MT10G036P

N-Channel Enhancement Mode Field Effect Transistor

MT Semiconductor®

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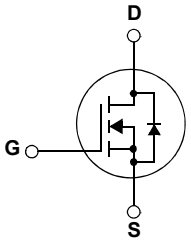
Product Summary

- V_{DS} = 100V
- I_D = 240A
- $R_{DS(ON)}$ =3.3mΩ @V_{GS} =10V

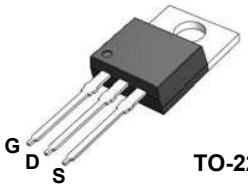
Simplified Schematic



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



TO-220

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℃	**240**	A
I_{DM}	Pulsed Drain Current [2]		**980**	A
I_S	Continuous Source Current (Diode Conduction) [1]		**220**	A
E_{AS}	Single Pulse Drain-Source Avalanche Energy [3]		658	mJ
P_D	Maximum Power Dissipation	T_C = 25℃	270	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	4.0	V
Drain-Source On-State Resistance[a]	$R_{DS(ON)}$	V_{GS}=10V, I_D=30A	-	**3.3**	**4.4**	mΩ
Dynamic Characteristics[b]						
Input Capacitance	C_{lss}	V_{DS}=50V,V_{GS}=0V, F=1.0MHz	-	**10080**	-	PF
Output Capacitance	C_{oss}		-	**1890**	-	PF
Reverse Transfer Capacitance	C_{rss}		-	**68**	-	PF
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}= 50V,I_D=90A V_{GS}=10V,R_G=3.0Ω	-	**28**	-	nS
Turn-on Rise Time	t_r		-	**98**	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	**75**	-	nS
Turn-Off Fall Time	t_f		-	**98**	-	nS
Total Gate Charge	Q_g	V_{DS}= 50V,I_D=90A , V_{GS}=10V	-	**128**		nC
Gate-Source Charge	Q_{gs}		-	**41**		nC
Gate-Drain Charge	Q_{gd}		-	**28**		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		-	-	**220**	A
Reverse Recovery Time	t_{rr}	TJ = 25°C, IF = 90A di/dt = 500A/μs	-	**51**	-	nS
Reverse Recovery Charge	Qrr		-	**92**	-	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)

