
PINOUT



Schematic diagram



Marking and pin Assignment


SOT23 top view

ORDERING INFORMATION

Part Number	StorageTemperature	Package	Devices Per Reel
MX0103A	-55°C to 150°C	SOT-23	-

ABSOLUTE MAXIMUM RATINGS(T_A=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	2.5	A
Drain Current-Continuous(T_C=100°C)	I_D	1.4	A
Pulsed Drain Current(Note1)	I_{DM}	7.5	A
Maximum Power Dissipation	P_D	1.0	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	°C

THERMAL RESISTANCE

Thermal Resistance, Junction-to-Case(Note2)	$R_{\theta JC}$	125	°C/W

Note 1. Repetitive Rating: Pulse width limited by maximum junction temperature.
Note 2. Surface Mounted on FR4 Board, t ≤ 10 sec.

ELECTRICAL CHARACTERISTICS(T_A=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250μA	100	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=100V, V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
On Characteristics(Note2)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	1.0	1.5	2.2	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=2A	-	140	175	mΩ
Forward Transconductance	g_{FS}	V_{DS}=5V, I_D=2A	-	10	-	S
Dynamic Characteristics(Note3)						
Input Capacitance	C_{iss}	V_{DS}=50V, V_{GS}=0V, F=1.0MHz	-	415	-	pF
Output Capacitance	C_{oss}		-	30	-	pF
Reverse Transfer Capacitance	C_{rss}		-	25	-	pF
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	V_{DS}=50V, I_D=2A, R_L=1Ω, V_{GS}=10V, R_G=3Ω	-	8	-	nS
Turn-on Rise Time	t_r		-	3	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	17	-	nS
Turn-Off Fall Time	t_f		-	4.5	-	nS
Total Gate Charge	Q_g	V_{DS}=50V, I_D=2A, V_{GS}=10V	-	15	-	nC
Gate-Source Charge	Q_{gs}		-	2	-	nC
Gate-Drain Charge	Q_{gd}		-	4	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage(Note2)	V_{SD}	V_{GS}=0V, I_S=2A	-	-	1.2	V
Diode Forward Current(Note1)	I_S		-	-	2	A

Note 1. Surface Mounted on FR4 Board, t ≤ 10 sec.
Note 2. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
Note 3. Guaranteed by design, not subject to product.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 1. Switching Test Circuit

