MT3401A

P-Channel Enhancement Mode Field Effect Transistor

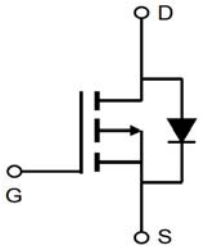
MT Semiconductor®

http://www.mtsemi.com

Product Summary

- V_{DS}= -30V
- I_D= -4.2A (V_{GS}= -10V)
- $R_{DS(ON)}$ ≦45mΩ @V_{GS}= -10V
- $R_{DS(ON)}$ ≦55mΩ @V_{GS}= -4.5V
- $R_{DS(ON)}$ ≦75mΩ @V_{GS}= -2.5V

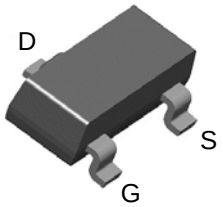
Simplified Schematic



Features

- Advanced Trench Process Technology.
- High dense cell design for ultra low $R_{DS(ON)}$.
- Lead free product is acquired.
- RoHS Compliant.

MARKING DIAGRAM & PIN ASSIGNMENT



SOT-23-3L

Applications

- Power Management in Notebook Computer
- Portable Equipment and Battery Powered Systems

Absolute Maximum Ratings (T_A = 25℃ unless otherwise noted)

Symbol	Parameter	Steady State	Units
V_{DS}	Drain-Source Voltage	-30	V
V_{GS}	Gate-Source Voltage	±12	V
I_D	Continuous Drain Current [1]	-4.2	A
I_{DM}	Pulsed Drain Current [2]	-30	A
I_S	Continuous Source Current (Diode Conduction) [1]	-2	A
P_D	Maximum Power Dissipation [1]	1.25	W
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 to 150	℃

Notes:

1. Surface Mounted on 1” x 1” FR4 Board, t≦10 Sec.
2. Pulse width limited by maximum junction temperature.

Thermal Resistance Ratings

Symbol	Parameter		Typical	Maximum	Unit
R_{thJA}	Maximum Junction-to-Ambient	t≦10 Sec	65	90	℃/W
		Steady State	85	125	
R_{thJF}	Maximum Junction-to-Foot (Drain)	Steady State	43	60	

Electrical Characteristics (T_A=25°C, unless otherwise noted)

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
● Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}= 0V, I_D= -250μA	-30	-	-	V
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = -250μA	-0.7	-1	-1.5	V
I_{GSS}	Gate-Body Leakage Current	V_{DS} = 0V, V_{GS} = ±12V	-	-	±100	nA
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = -24V, V_{GS} = 0V	-	-	-1	μA
		V_{DS} = -24V, V_{GS} = 0V, T_J = 85℃	-	-	-30	
$R_{DS(on)}$	Drain Source On State Resistance [a]	V_{GS} = -10V, I_D = -4.2A		45		mΩ
		V_{GS} = -4.5V, I_D = -4A		55		
		V_{GS} = -2.5V, I_D = -1A		75		
g_{fs}	Forward Transconductance [a]	V_{DS} = -5V, I_D = -5A	7	11	-	S
V_{SD}	Diode Forward Voltage [a]	I_S = -1A, V_{GS} = 0V	-	-0.77	-1	V
● Dynamic Characteristics [b]						
C_{iss}	Input Capacitance	V_{DS}= -15V, V_{GS}=0V, f=1MHz	-	720	-	pF
C_{oss}	Output Capacitance		-	90	-	
C_{rss}	Reverse Transfer Capacitance		-	65	-	
Q_g	Total Gate Charge	V_{DS} = -15V, V_{GS} = -4.5V, I_D = -2.5A	-	11.5	14	nC
Q_{gs}	Gate-Source Charge		-	1.56	-	
Q_{gd}	Gate-Drain Charge		-	2.2	-	
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = -15V, R_L = 15Ω I_D= -1.0A, V_{GEN} = -10V, R_G = 6Ω	-	8.3	12	nSec
t_r	Rise Time		-	7.6	15	
$T_{d(off)}$	Turn-Off Delay Time		-	26	46	
t_f	Fall Time		-	5.6	10	
R_g	Gate Resistance	V_{GS}=0, V_{DS}=0, f=1MHz	-	8	-	Ω
t_{rr}	Body Diode Reverse Recovery Time	I_F = -4A, di/dt = 100A/μs	-	11	-	nSec
Qrr	Body Diode Reverse Recovery Charge		-	6	-	nC

Note:

a. Pulse test; pulse width≦300μs, duty cycle≦2%.

b. Guaranteed by design, not subject to production testing.