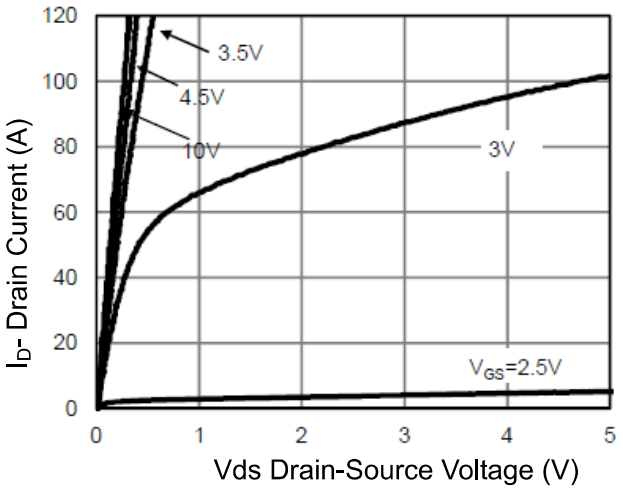


Figure 1 Output Characteristics

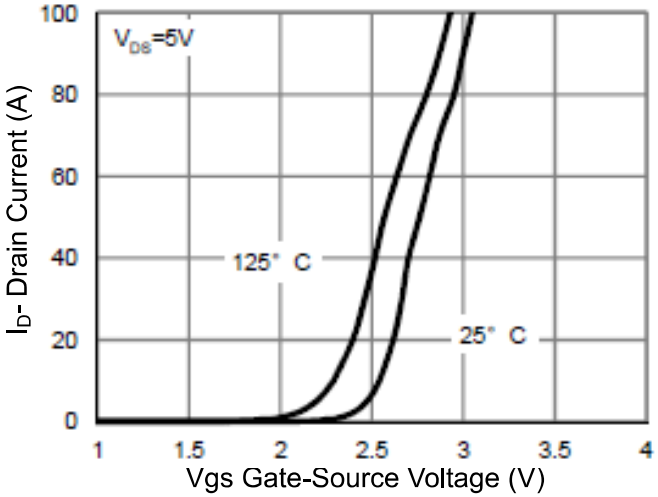


Figure 2 Transfer Characteristics

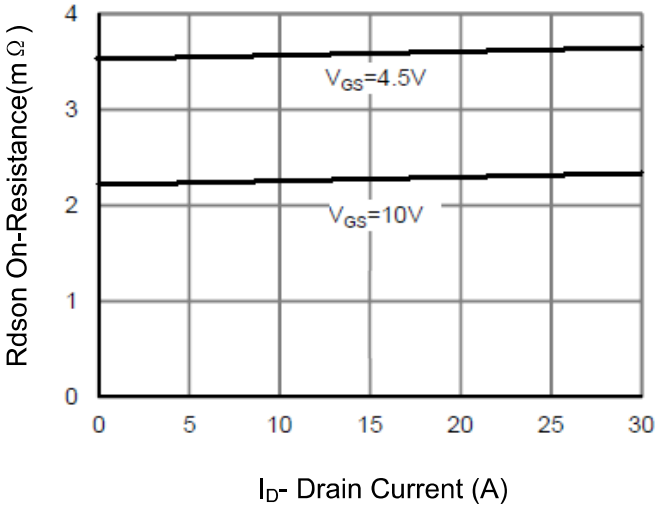


Figure 3 Rdson- Drain Current

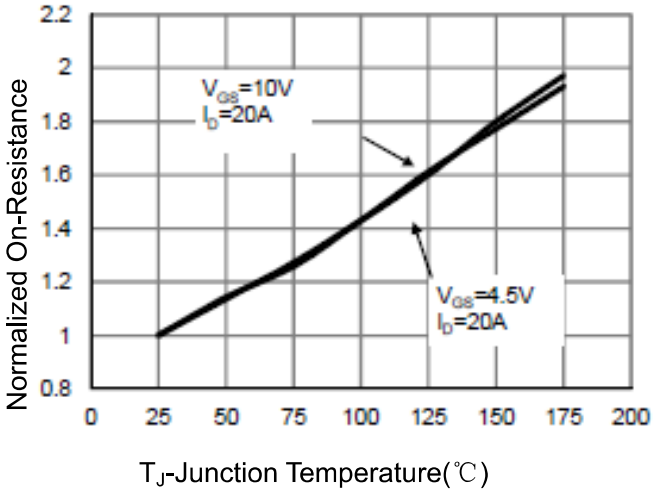


Figure 4 Rdson-JunctionTemperature

