MT20P013

P-Channel Enhancement Mode Field Effect Transistor

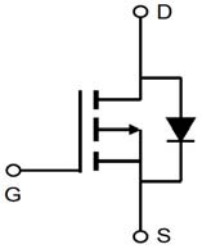
MT Semiconductor®

http://www.mtsemi.com

Product Summary

PRODUCT SUMMARY		
V_{DSS}	I_D	$R_{DS(ON)}$ (mΩ) Typ
-20	-12A	17.1 @ V_{GS}=-4.5V
		21.1 @ V_{GS}=-2.5V

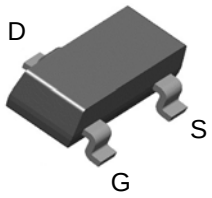
Simplified Schematic



Features

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

MARKING DIAGRAM & PIN ASSIGNMENT



SOT-23-3L

Application

- DC/DC Converter
- Ideal for high-frequency switching and synchronous rectification

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

Parameter Sym	bol	Limit	Unit
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	±12	V
Drain Current-Continuous[a] @Tj=25℃	I_D	-12	A
- Pulse d^b	I_{DM}	-8.0	A
Drain-source Diode Forward Current[a]	I_S	-9.0	A
Maximum Power Dissipation[a]	P_D	1.8	W
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 to 150	°C

THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to Ambient[a] Rth	J_A	88 MAX	℃/W

ELECTRICAL CHARACTERISTICS (T_A=25℃ unless otherwise noted)

Parameter Sym	bol	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}=-19V,V_{GS}=0V			-1	μA
Gate-Body Leakage	I_{GSS}	V_{GS}=±12V,V_{DS}=0V			±100	nA
ON CHARACTERITICS						
Gate Threshold Voltage	$V_{GS(th)}$ V	$_{DS}$=V_{GS},I_D=-250μA	-0.4		-1.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=-4.5V,I_D=-3.0A		17.1	22	mΩ
		V_{GS}=-2.5V,I_D=-2.0A		21.1	26	
DAYNAMIC CHARACTERISTICS						
Input Capacitance	C_{ISS}	V_{DS}=-10V,V_{GS}=0V f=1.0MHz		878		pF
Output Capacitance	C_{OSS}			128		pF
Reverse Transfer Capacitance	C_{RSS}			116		pF
SWITCHING CHARACTERISISTICS						
Turn-On Delay Time	$t_{D(ON)}$	V_{GS} = -4.5V, V_{DD} = -10V I_D= -3A, R_{GEN} = 1Ω		12		ns
Rise Time	tr			35		ns
Turn-Off Delay Time	$t_{D(OFF)}$			49		ns
Fall Time	tf			55		ns
Total Gate Charge	Qg	V_{GS}=-4.5V, V_{DS}=-10V, I_D=-2A		8.9		nC
Gate-Source Charge	Qgs			1.5		nC
Gate-Drain Charge	Qgd			1.8		nC

ELECTRICAL CHARACTERICS (TA=25℃ unless otherwise noted)

Parameter Sym	bol	Condition	Min	Typ	Max	Unit
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode Forward Voltage	V_{SD}	V_{GS}=0V,I_S=-1.25A		-0.8	-1.2	V

Notes

a. Surface Mounted on FR4 Board, t≦10sec

b. Pulse Test: Pulse Width≦300Us, Duty Cycle≦2%

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

Typical Electrical And Thermal Characteristics (Curves)