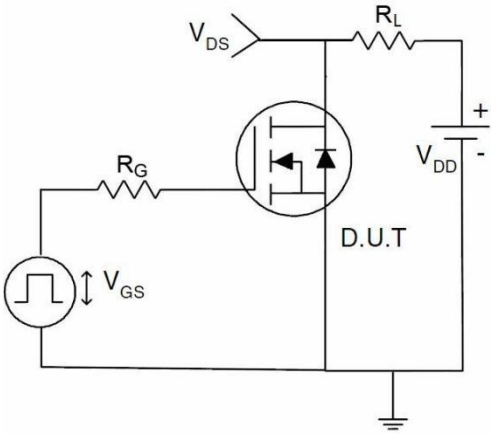


Figure 2. Switching Waveform

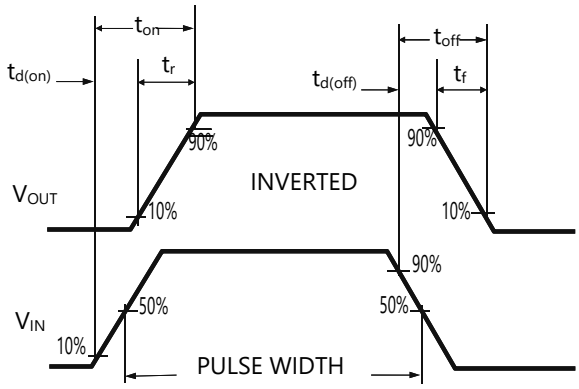


Figure 3. Power De-rating

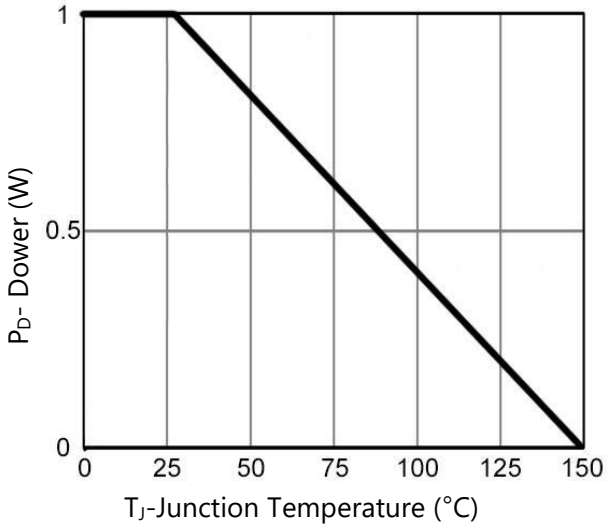


Figure 4. Drain Current

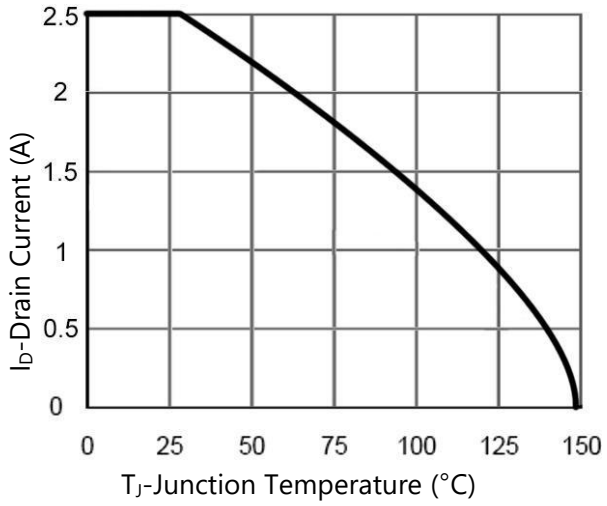


Figure 5. Output Characteristics

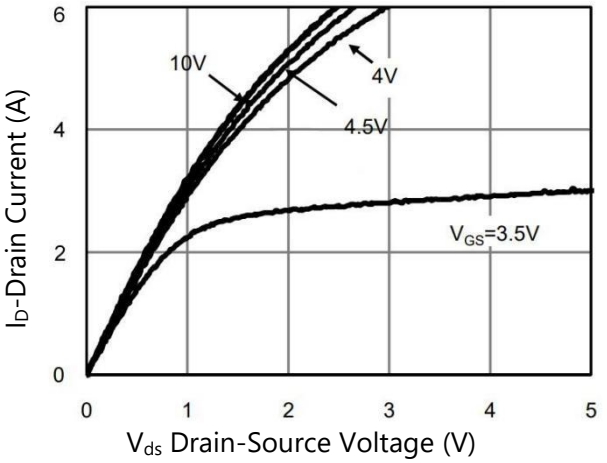
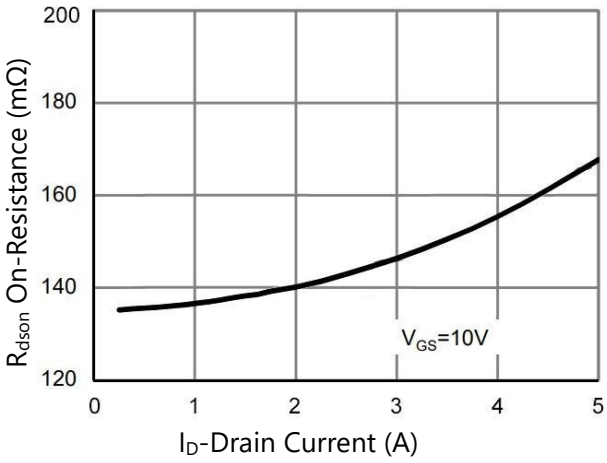


Figure 6. R_{dson} vs Drain Current



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 7. Transfer Characteristics

