MT10G020T

N-Channel Enhancement Mode Field Effect Transistor

MT Semiconductor®

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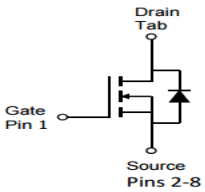
Product Summary

- V_{DS} = 100V
- I_D = 300A
- $R_{DS(ON)}$ =1.7mΩ @V_{GS} =10V

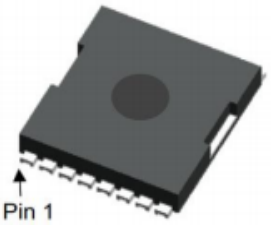
Simplified Schematic



Features

- Advanced Trench Process Technology.
- High Density Cell Design for Ultra Low On-Resistance.
- Lead free product is acquired.
- RoHS Compliant.
- TOLL Packge

MARKING DIAGRAM & PIN ASSIGNMENT



Applications

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply

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

Symbol	Parameter		Steady State	Units
V_{DS}	Drain-Source Voltage		100	V
V_{GS}	Gate-Source Voltage		±20	V
I_D	Continuous Drain Current [1]	T_C = 25℃	**300**	A
I_{DM}	Pulsed Drain Current [2]		**1190**	A
I_S	Continuous Source Current (Diode Conduction) [1]		**280**	A
E_{AS}	Single Pulse Drain-Source Avalanche Energy [3]		735	mJ
P_D	Maximum Power Dissipation	T_C = 25℃	330	W
T_J, T_{STG}	Operating Junction and Storage Temperature Range		-55~150	℃

Notes:

1. Surface Mounted on 1" x 1" FR4 Board, t≦10 Sec.
2. Pulse width limited by maximum junction temperature.
3. The test condition is T_J =25℃, V_{DD}=30V, V_{GS}=10V, L=0.1mH, R_G=25Ω, I_{AS}=50A.

Thermal Characteristic

Thermal Resistance,Junction-to-Case	$R_{\theta JC}$	0.4	℃/W

Electrical Characteristics (T_C=25℃unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	100	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=100V,V_{GS}=0V	-	-	1	uA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	100	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	2.0	2.8	5.0	V
Drain-Source On-State Resistance[a]	$R_{DS(ON)}$	V_{GS}=10V, I_D=30A	-	**1.7**	**2.6**	mΩ
Dynamic Characteristics[b]						
Input Capacitance	C_{lss}	V_{DS}=50V,V_{GS}=0V, F=1.0MHz	-	**10123**	-	PF
Output Capacitance	C_{oss}		-	**2049**	-	PF
Reverse Transfer Capacitance	C_{rss}		-	**77**	-	PF
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}= 50V,I_D=90A V_{GS}=10V,R_G=3.0Ω	-	**30**	-	nS
Turn-on Rise Time	t_r		-	**105**	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	**81**	-	nS
Turn-Off Fall Time	t_f		-	**109**	-	nS
Total Gate Charge	Q_g	V_{DS}= 50V,I_D=90A , V_{GS}=10V	-	**140**		nC
Gate-Source Charge	Q_{gs}		-	**48**		nC
Gate-Drain Charge	Q_{gd}		-	**30**		nC
Drain-Source Diode Characteristics						
Diode Forward Voltage	V_{SD}	V_{GS}=0V,I_S=30A	-	0.75	**1.4**	V
Diode Forward Current	I_S		-	-	**300**	A
Reverse Recovery Time	t_{rr}	TJ = 25°C, IF = 90A di/dt = 500A/μs	-	**56**	-	nS
Reverse Recovery Charge	Qrr		-	**96**	-	nC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Note:

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

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

Typical Electrical and Thermal Characteristics (Curves)