Figure 1. Output Characteristics

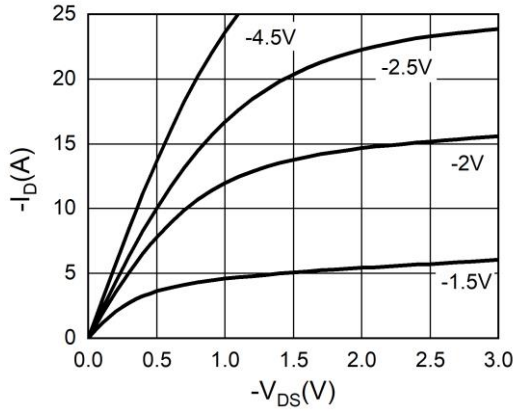


Figure 2. Transfer Characteristics

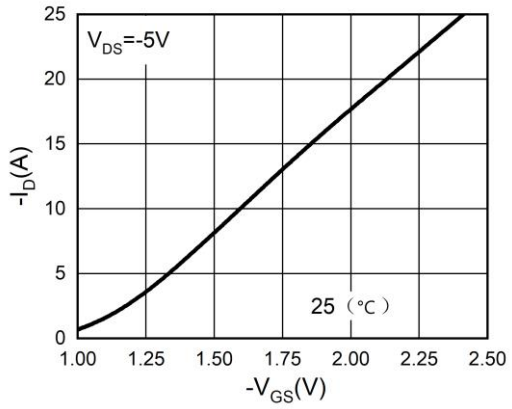


Figure 3. Power Dissipation

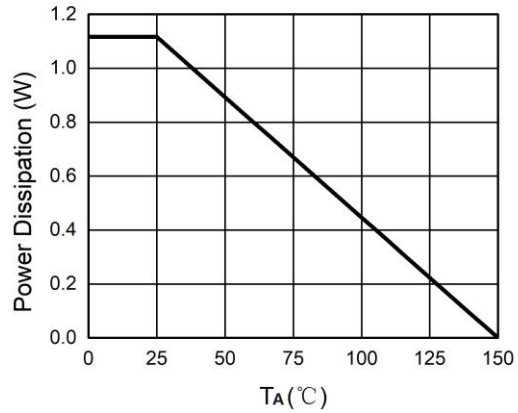
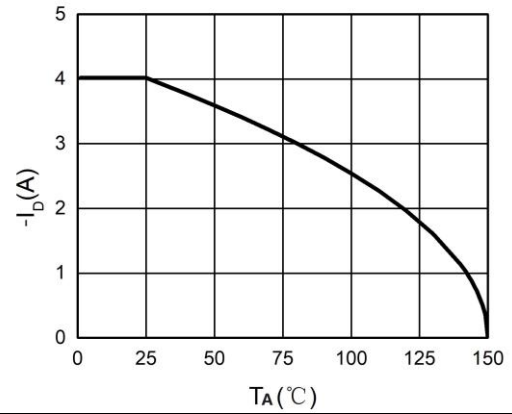


Figure 4. Drain Current



Typical Electrical And Thermal Characteristics (Curves)