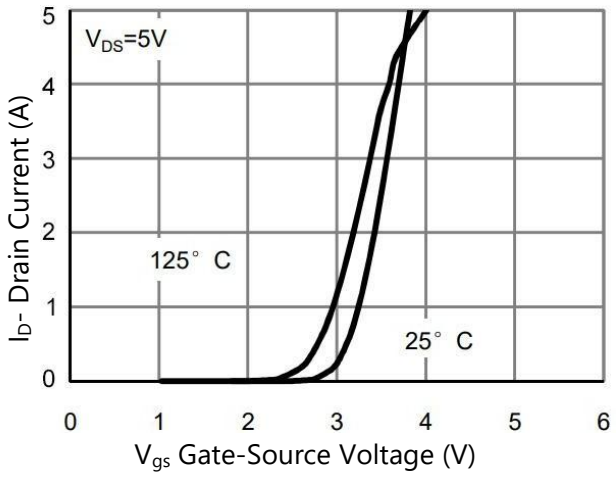


Figure 8. R_{dson} vs Junction Temperature

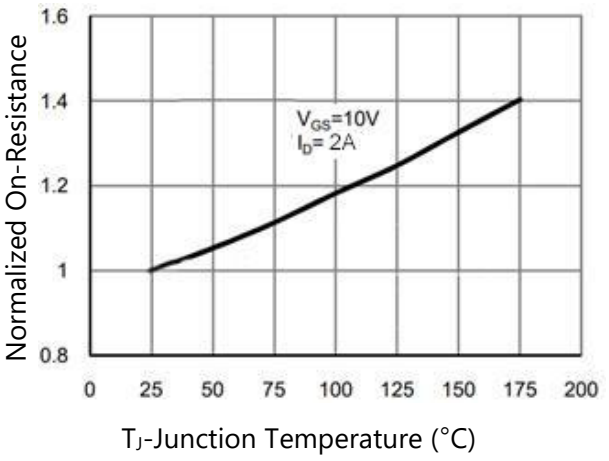


Figure 9. Rdson vs V_{gs}

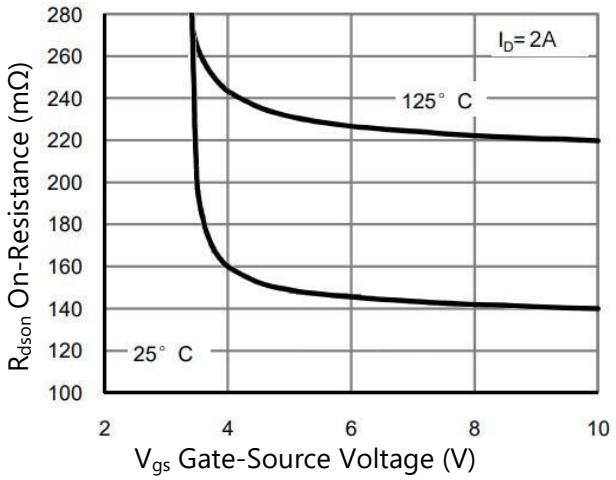


