MT35P30

P-Channel Enhancement Mode Field Effect Transistor

MT Semiconductor®

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Product Summary

- V_{DS} = -55V
- I_D = -30A (VGS= -10V)
- $R_{DS(ON)}$ 30m Ω @VGS= -10V

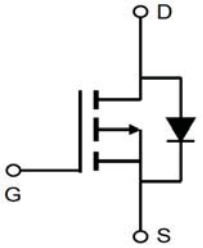
Features

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

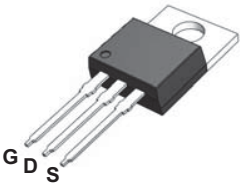
Applications

- Power Switching Application
- Hard switched and high frequency circuit
- UPS

Simplified Schematic



MARKING DIAGRAM & PIN ASSIGNMENT



TO-220FB-3L

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-55	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	-30	A
Drain Current-Continuous(T_C=100℃)	I_D (100℃)	-21	A
Pulsed Drain Current	I_{DM}	110	A
Maximum Power Dissipation	P_D	90	W
Derating factor		0.72	W/℃
Single pulse avalanche energy (Note 5)	E_{AS}	420	mJ
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Case (Note 2)	$R_{\theta JC}$	1.39	℃/W

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
MT35P30	MT35P30	TO-220FB-3L	-	-	50

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	-55	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-55V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=-250μA	-2	-2.6	-4	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-15A	-	30	40	mΩ
Forward Transconductance	g_{FS}	V_{DS}=-25V,I_D=-16A	8	-	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=-30V,V_{GS}=0V, F=1.0MHz	-	3500	-	PF
Output Capacitance	C_{oss}		-	240	-	PF
Reverse Transfer Capacitance	C_{rss}		-	153	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-30V,I_D=-15A V_{GS}=-10V,R_{GEN}=3Ω	-	12	-	nS
Turn-on Rise Time	t_r		-	15	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	38	-	nS
Turn-Off Fall Time	t_f		-	15	-	nS
Total Gate Charge	Q_g	V_{DS}=-44V,I_D=-16A, V_{GS}=-10V	-	56	-	nC
Gate-Source Charge	Q_{gs}		-	11	-	nC
Gate-Drain Charge	Q_{gd}		-	24	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=-24A	-	-	1.2	V
Diode Forward Current (Note 2)	I_S		-	-	-30	A
Reverse Recovery Time	t_{rr}	TJ = 25°C, IF = -15A di/dt = 100A/μs (Note3)	-	-	71	nS
Reverse Recovery Charge	Qrr		-	-	170	nC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production
5. E_{AS} condition：Tj=25℃,V_{DD}=-25V,V_G=-20V,L=1mH,Rg=25Ω,I_{AS}=29A