Figure 5. BV_{DSS} vs Junction Temperature

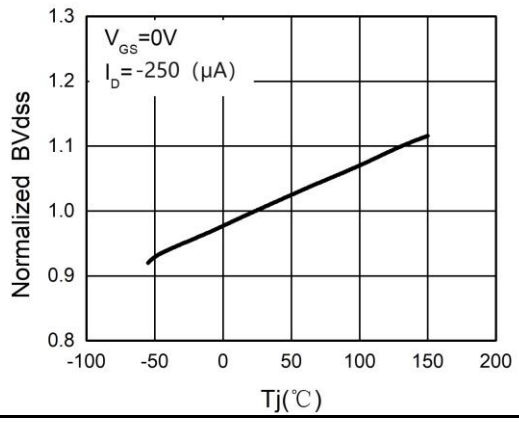


Figure 6. $R_{DS(ON)}$ vs Junction Temperature

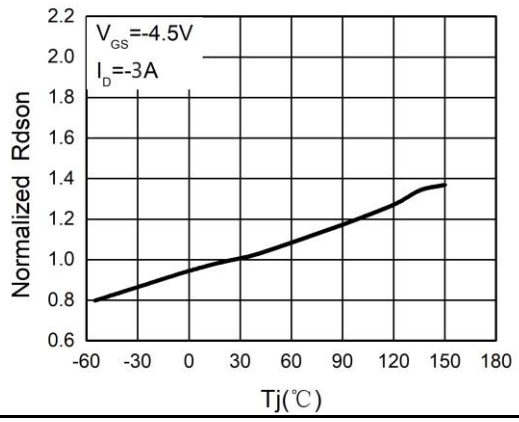


Figure 7. Gate Charge Waveforms

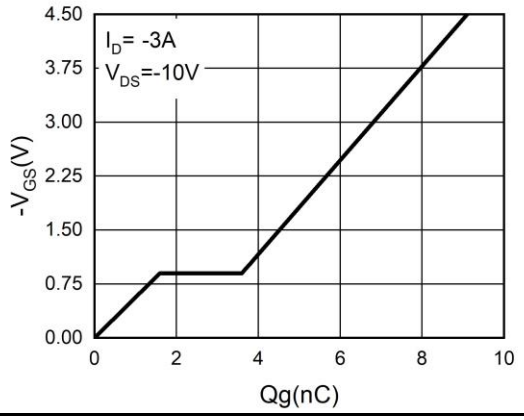


Figure 8. Capacitance

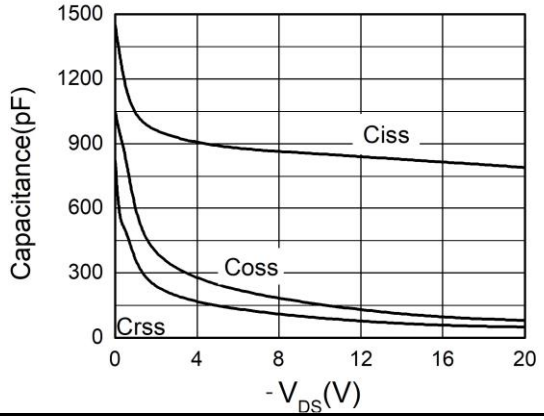


Figure 9. Body-Diode Characteristics

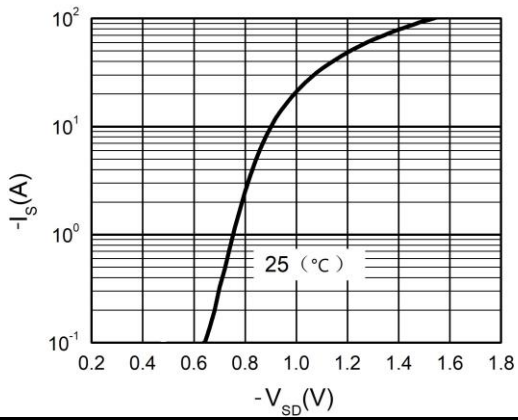
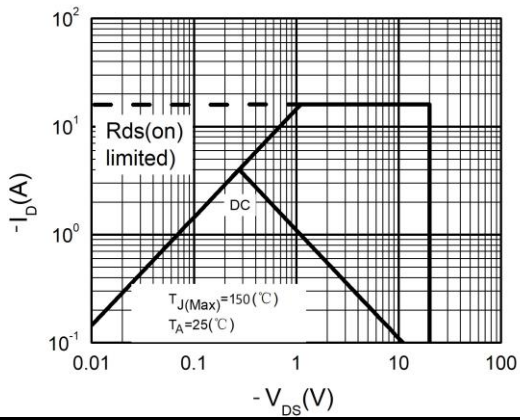
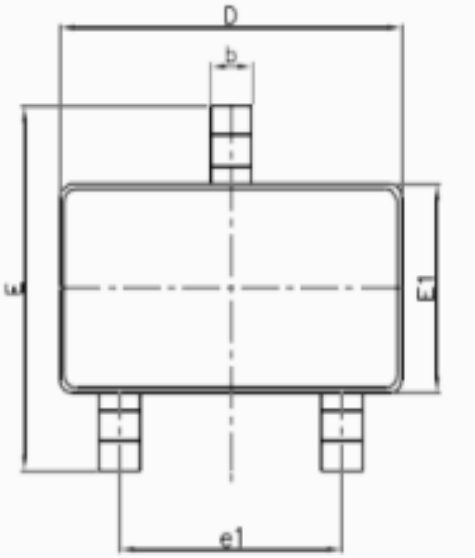
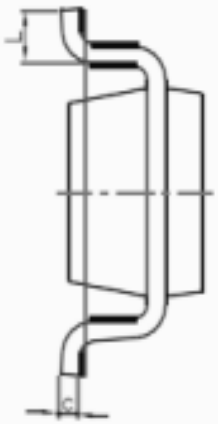


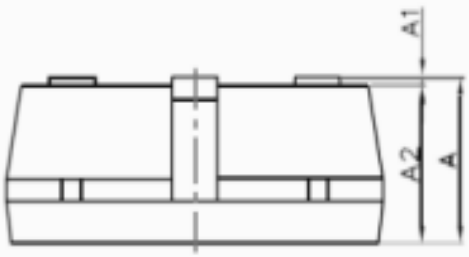
Figure 10. Maximum Safe Operating Area



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
   ARE NOT NECESSARILY EXACT.
5. ALL DIMENSIONS ARE IN MILLIMETERS.

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