Figure 10. Capacitance vs V_{DS}

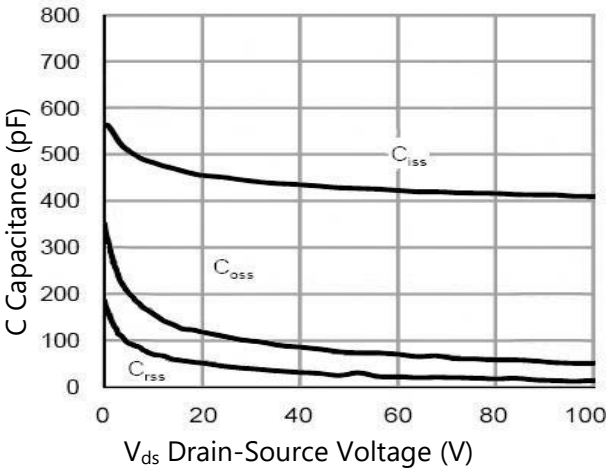


Figure 11. Gate Charge

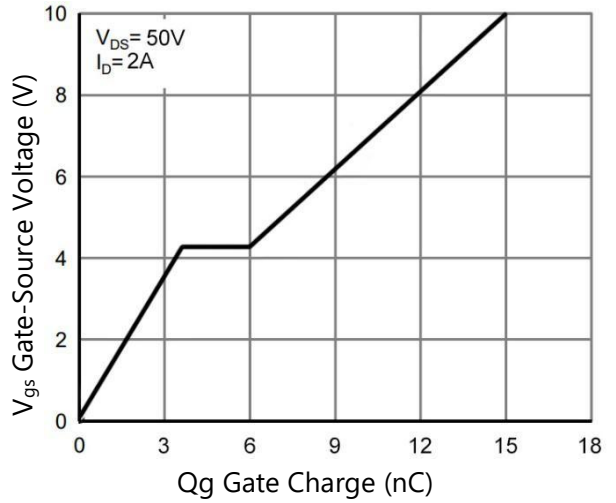
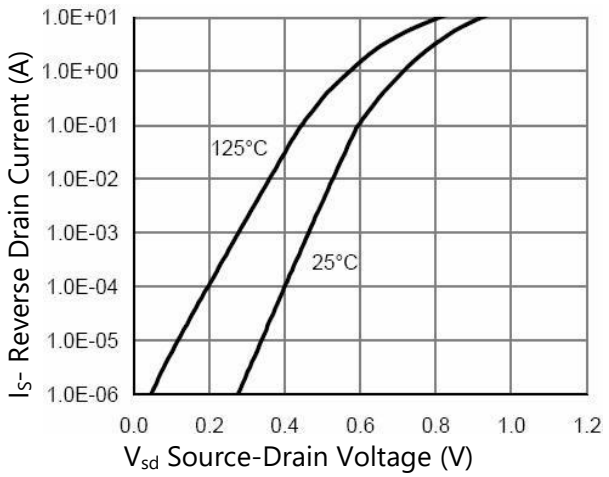


