

MT3407

P-Channel Enhancement Mode Field Effect Transistor

Product Summary

- $V_{DS} = -30V$
- $I_D = -4.1A$ ($V_{GS} = -10V$)
- $R_{DS(ON)} \leq 53m\Omega @ V_{GS} = -10V$
- $R_{DS(ON)} \leq 80m\Omega @ V_{GS} = -4.5V$

Features

- Advanced Trench Process Technology
- High dense cell design for ultra low on-resistance
- Lead free product acquired
- Rohs compliant

Applications

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

Absolute Maximum Ratings ($T_A = 25^\circ C$ unless otherwise noted)

Symbol	Parameter	Steady State	Units
V_{DS}	Drain-Source Voltage	-30	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current ¹	-4.1	A
I_{DM}	Pulsed Drain Current ²	-20	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	-55~150	$^\circ C$

Notes:

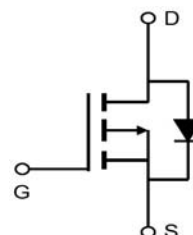
1. Surface Mounted on 1" x 1" FR4 Board, $t \leq 10$ Sec.
2. Pulse width limited by maximum junction temperature.



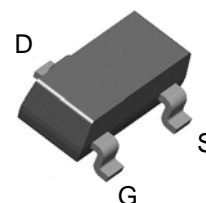
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Simplified Schematic



MARKING DIAGRAM & PIN ASSIGNMENT



SOT-23

Thermal Resistance Ratings

Symbol	Parameter		Typical	Maximum	Unit
R _{thJA}	Maximum Junction-to-Ambient	t ≤ 10 Sec	65	90	°C/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	-1	-1.5	-2	V
I _{GSS}	Gate-Body Leakage Current	V _{DS} = 0V, V _{GS} = ±20V	-	-	±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°C	-	-	-30	
R _{DS(on)}	Drain Source On State Resistance ^a	V _{GS} = -10V, I _D = -4.1A	-	53	60	mΩ
		V _{GS} = -4.5V, I _D = -3A	-	80	95	
g _{fs}	Forward Transconductance ^a	V _{DS} = -5V, I _D = -4A	5.5	8.2	-	S
V _{SD}	Diode Forward Voltage ^a	V _{GS} = 0V, I _S = -1A	-	-0.8	-1.3	V
Dynamic Characteristics ^b						
C _{iss}	Input Capacitance	V _{DS} = -15V, V _{GS} =0V, f=1MHz	-	625	-	pF
C _{oss}	Output Capacitance		-	100	-	
C _{rss}	Reverse Transfer Capacitance		-	60	-	
Q _g	Total Gate Charge	V _{DS} = -15V, V _{GS} = -4.5V, I _D = -2.5A	-	11.6	16	nC
Q _{gs}	Gate-Source Charge		-	1.3	-	
Q _{gd}	Gate-Drain Charge		-	2.5	-	
t _{d(on)}	Turn-On Delay Time	V _{DD} = -15V, R _L = 15Ω I _D = -1.0A, V _{GEN} = -10V, R _G = 6Ω	-	6	12	nSec
t _r	Rise Time		-	12	23	
T _{d(off)}	Turn-Off Delay Time		-	25	46	
t _f	Fall Time		-	6	12	
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	-	14	-	nSec
Q _{rr}	Body Diode Reverse Recovery Charge		-	5	-	nC

Note:

