

MT20P019A

P-Channel Enhancement Mode Field Effect Transistor

Product Summary

PRODUCT SUMMARY		
V _{DSS}	I _D	R _{DS(ON)} (mΩ) Typ
-20	-10A	21.8 @ V _{GS} =-4.5V
		28.5 @ V _{GS} =-2.5V

Features

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

Application

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

Absolute Maximum Ratings (T_A = 25°C 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 @T _j =25°C - Pulse <i>d</i> ^b	I _D	-10	A
	I _{DM}	-7.0	A
Drain-source Diode Forward Current ^a	I _S	-8.0	A
Maximum Power Dissipation ^a	P _D	1.47	W
Operating Junction and Storage Temperature Range	T _J , T _{STG}	-55 to 150	°C

THERMAL CHARACTERISTICS

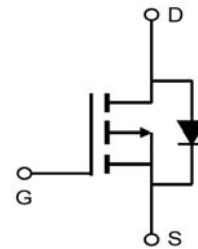
Thermal Resistance, Junction-to Ambient ^a	R _{th}	J _A	85 MAX	°C/W
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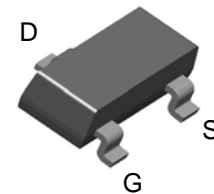
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Simplified Schematic



MARKING DIAGRAM & PIN ASSIGNMENT



SOT-23

ELECTRICAL CHARACTERISTICS (T_A=25°C 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 CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(th)} V	D _S =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		21.8	29.5	mΩ
		V _{GS} =-2.5V, I _D =-2.0A		28.5	38.5	
DAYNAMIC CHARACTERISTICS						
Input Capacitance	C _{ISS}	V _{DS} =-10V, V _{GS} =0V f=1.0MHz		906		pF
Output Capacitance	C _{OSS}			130		pF
Reverse Transfer Capacitance	C _{RSS}			112		pF
SWITCHING CHARACTERISISTICS						
Turn-On Delay Time	t _{D(ON)}	V _{GS} = -4.5V, V _{DD} = -10V I _D = -3A, R _{GEN} = 1Ω		10		ns
Rise Time	t _r			32		ns
Turn-Off Delay Time	t _{D(OFF)}			50		ns
Fall Time	t _f			51		ns
Total Gate Charge	Q _g	V _{GS} =-4.5V, V _{DS} =-10V, I _D =-2A		8.8		nC
Gate-Source Charge	Q _{gs}			1.4		nC
Gate-Drain Charge	Q _{gd}			1.9		nC

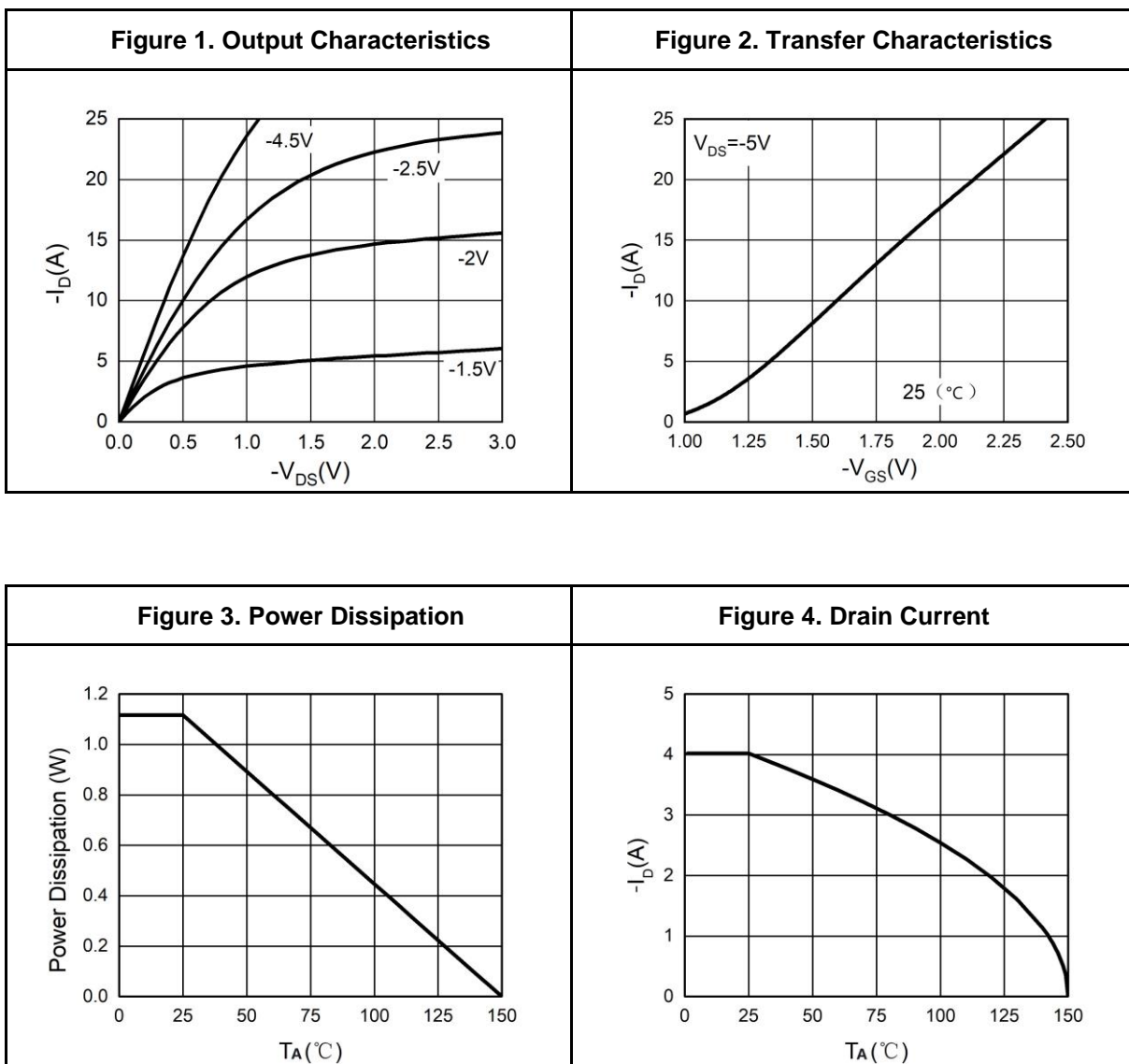
ELECTRICAL CHARACTERISTICS (TA=25°C unless otherwise noted)