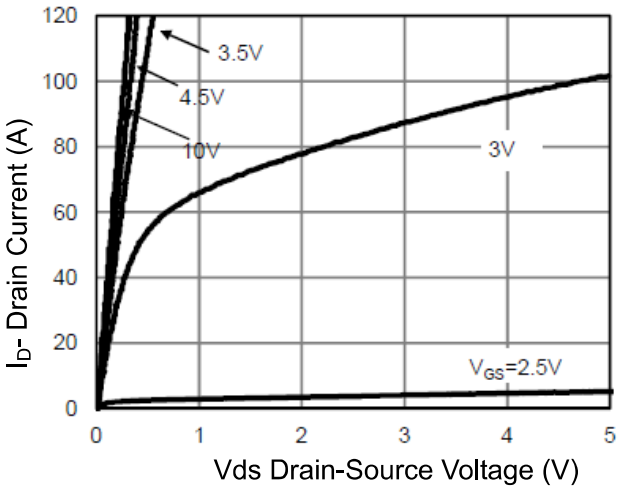


Figure 1 Output Characteristics

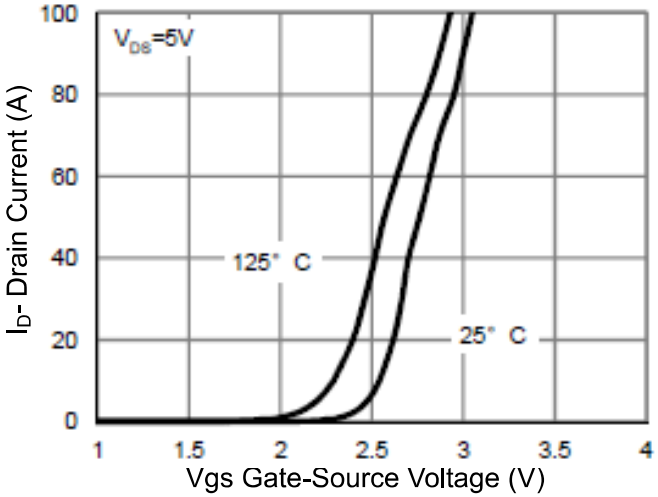


Figure 2 Transfer Characteristics

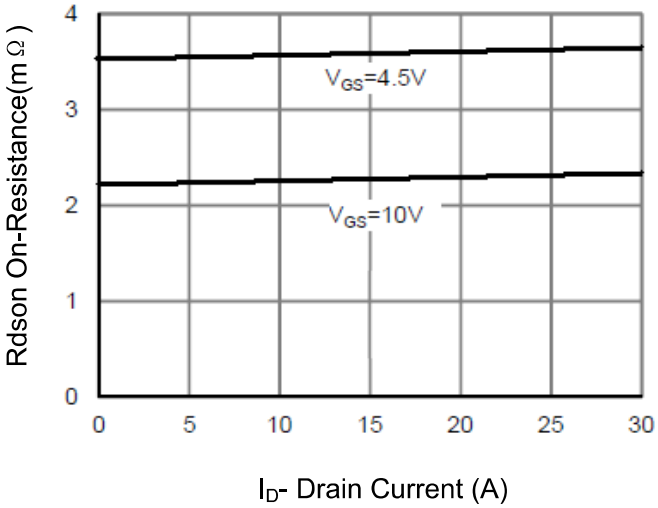


Figure 3 Rdson- Drain Current

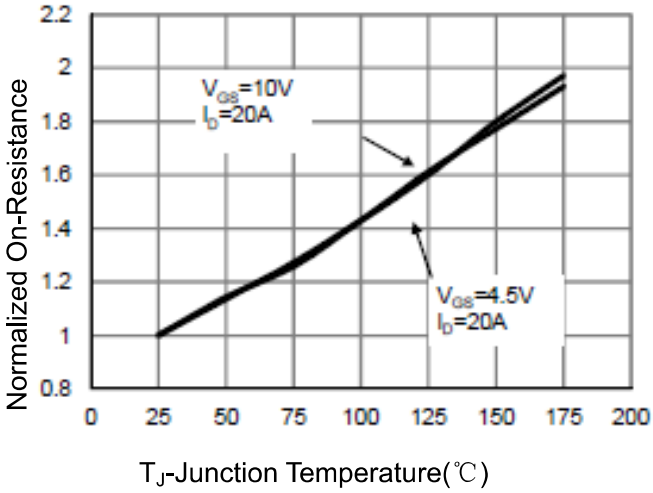


Figure 4 Rdson-JunctionTemperature

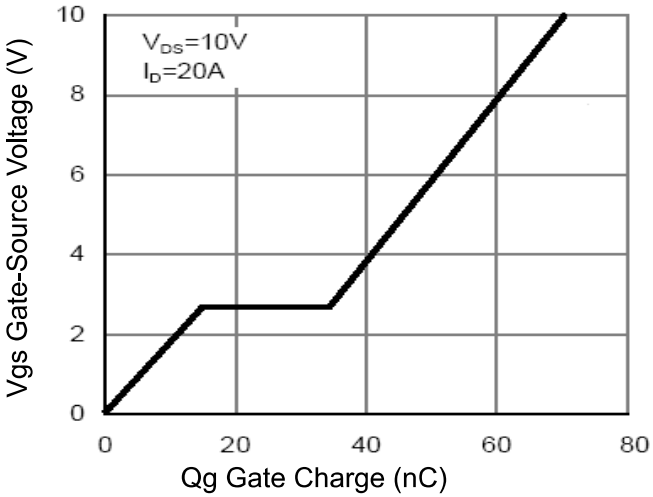


Figure 5 Gate Charge