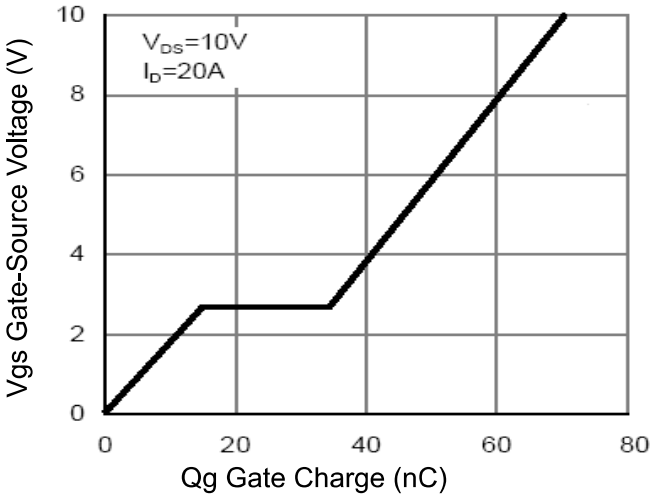


Figure 5 Gate Charge

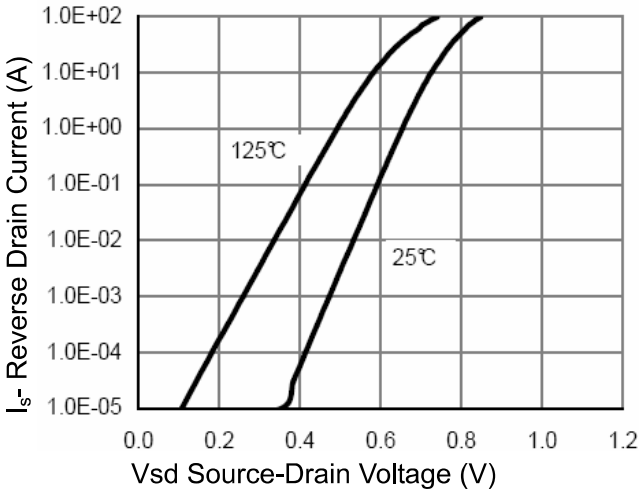


Figure 6 Source- Drain Diode Forward

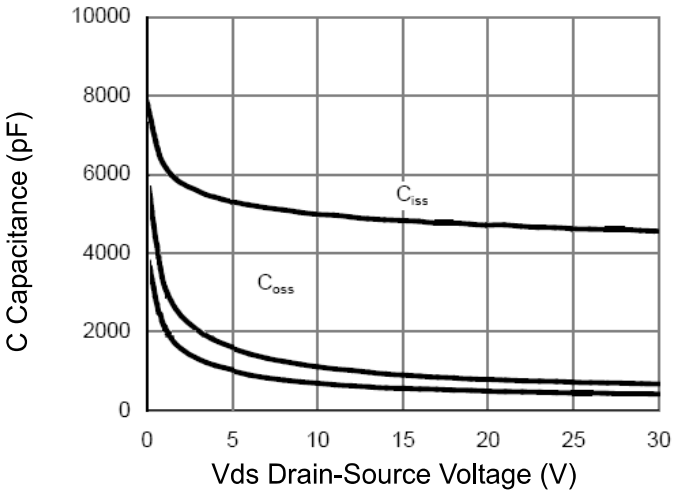


Figure 7 Capacitance vs Vds

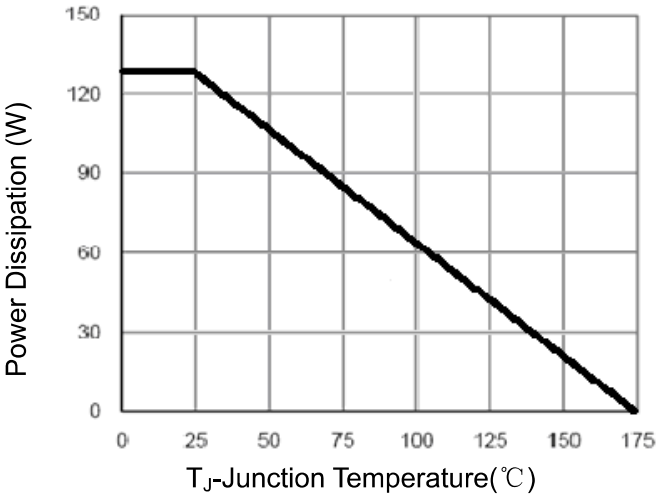


Figure 9 Power De-rating