Figure 12. Source- Drain Diode Forward



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 13. Safe Operation Area

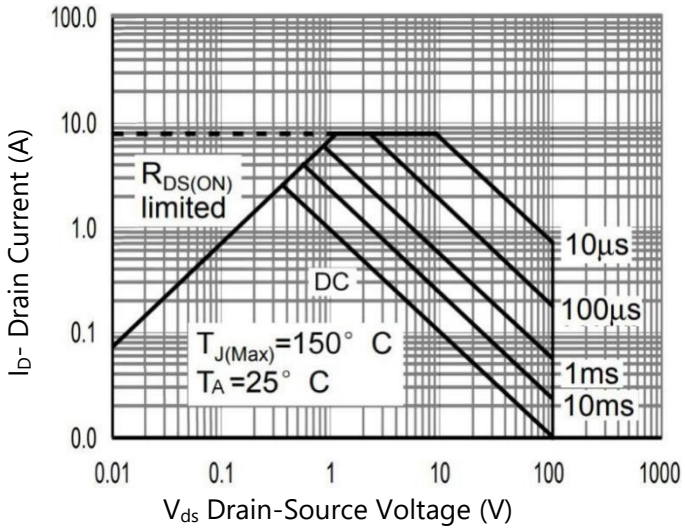
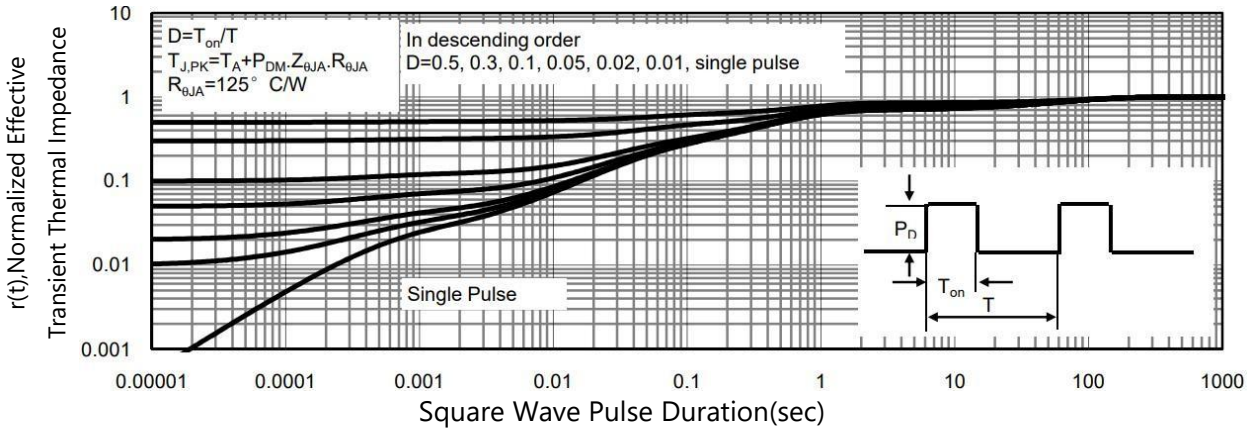
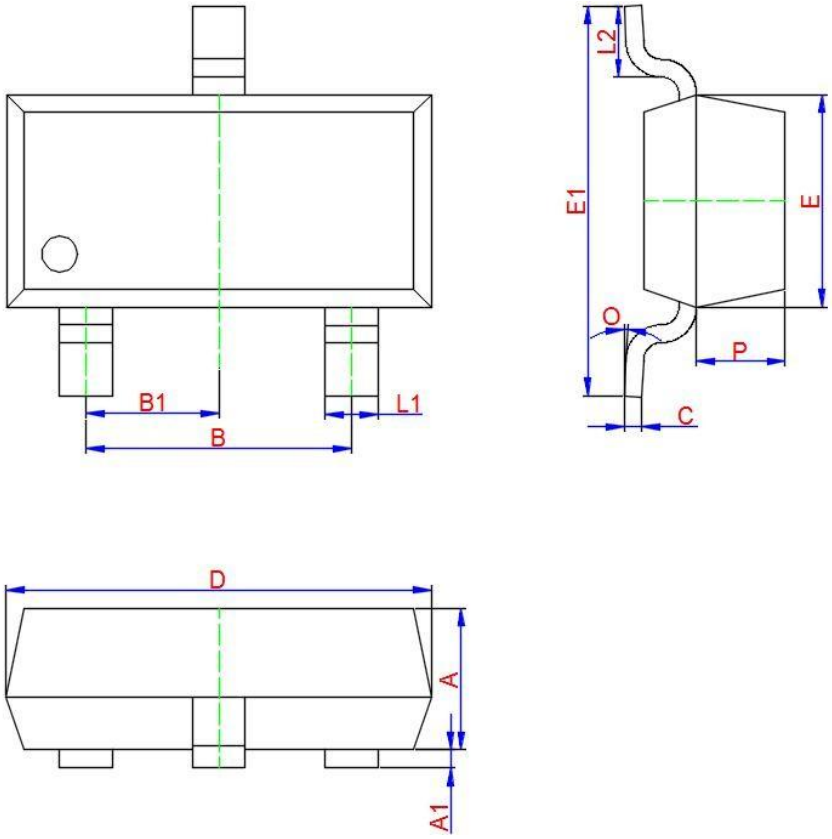


Figure 14. Normalized Maximum Transient Thermal Impedance



PACKAGE INFORMATION

SOT-23



Symbol	Dimensions in Millimeters		
	Min.	Typ.	Max.
A	0.900	1.000	1.100
A1	0.000	0.050	0.100
L1	0.300	0.400	0.500
C	0.100	0.110	0.120
D	2.800	2.900	3.000
E	1.250	1.300	1.350
E1	2.250	2.400	2.550
B	1.800	1.900	2.000
B1	0.950 TYP.		
L2	0.200	0.350	0.450
P	0.550	0.575	0.600
O	0°	4°	8°