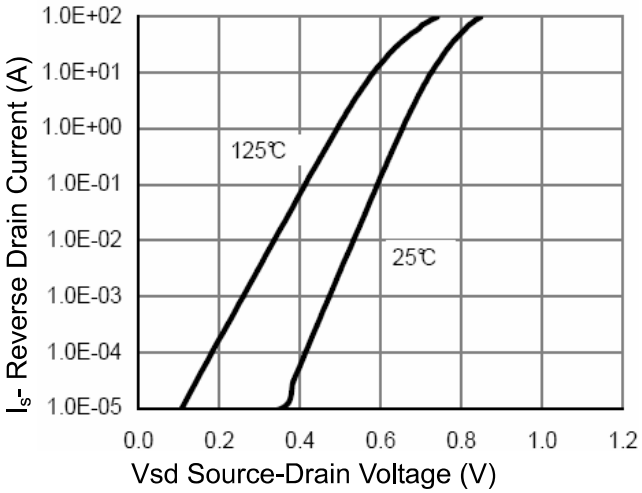


Figure 6 Source- Drain Diode Forward

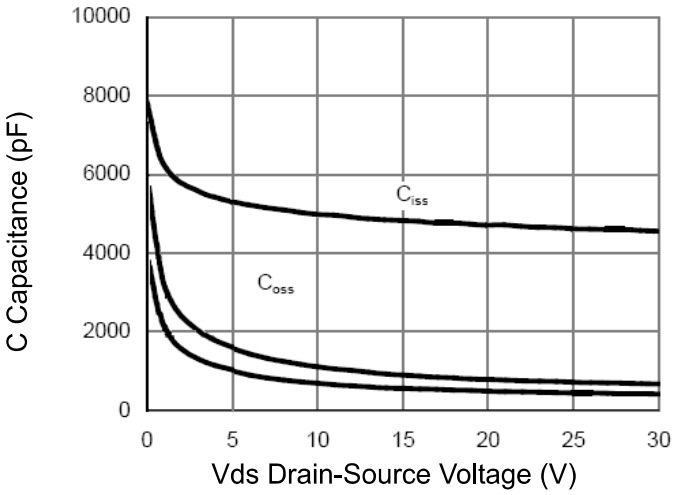


Figure 7 Capacitance vs Vds

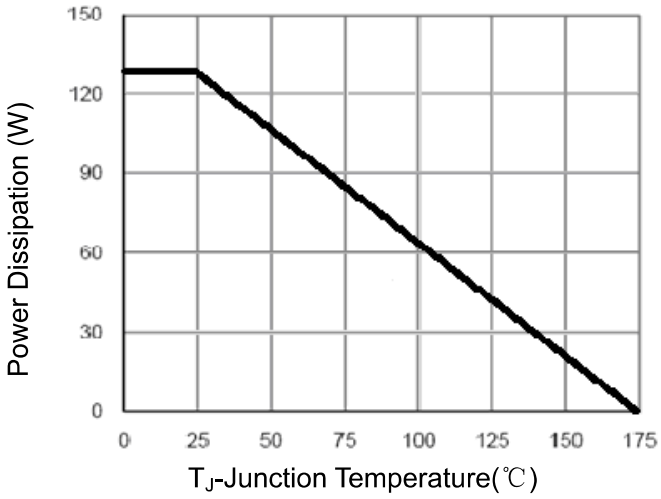


Figure 9 Power De-rating

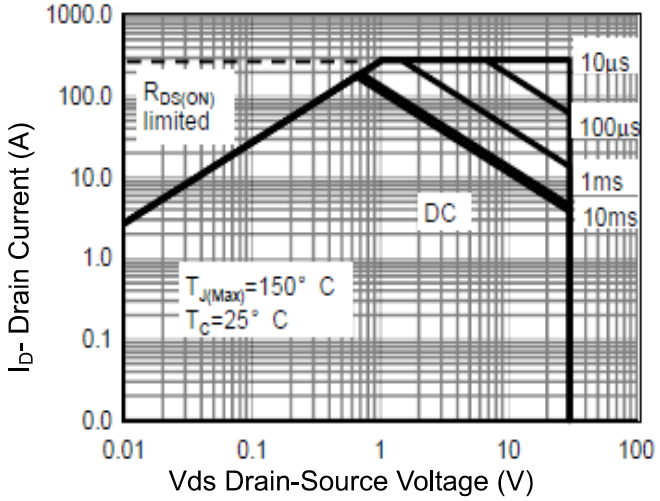


Figure 8 Safe Operation Area

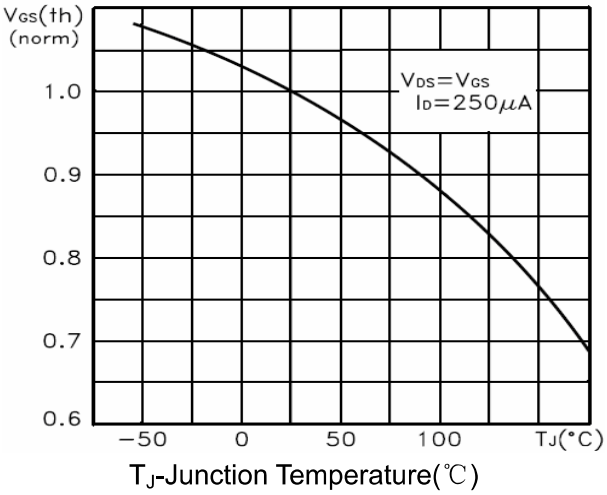


Figure 10 $V_{GS(th)}$ vs Junction Temperature