Characteristics Curve

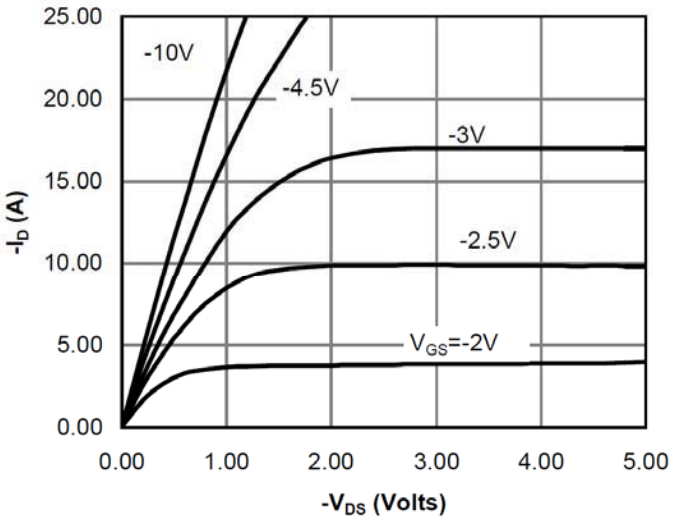


Fig 1: On-Region Characteristics

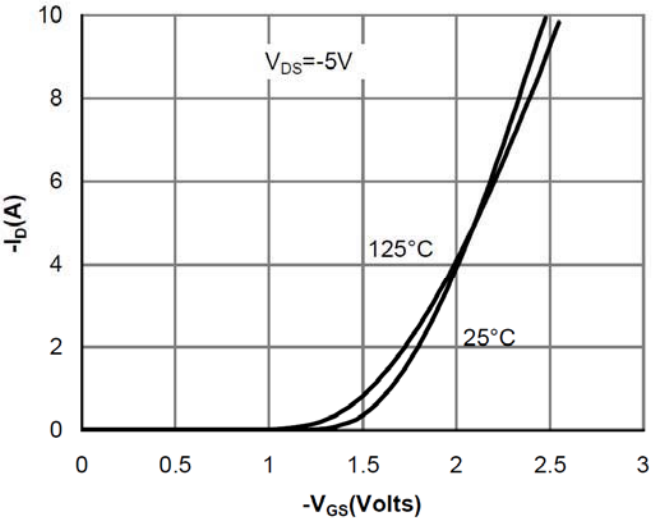


Figure 2: Transfer Characteristics

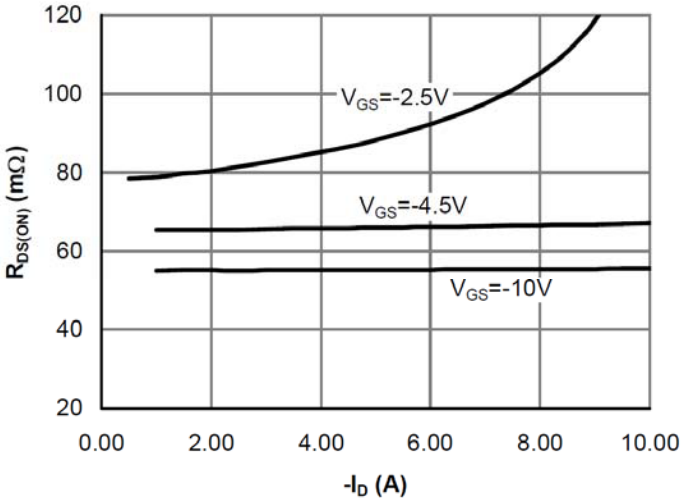


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

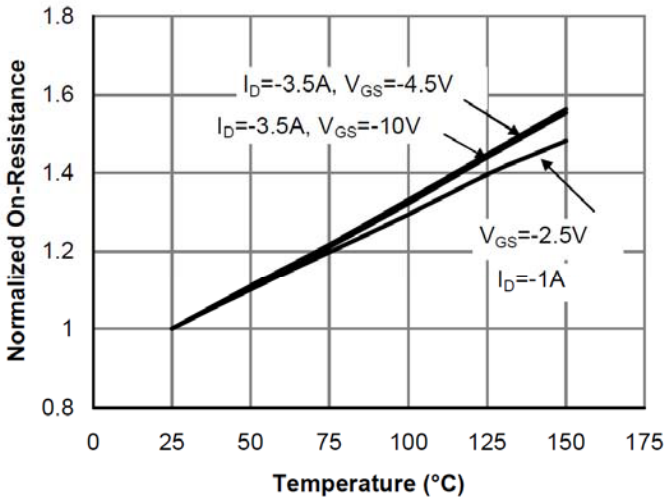


Figure 4: On-Resistance vs. Junction Temperature