Parameter Sym	bol	Condition	Min	Typ	Max	Unit
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode Forward Voltage	VSD	VGS=0V,Is=-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)



Typical Electrical And Thermal Characteristics (Curves)

Figure 5. BV_{DSS} vs Junction Temperature

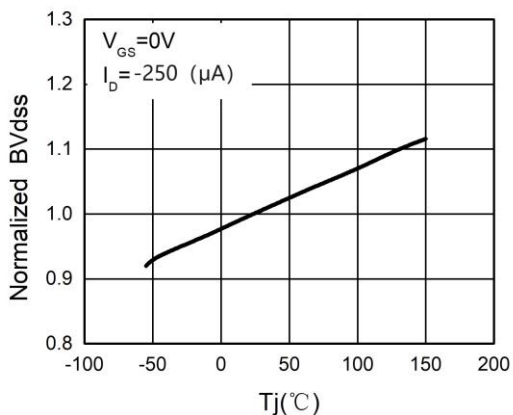


Figure 6. $R_{DS(ON)}$ vs Junction Temperature

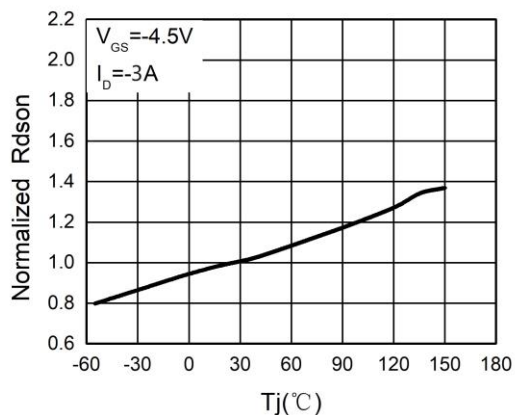


Figure 7. Gate Charge Waveforms

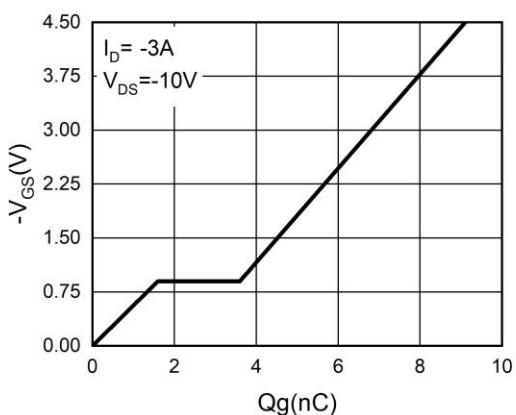