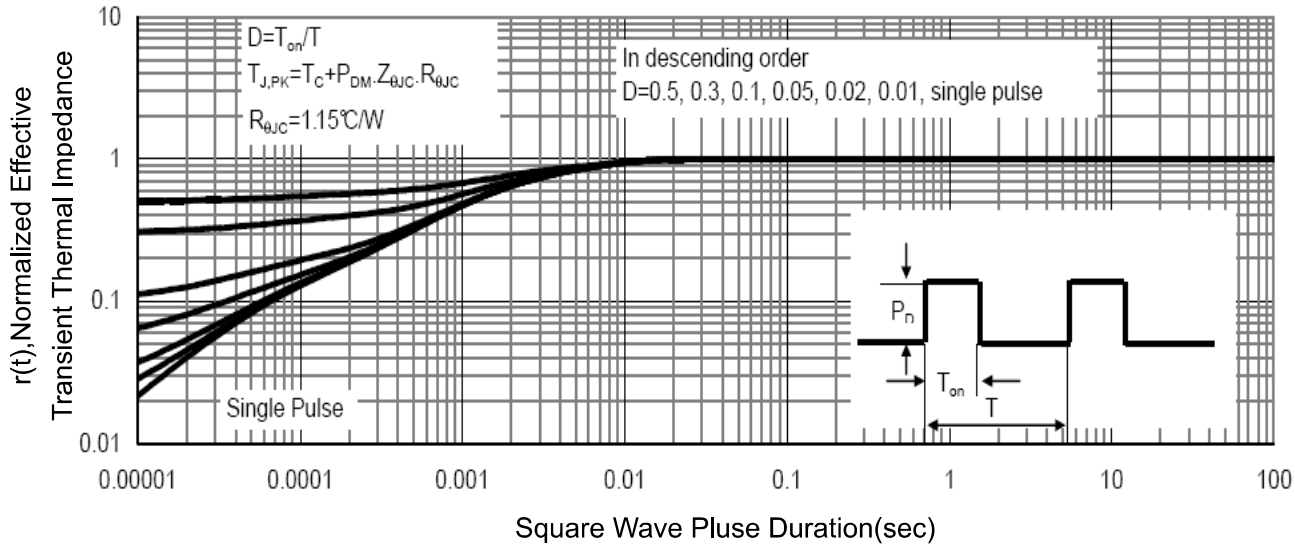
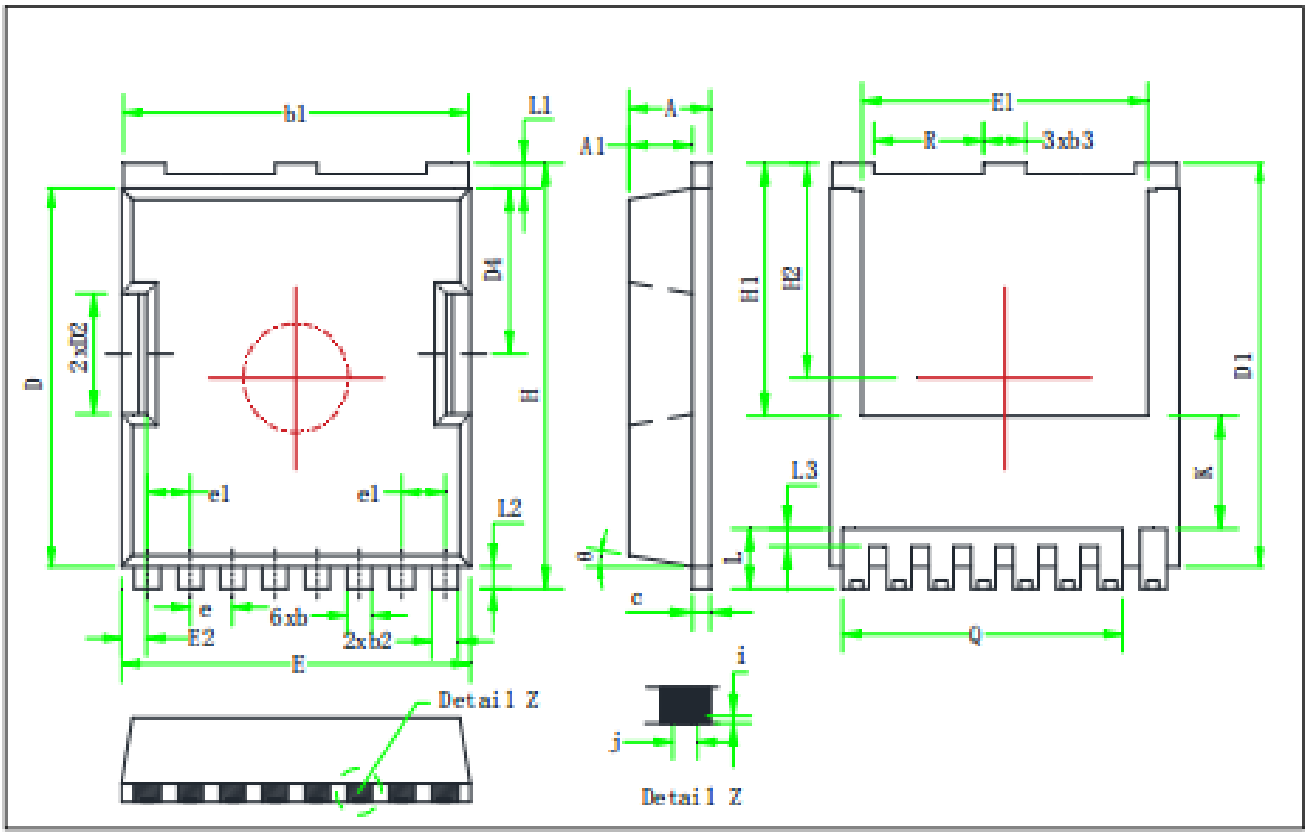


Figure 11 Normalized Maximum Transient Thermal Impedance

Package Mechanical Data(TOLL)



Symbol	Min	Typ	Max		Symbol	Min	Typ	Max
A	2.25	2.30	2.35		E2	0.65	0.70	0.75
A1	1.75	1.80	1.85		H	11.60	11.70	11.80
b	0.65	0.70	0.75		H1	6.95 BSC		
b1	9.75	9.80	9.85		H2	5.90 BSC		
b2	0.70	0.75	0.80		i	0.10 REF		
b3	1.15	1.20	1.25		j	0.35 REF		
c	0.45	0.50	0.55		K	3.10 REF		
D	10.35	10.40	10.45		L	1.55	1.65	1.75
D1	11.00	11.10	11.20		L1	0.65	0.70	0.75
D2	3.25	3.30	3.35		L2	0.50	0.60	0.70
D4	4.50	4.55	4.60		L3	0.40	0.50	0.60
e	1.20 BSC				Q	7.95 REF		
e1	1.225 BSC				R	3.05	3.10	3.15
E	9.85	9.90	9.95		θ	10°REF		
E1	8.00	8.10	8.20					

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