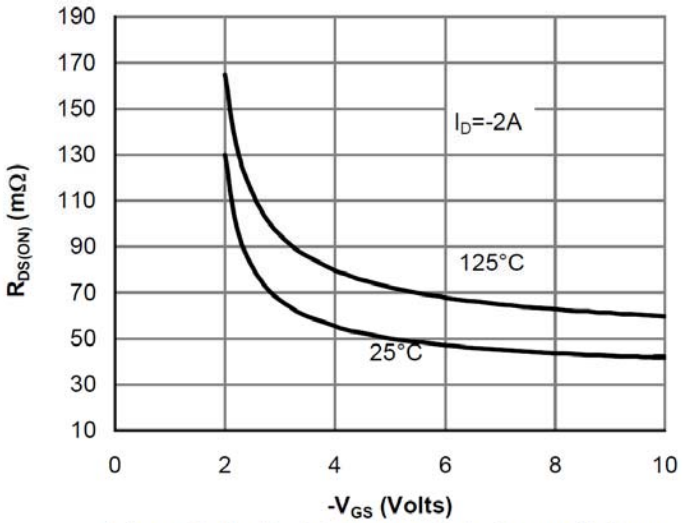


Figure 5: On-Resistance vs. Gate-Source Voltage

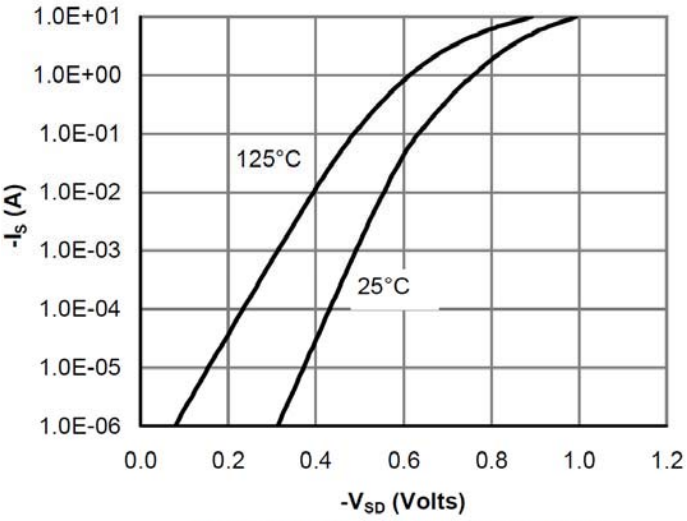


Figure 6: Body-Diode Characteristics

Characteristics Curve

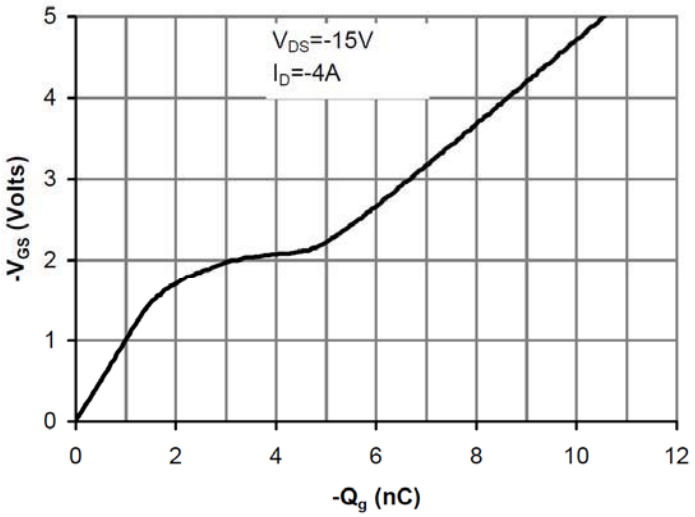


Figure 7: Gate-Charge Characteristics

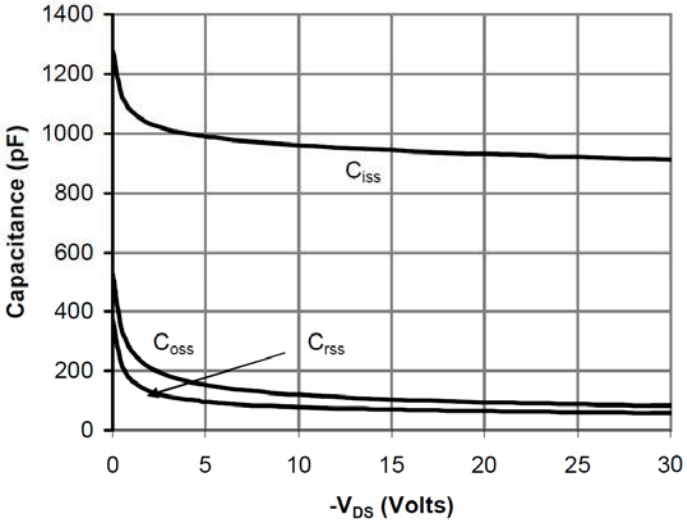


Figure 8: Capacitance Characteristics

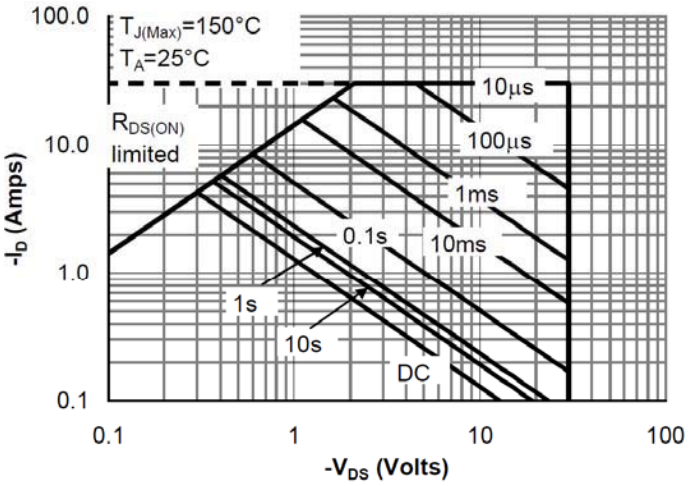


