

MT2302

N-Channel Enhancement Mode Field Effect Transistor

Product Summary

PRODUCT SUMMARY		
V _{DSS}	I _D	R _{DS(ON)} (mΩ) Typ
20V	3.6A	36@ V _{GS} =4.5V
		45@ V _{GS} =2.5V

Features

- Super high dense cell design for low R_{DS(ON)}
- Rugged and reliable
- Simple drive requirement
- SOT-23 package

Applications

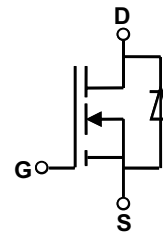
- Notebook Computer
- Portable Battery Pack



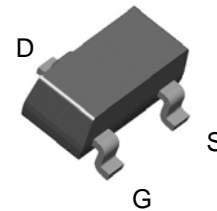
MT Semiconductor®

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Simplified Schematic



MARKING DIAGRAM & PIN ASSIGNMENT



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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V _{DS}	20	V
Gate-Source Voltage	V _{GS}	±12	V
Drain Current-Continuous ^a @T _j =125°C - Pulse ^d	I _D	3.6	A
	I _{DM}	12	A
Drain-source Diode Forward Current ^a	I _S	1.25	A
Maximum Power Dissipation ^a	P _D	1.25	W
Operating Junction and Storage Temperature Range	T _J ,T _{STG}	-55 to 150	°C

THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to Ambient ^a	R _{th JA}	100	°C/W
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ELECTRICAL CHARACTERISTICS (TA=25°C unless otherwise noted)

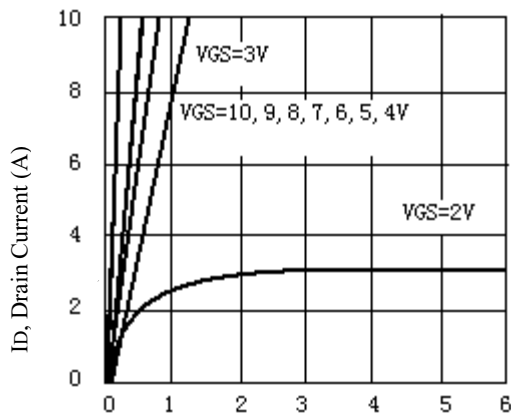
Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V,I _D =250μA	20			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =16V,V _{GS} =0V			1	μA
Gate-Body Leakage	I _{GSS}	V _{GS} =±8V,V _{DS} =0V			±100	nA
ON CHARACTERITICS						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} ,I _D =-250μA	0.5	0.8	1.5	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =4.5V,I _D =2.8A		36	41	m Ω
		V _{GS} =2.5V,I _D =2.0A		45	51	
Forward Transconductance	g _{FS}	V _{GS} =5V,I _D =5A		5		S
DYNAMIC CHARACTERISTICS						
Input Capacitance	C _{ISS}	V _{DS} =10V,V _{GS} =0V f=1.0MHz		586		pF
Output Capacitance	C _{OSS}			101		pF
Reverse Transfer Capacitance	C _{RSS}			59		pF
SWITCHING CHARACTERISISTICS						
Turn-On Delay Time	t _{D(ON)}	V _{DD} =10V I _D =3.6A, V _{GEN} =4.5V R _L =10ohm R _{GEN} =10ohm		6.5		ns
Rise Time	tr			32.1		ns
Turn-Off Delay Time	t _{D(OFF)}			58.4		ns
Fall Time	tf			48		ns
Total Gate Charge	Q _g	V _{DS} =10V,I _D =1A V _{GS} =4.5V		6		nC
Gate-Source Charge	Q _{gs}			1.35		nC
Gate-Drain Charge	Q _{gd}			1.5		nC