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

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

Characteristics Curve

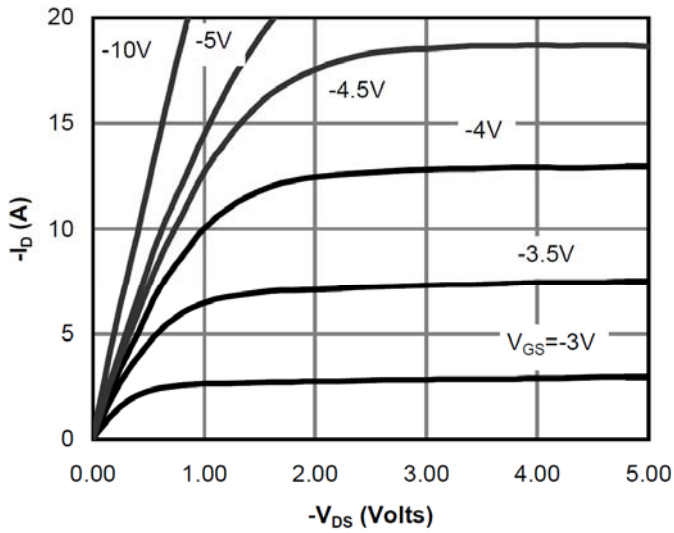


Figure 1: On-Region Characteristics

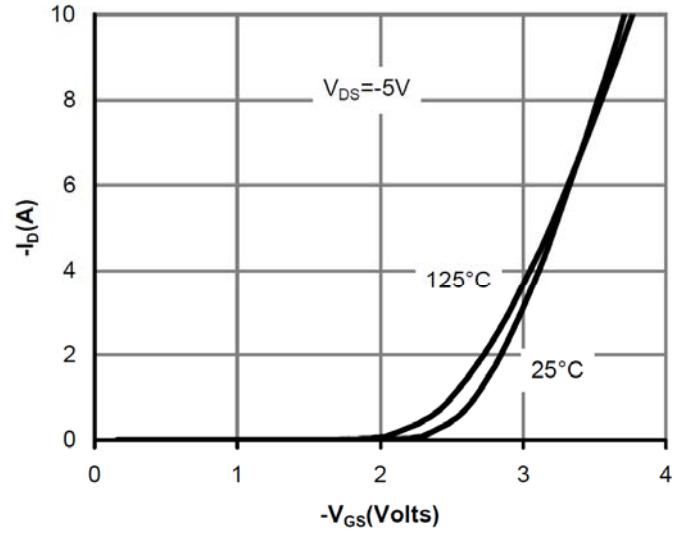


Figure 2: Transfer Characteristics

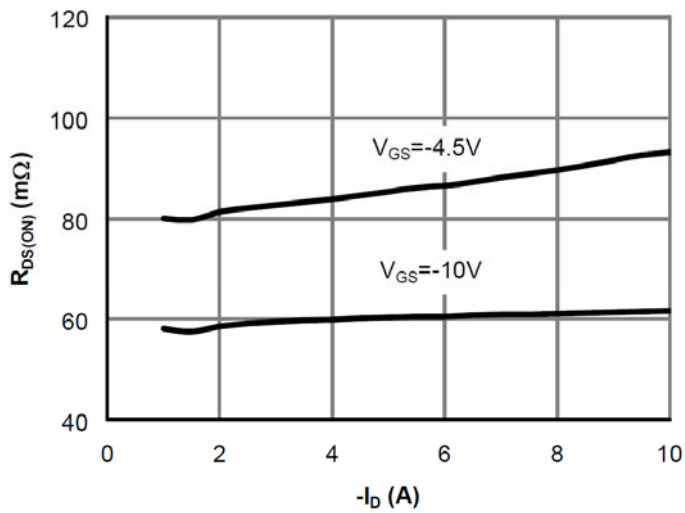