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

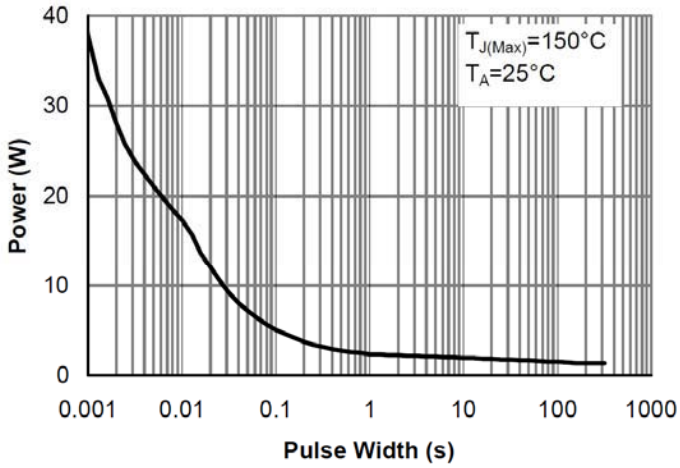


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

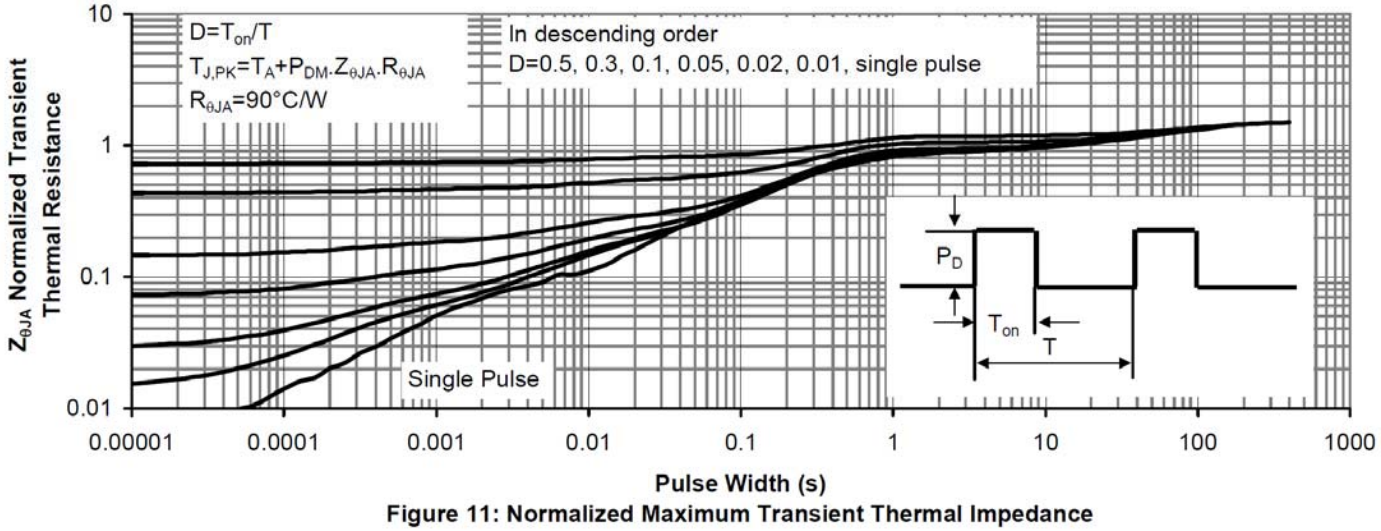
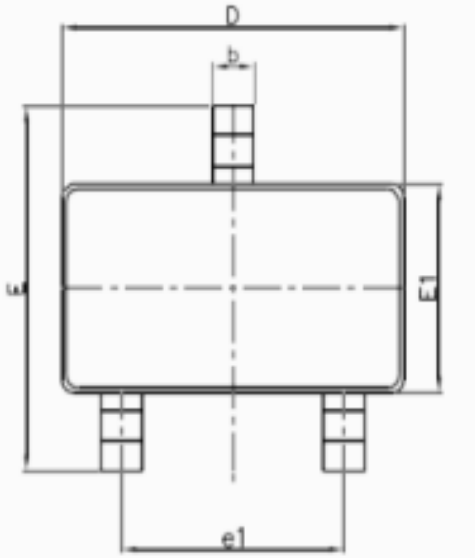
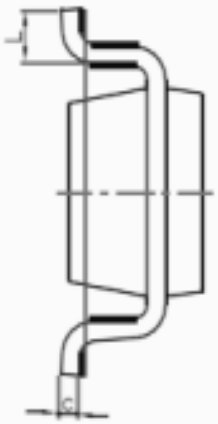
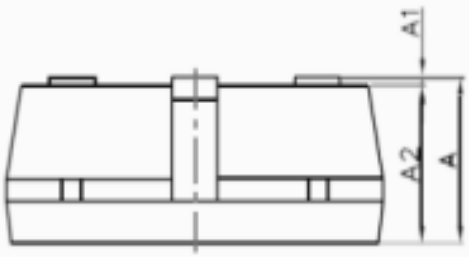


Figure 11: Normalized Maximum Transient Thermal Impedance

SOT-23-3L Package Outline Dimensions







DIM	MILLIMETERS
A	1.05~1.25
A1	0~0.1
A2	1.05~1.15
b	0.3~0.5
c	0.10~0.20
D	2.82~3.02
E	2.8~3.0
E1	1.5~1.7
e1	1.8~2.0
L	0.3~0.5

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
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5. ALL DIMENSIONS ARE IN MILLIMETERS.

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