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

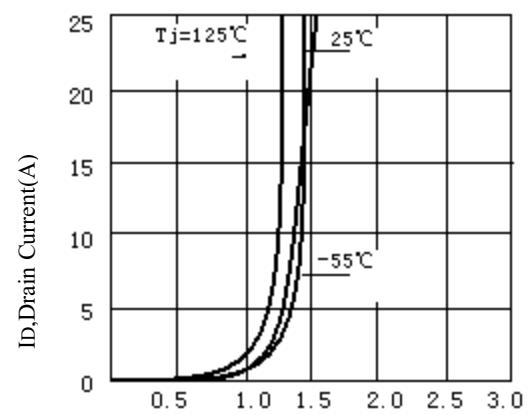
Parameter	Symbol	Condition	Min	Typ	Max	Unit
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =1.25A		0.84	1.2	V

Notes

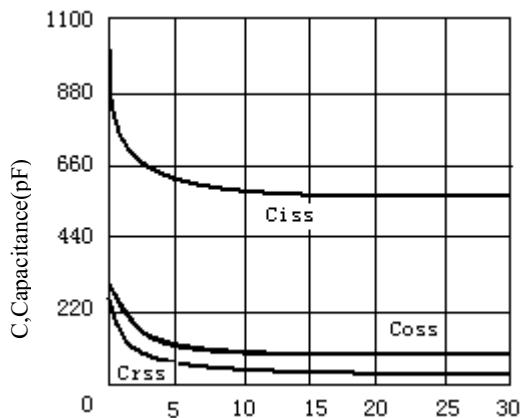
- Surface Mounted on FR4 Board, $t \leq 10\text{sec}$
- Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$
- Guaranteed by design, not subject to production testing.