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

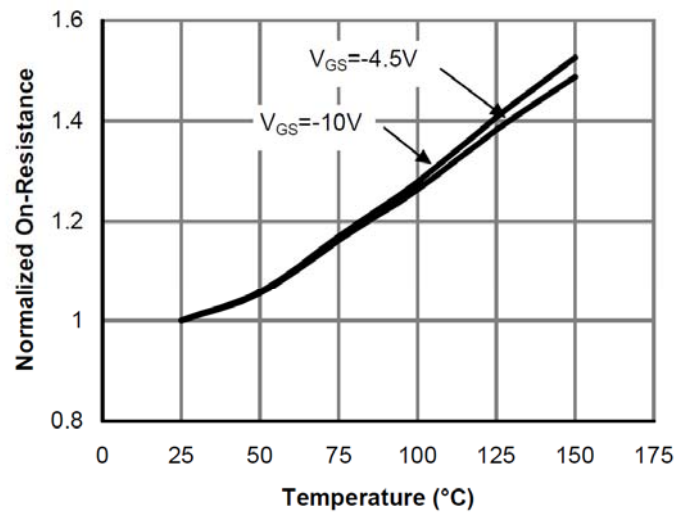


Figure 4: On-Resistance vs. Junction Temperature

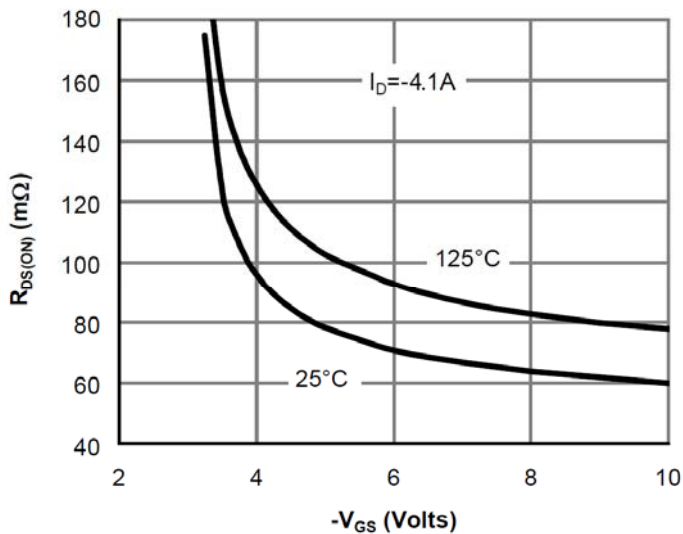


Figure 5: On-Resistance vs. Gate-Source Voltage

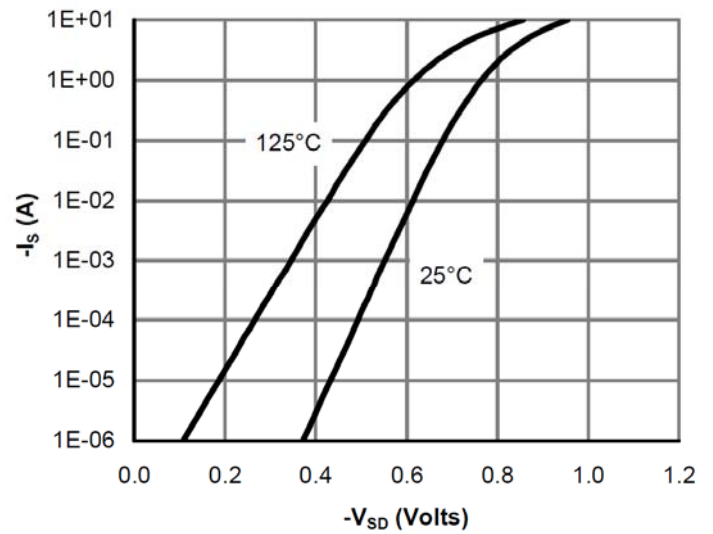


Figure 6: Body-Diode Characteristics

Characteristics Curve