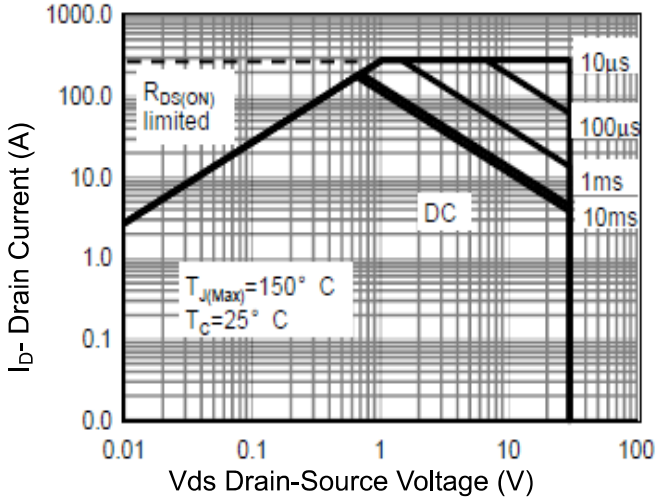


Figure 8 Safe Operation Area

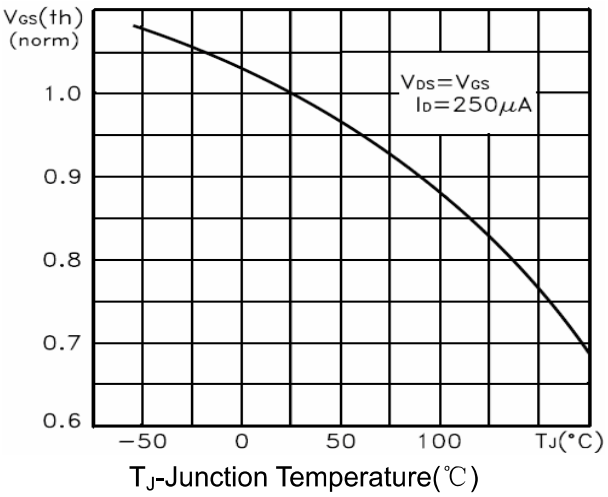


Figure 10 $V_{GS(th)}$ vs Junction Temperature

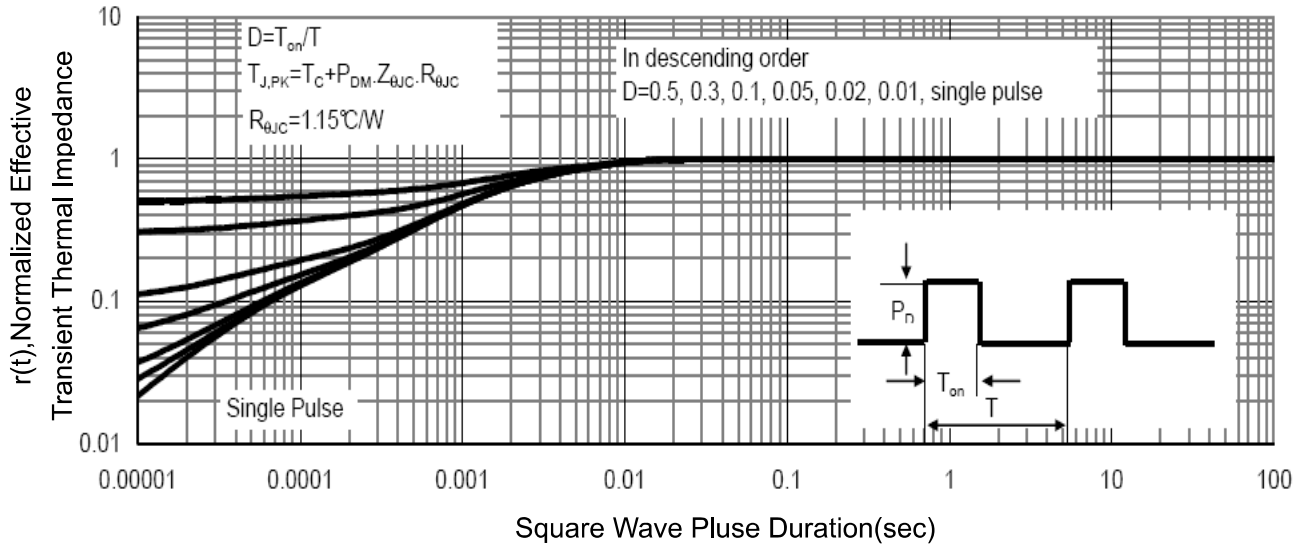
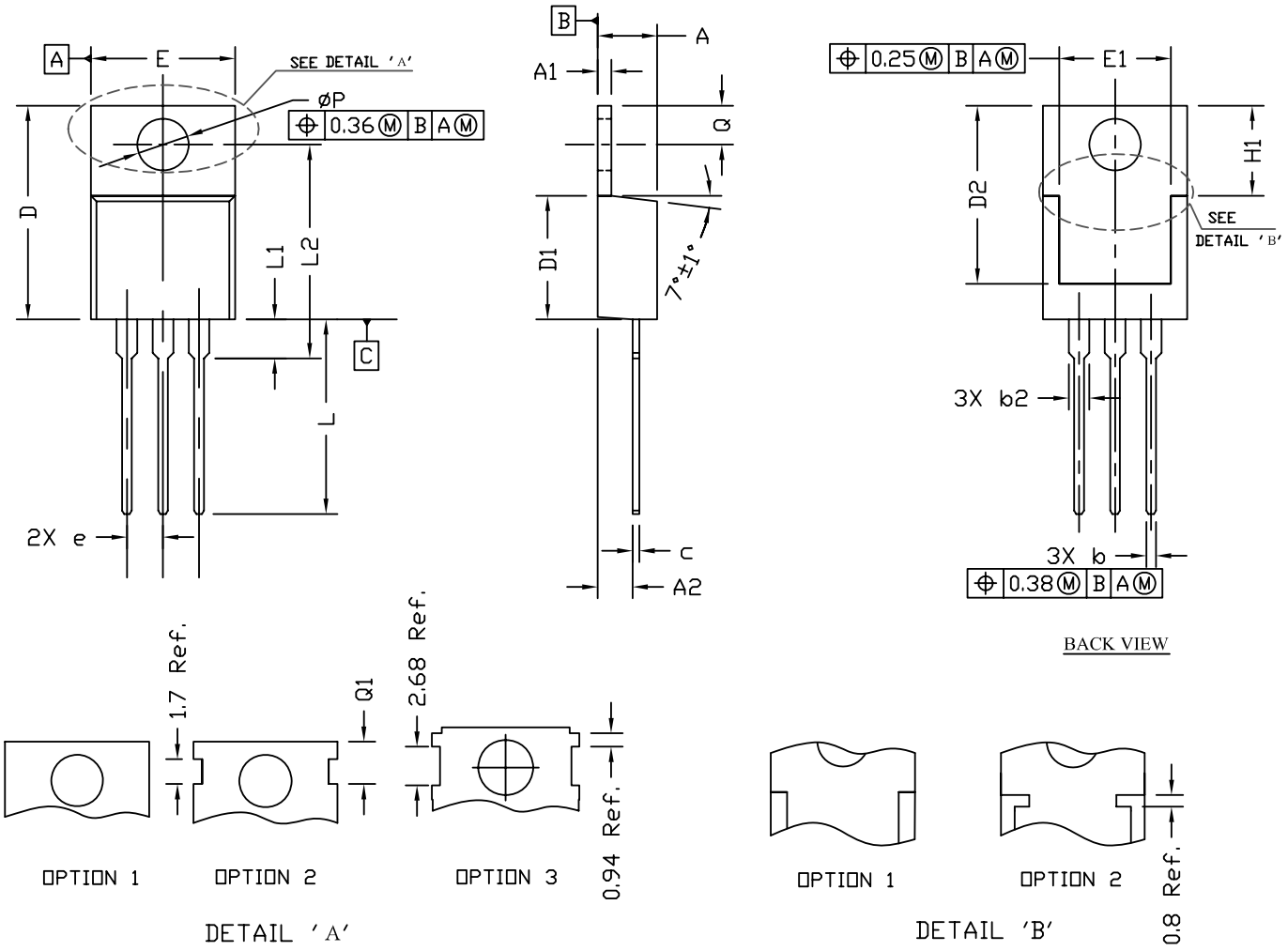
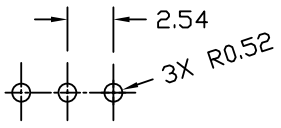