V_{DS}, Drain-to-Source Voltage (V)
Figure 1. Output Characteristics



V_{GS}, Gate-to-source Voltage (V)
Figure 2. Transfer Characteristics



V_{GS}, Drain-to Source Voltage
Figure3. Capacitance

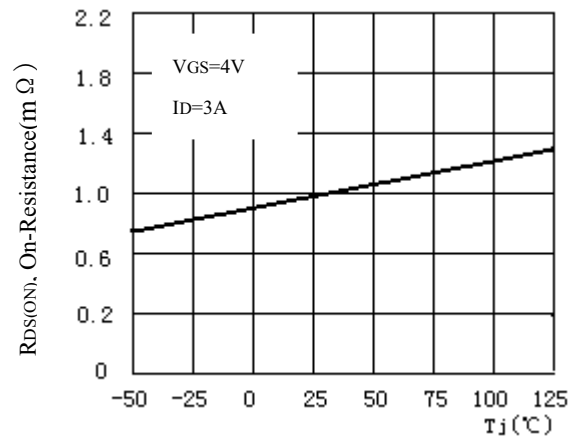


Figure4. On-Resistance Variation with Temperature

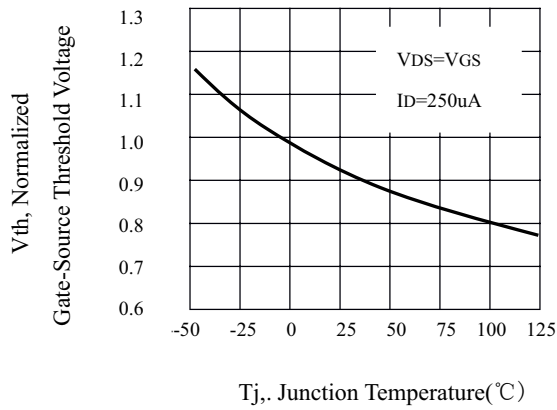


Figure5. Gate Threshold Variation With Temperature

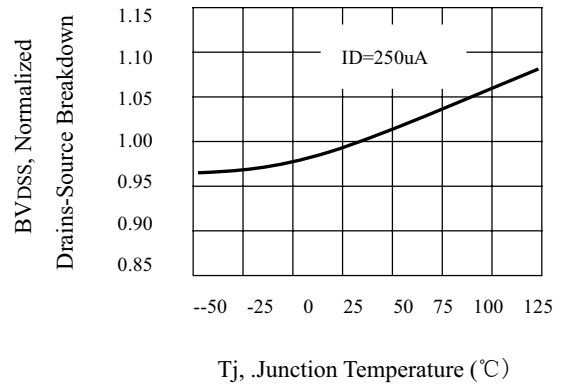


Figure6. Breakdown Voltage Variation With Temperature

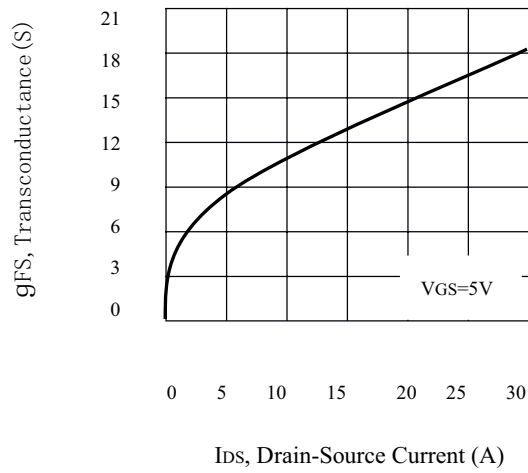


Figure7. Transconductance Variation With Drain Current

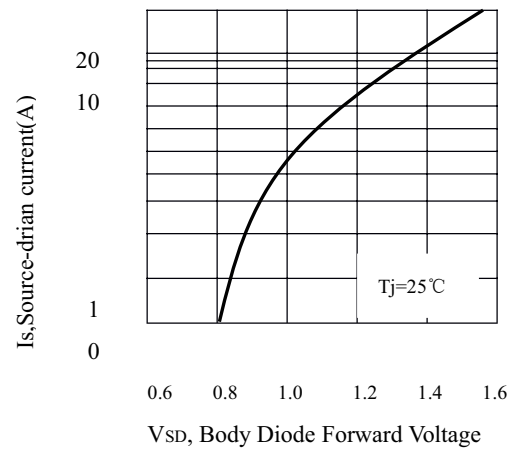


Figure8. Body Diode Forward Voltage Variation with Source Current

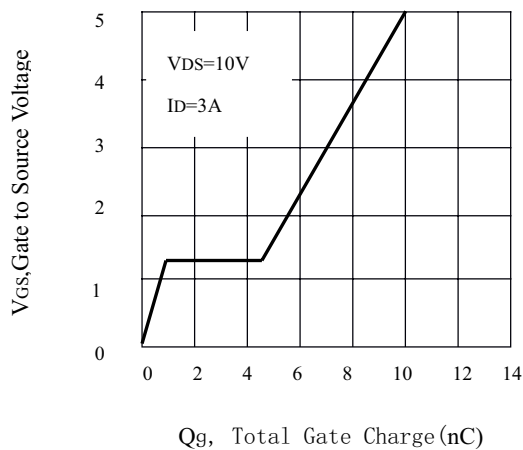


Figure9. Gate Charge

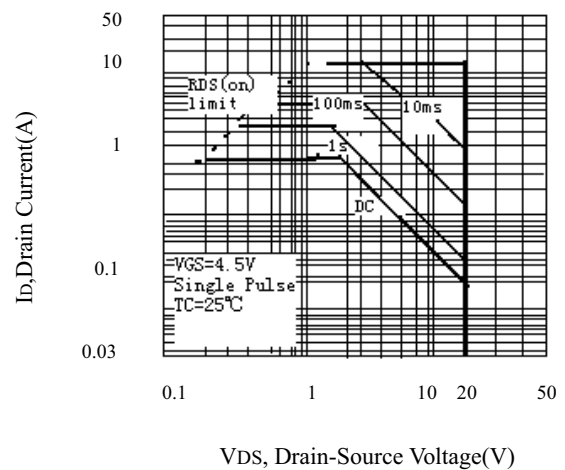
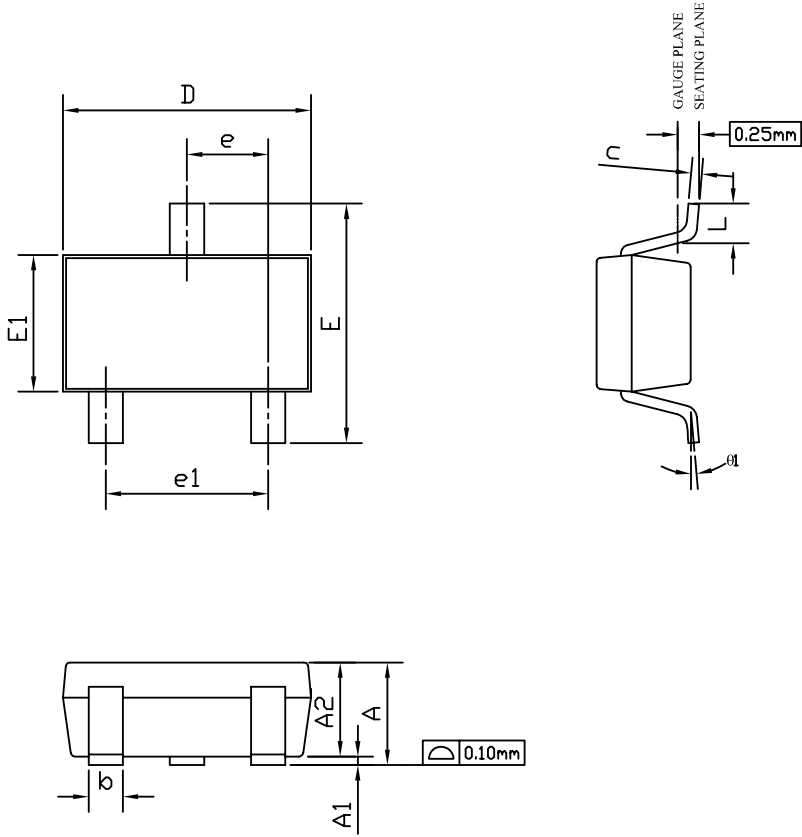


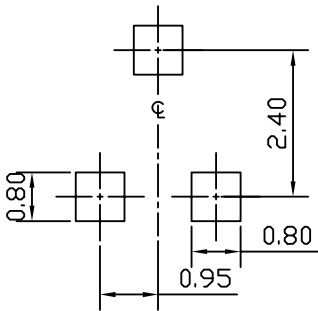
Figure10. Maximum Safe Operating Area