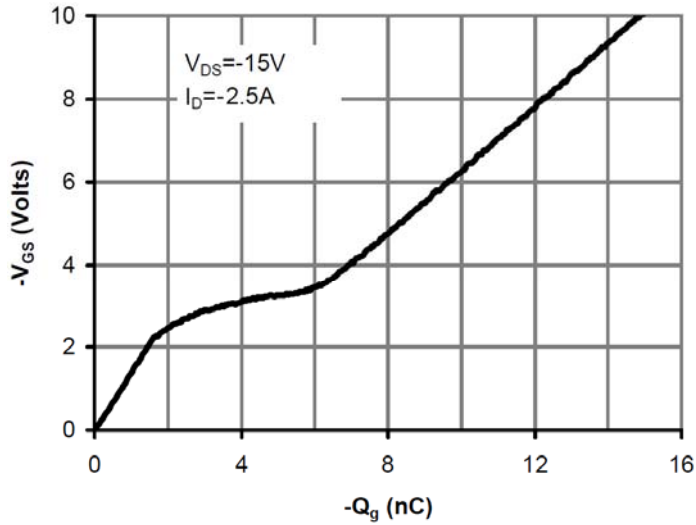


Figure 7: Gate-Charge Characteristics

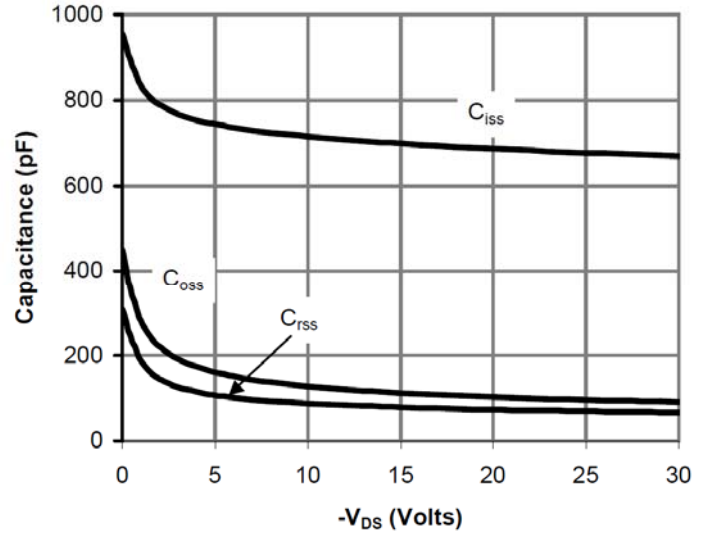


Figure 8: Capacitance Characteristics

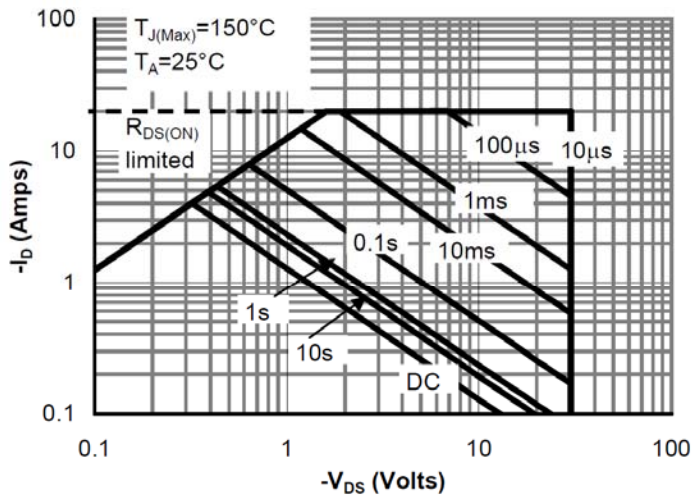


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

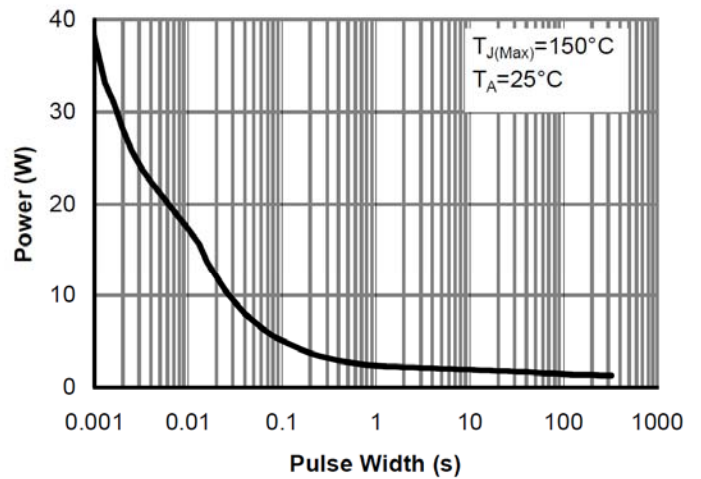


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

