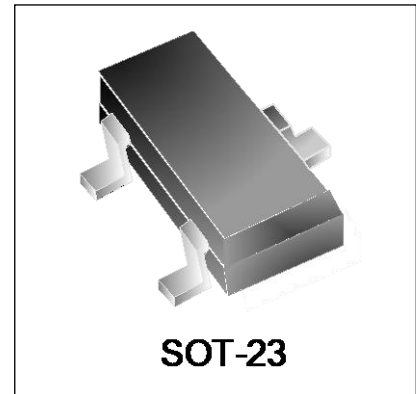


N-Channel MOSFET

Features

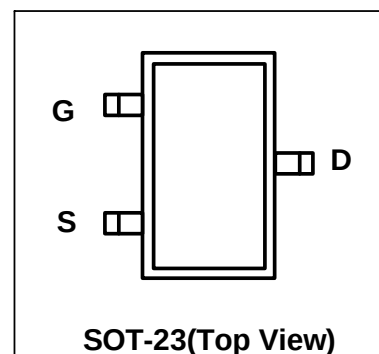
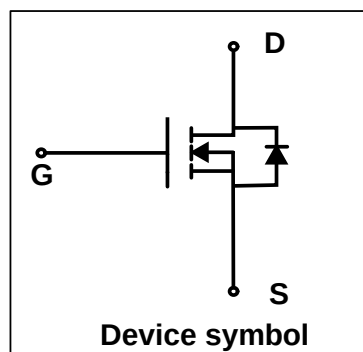
- $V_{DS} = 20\text{ V}$, $I_D = 3.1\text{ A}$
 $R_{DS(on)} < 45\text{ m}\Omega$ @ $V_{GS} = 4.5\text{ V}$
 $R_{DS(on)} < 60\text{ m}\Omega$ @ $V_{GS} = 2.5\text{ V}$
- High Power and Current Handling Capability
- Lead Free Product is Acquired
- Surface Mount Package



Mechanical Characteristics

- SOT-23 Package
- Marking : Making Code
- RoHS Compliant
- MSL1

Schematic & PIN Configuration



Absolute Maximum Rating

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	20	V
Continuous Drain Current ($T_C = 25\text{ }^{\circ}\text{C}$)	I_D	3.1	A
Pulsed Drain Current ¹	I_{DM}	10	A
Gate-Source Voltage	V_{GS}	± 8	V
Power Dissipation ($T_C = 25\text{ }^{\circ}\text{C}$)	P_D	350	mW
Junction Temperature	T_J	150	$^{\circ}\text{C}$
Storage Temperature	T_{STG}	-55 to +150	$^{\circ}\text{C}$
Thermal Resistance from Junction to Ambient ²	$R_{\theta JA}$	357	$^{\circ}\text{C/W}$

Electrical Characteristics ($T_{amb}=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V _{GS} = 0 V, I _D = 250 μA	20	-	-	V
Gate Threshold Voltage ³	V_{GS(th)}	V _{GS} = V _{DS} , I _D = 250 μA	0.4	0.75	1.2	
Drain Cut-off Current	I_{DSS}	V _{DS} = 20V, V _{GS} = 0 V	-	-	1	μA
Gate Leakage Current	I_{GSS}	V _{GS} = ±8V, V _{DS} = 0 V	-	-	±100	nA
Drain-Source on-State Resistance ³	R_{DS(on)}	V _{GS} = 4.5V, I _D = 3.6A	-	32	45	mΩ
		V _{GS} = 2.5V, I _D = 3.1A	-	43	60	
Forward Trans Conductance ³	g_{fs}	V _{DS} = 5V, I _D = 3.6A	-	8	-	S
Dynamic Characteristics						
Input Capacitance	C_{iss}	V _{GS} = 0 V, V _{DS} = 10V, f = 1 MHz	-	350	-	pF
Output Capacitance	C_{oss}		-	60	-	
Reverse Transfer Capacitance	C_{rss}		-	54	-	
Switching Characteristics						
Total Gate Charge ⁴	Q_g	V _{DS} = 10V, V _{GS} = 4.5V, I _D = 3.0A	-	2.9	-	nC
Gate-Source charge ⁴	Q_{gs}		-	0.4	-	
Gate-Drain Charge ⁴	Q_{gd}		-	0.6	-	
Turn-on Time ⁴	t_{d(on)}	V _{GEN} = 4.5V, V _{DD} = 10V, R _L = 3.3Ω, R _g = 6Ω	-	2.5	-	ns
Rise Time ⁴	t_r		-	3.2	-	
Turn-off Time ⁴	t_{d(off)}		-	21	-	
Fall Time ⁴	t_f		-	3	-	
Source-Drain Diode characteristics						
Body Diode Voltage	V_{SD}	I _S = 1A, V _{GS} = 0V	-	-	1.2	V

Notes:

1. Repetitive rating : Pulse width limited by junction temperature.
2. Surface mounted on FR4 board , $t \leq 10\text{s}$.
3. Pulse Test : Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 0.5\%$.
4. Guaranteed by design, not subject to producing.