Figure 8. Capacitance

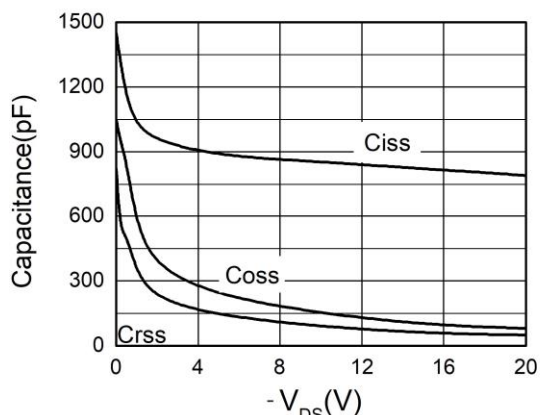


Figure 9. Body-Diode Characteristics

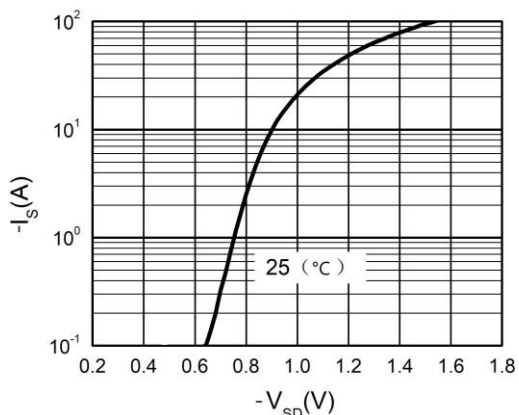
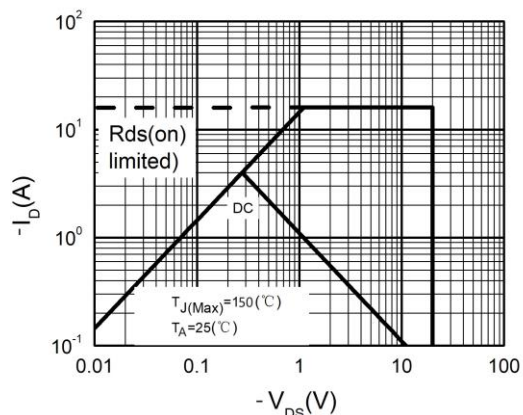
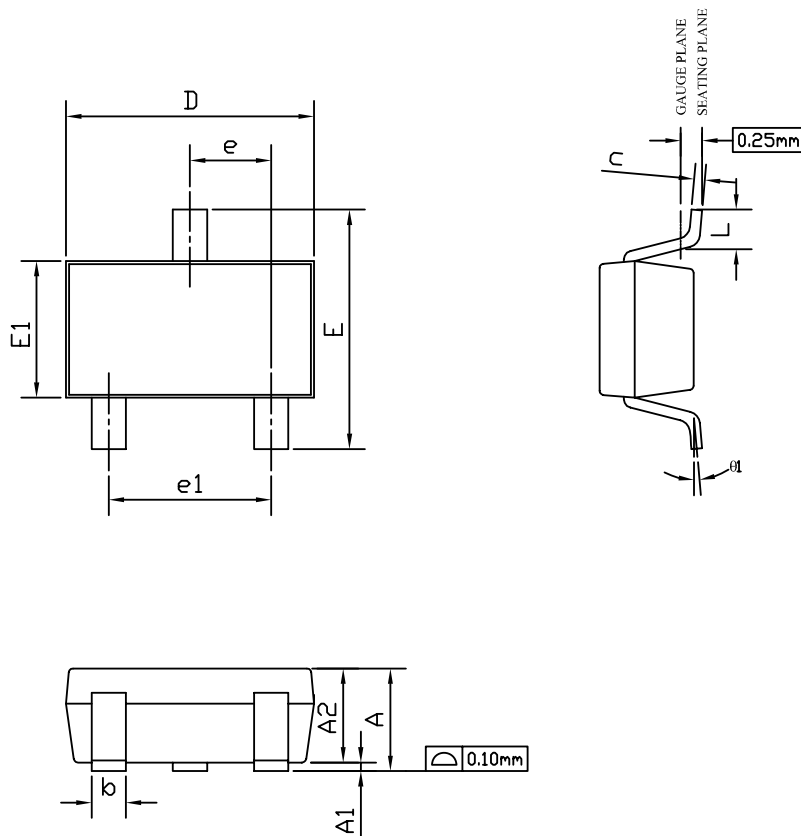


Figure 10. Maximum Safe Operating Area

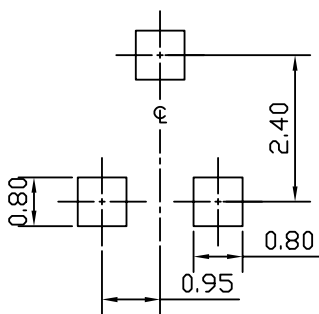


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Version	L

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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