Figure 11 Normalized Maximum Transient Thermal Impedance

TO220 PACKAGE OUTLINE



RECOMMENDATION OF HOLE PATTERN



UNIT: mm

SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	4.30	4.45	4.72	0.169	0.175	0.186
A1	1.15	1.27	1.40	0.045	0.050	0.055
A2	2.20	2.67	2.90	0.087	0.105	0.114
b	0.69	0.81	0.95	0.027	0.032	0.037
b2	1.17	1.37	1.45	0.046	0.050	0.068
c	0.36	0.38	0.60	0.014	0.015	0.024
D	14.50	15.44	15.80	0.571	0.608	0.622
D1	8.59	9.14	9.65	0.338	0.360	0.380
D2	11.43	11.73	12.48	0.450	0.462	0.491
e	2.54 BSC			0.100 BSC.		
E	9.66	10.03	10.54	0.380	0.395	0.415
E1	6.22	---	---	0.245	---	---
H1	6.10	6.30	6.50	0.240	0.248	0.256
L	12.27	12.82	14.27	0.483	0.505	0.562
L1	2.47	---	3.90	0.097	---	0.154
L2	---	---	16.70	---	---	0.657
Q	2.59	2.74	2.89	0.102	0.108	0.114
øP	3.50	3.84	3.89	0.138	0.151	0.153
Q1	2.70	---	2.90	0.106	---	0.114

NOTE
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2. TOLERANCE 0.100 MILLIMETERS UNLESS OTHERWISE SPECIFIED.
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