Typical Characteristics

Figure 1. Output Characteristics

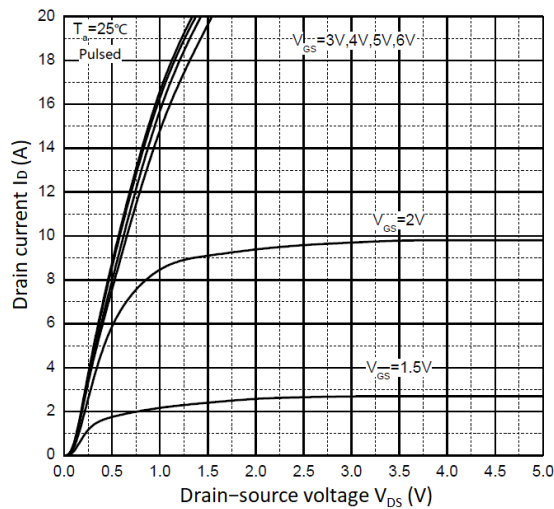


Figure 2. Transfer Characteristics

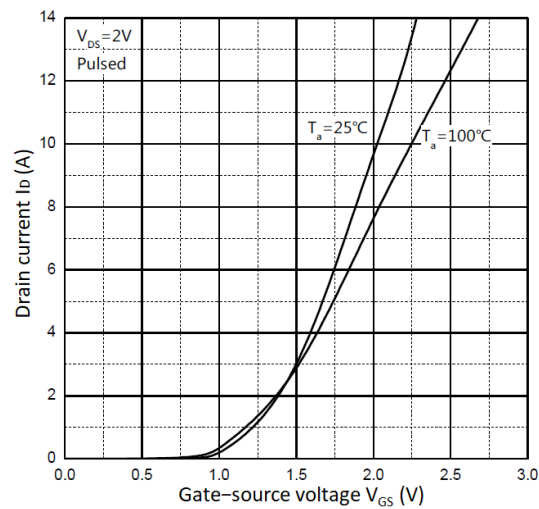


Figure 3. $R_{DS(on)}$ vs. I_D

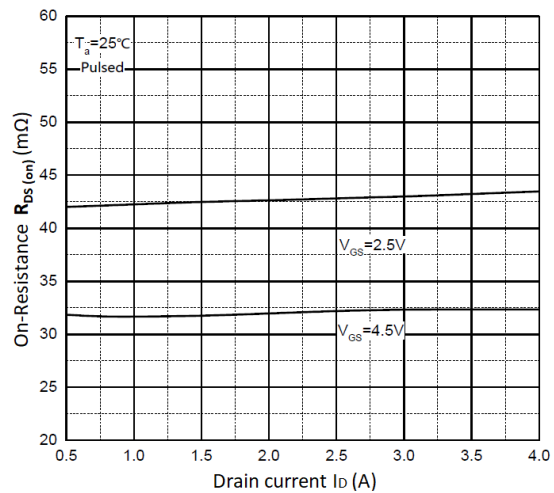


Figure 4. $R_{DS(on)}$ vs. V_{GS}

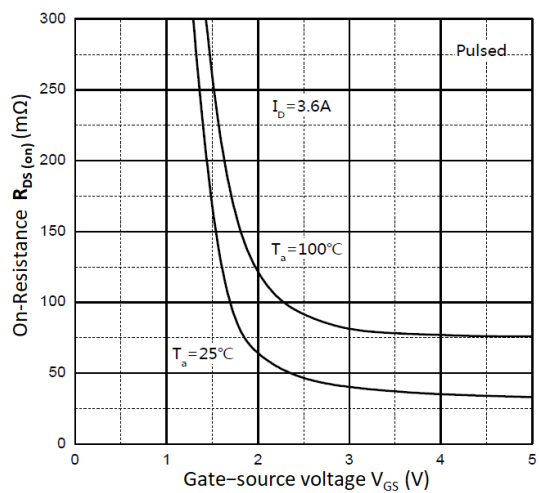


Figure 5. I_S vs. V_{SD}

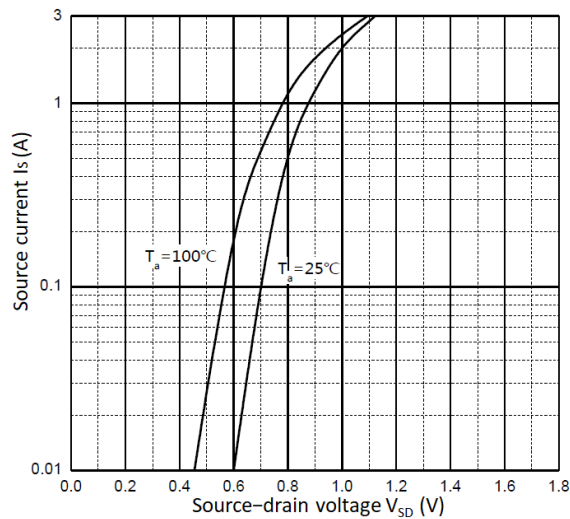
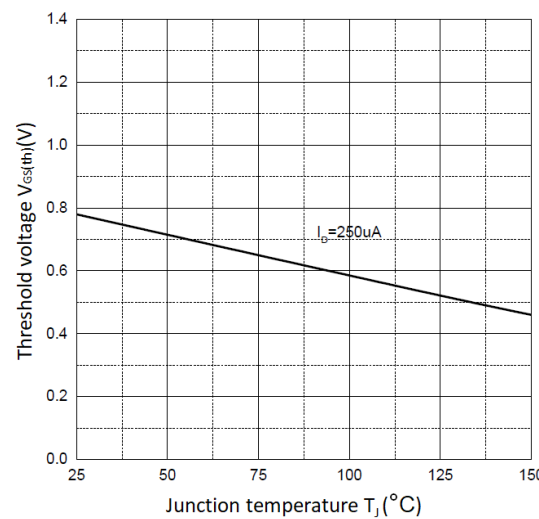