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Version	L

SOT23 PACKAGE OUTLINE



RECOMMENDED LAND PATTERN



UNIT: mm

SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.85	—	1.25	0.033	—	0.049
A1	0.00	—	0.13	0.000	—	0.005
A2	0.70	1.00	1.15	0.028	0.039	0.045
b	0.30	0.40	0.50	0.012	0.016	0.020
c	0.08	0.13	0.20	0.003	0.005	0.008
D	2.80	2.90	3.10	0.110	0.114	0.122
E	2.60	2.80	3.00	0.102	0.110	0.118
E1	1.40	1.60	1.80	0.055	0.063	0.071
e	0.95 BSC			0.037 BSC		
e1	1.90 BSC			0.075 BSC		
L	0.30	—	0.60	0.012	—	0.024
θ1	0°	5°	8°	0°	5°	8°

- NOTE
1. PACKAGE BODY SIZES EXCLUDE MOLD FLASH OR GATE BURRS.
MOLD FLASH AT THE NON-LEAD SIDES SHOULD BE LESS THAN 5 MILS EACH.
 2. TOLERANCE ± 0.100 mm (4 mil) UNLESS OTHERWISE SPECIFIED.
 3. DIMENSION L IS MEASURED IN GAUGE PLANE.
 4. CONTROLLING DIMENSION IS MILLIMETER. CONVERTED INCH DIMENSIONS ARE NOT NECESSARILY EXACT.
 5. ALL DIMENSIONS ARE IN MILLIMETERS.

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