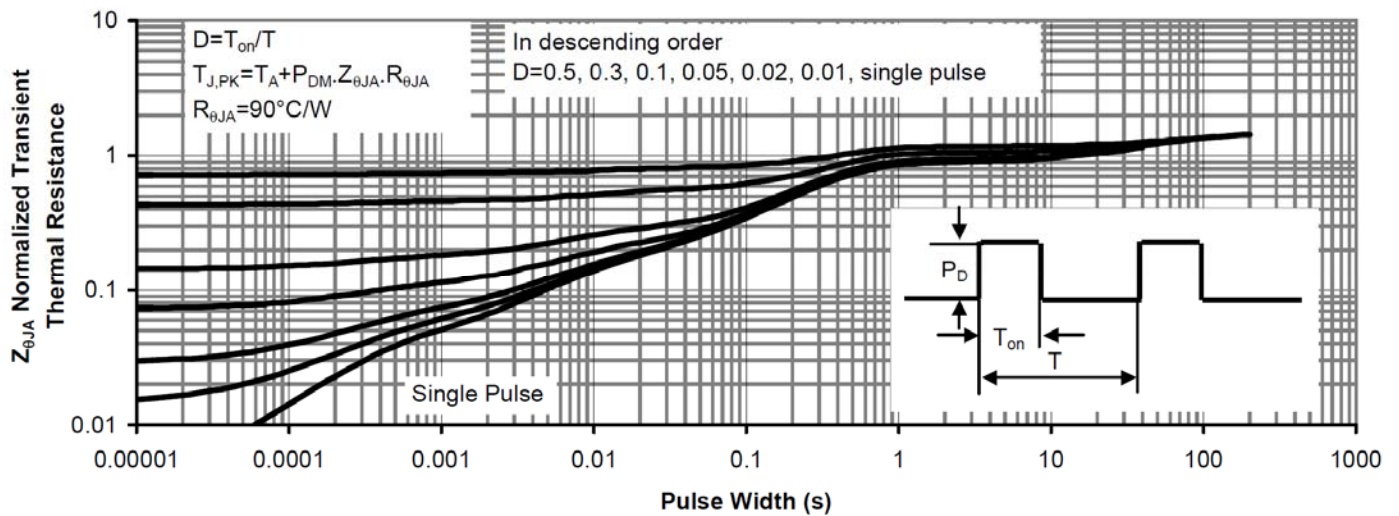
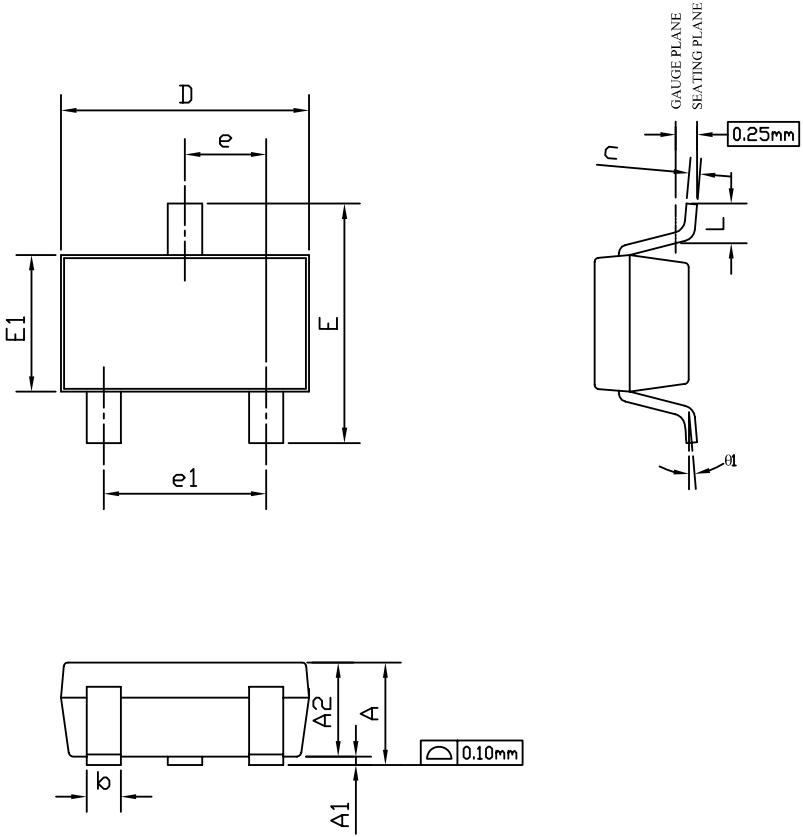


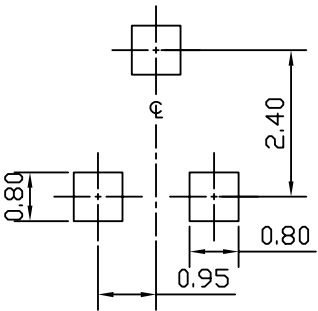
Figure 11: Normalized Maximum Transient Thermal Impedance

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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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