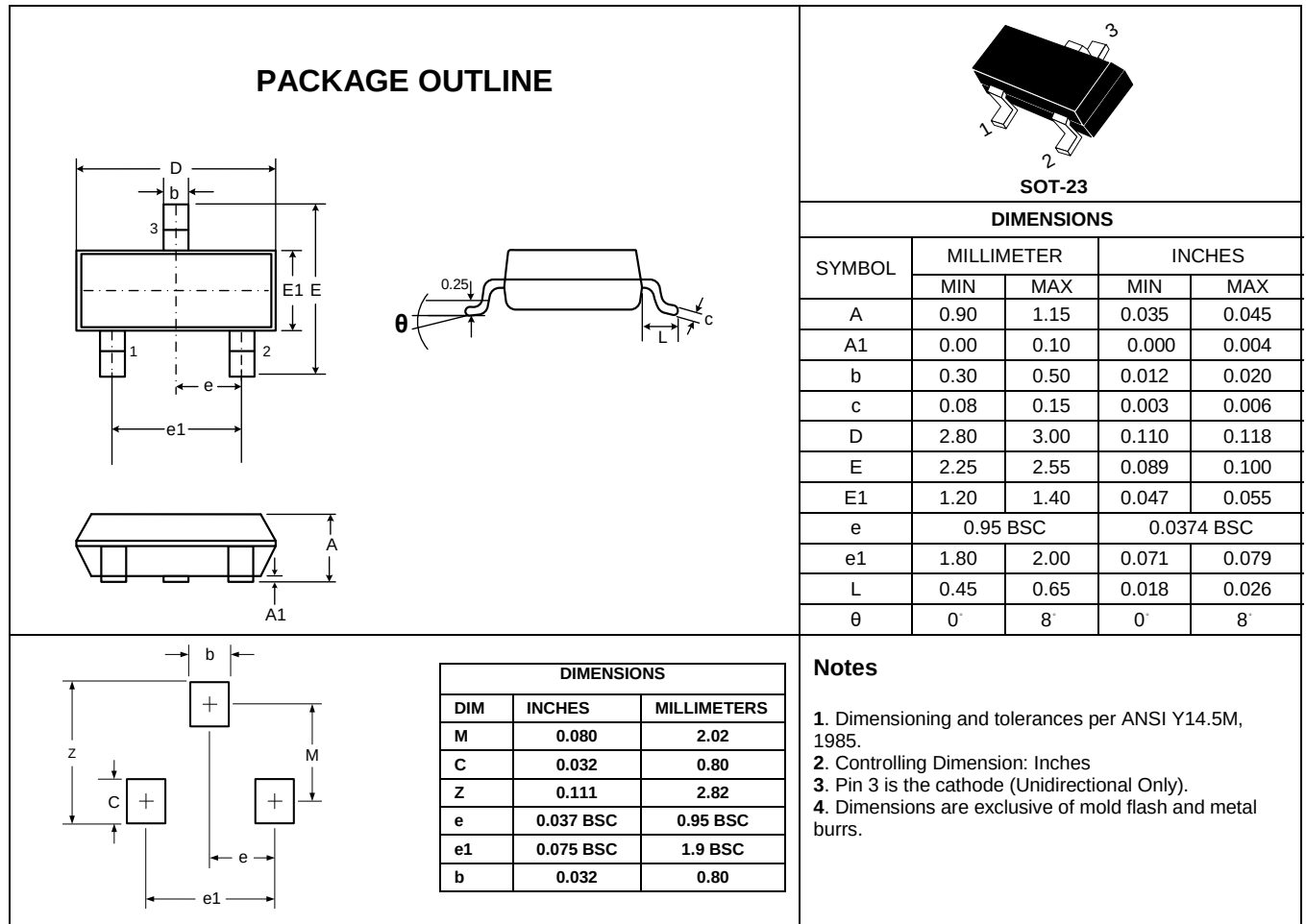


Figure 6. Threshold Voltage vs. T_J



Outline Drawing – SOT-23



Marking Codes

Part Number	EM02N31M
Marking Code	

Package Information

Qty: 3k/Reel

Revision History

No.	Version	Date	Revision Item	Request	Function and characteristic checking	Package dimension checking	Typos checking
1	1.0	2013-01-22	Released Version	Qi Shu Kun	Qi Shu Kun	Liu Jia Ying	Liu Jia Ying