Characteristics Curve

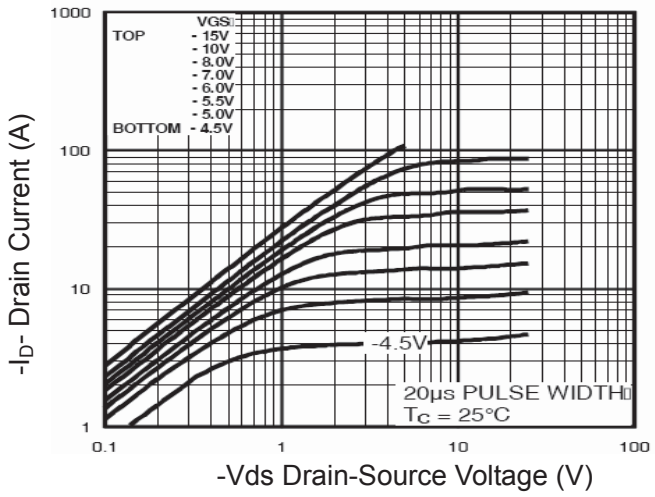


Figure 1 Output Characteristics

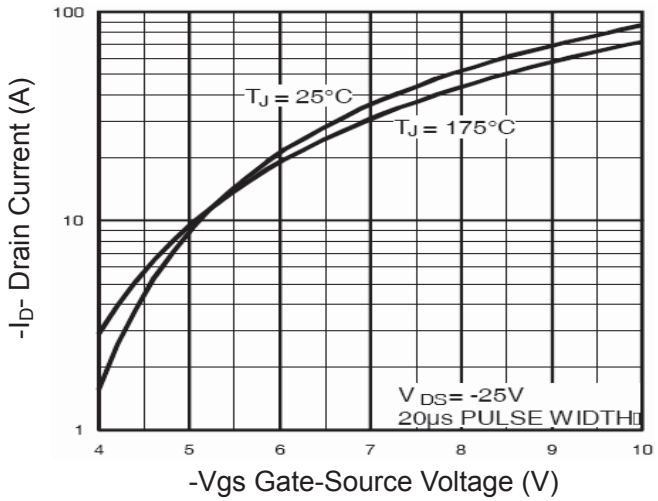


Figure 2 Transfer Characteristics

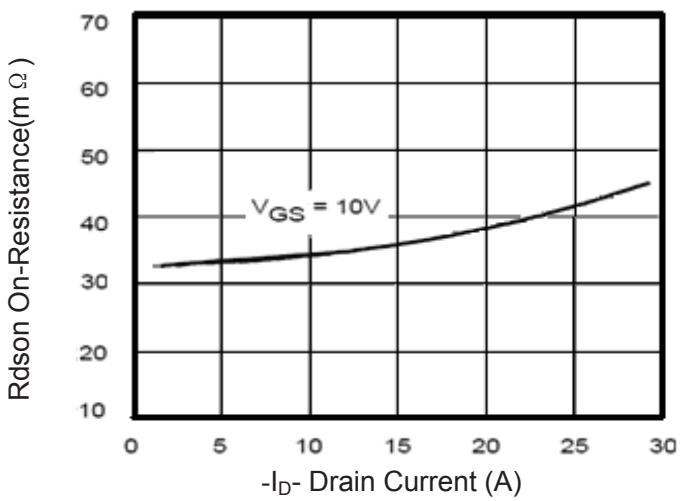


Figure 3 Rdson- Drain Current

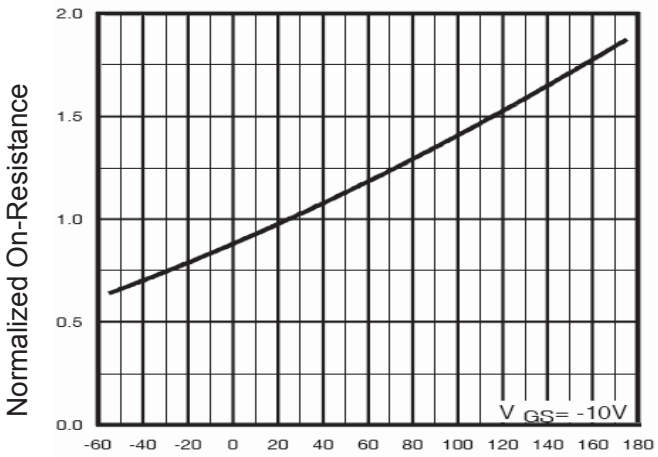


Figure 4 Rdson-JunctionTemperature

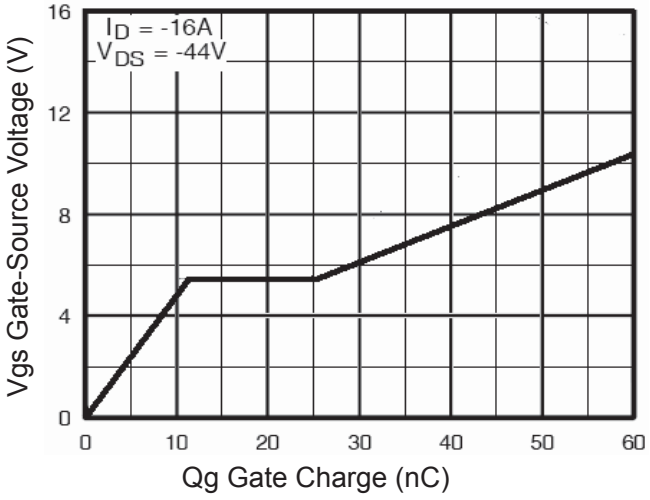


Figure 5 Gate Charge

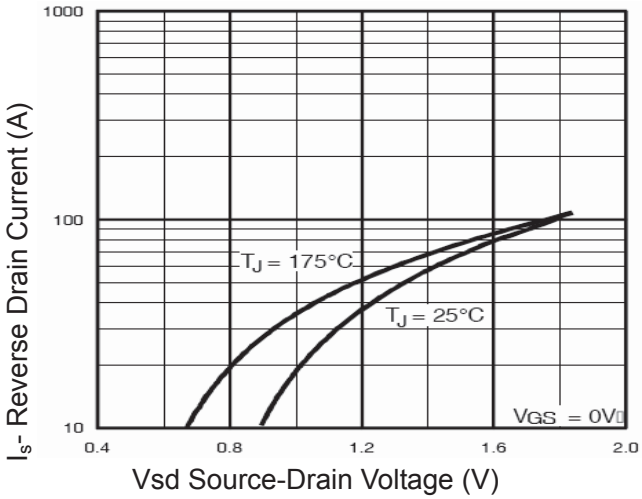


Figure 6 Source- Drain Diode Forward

Characteristics Curve

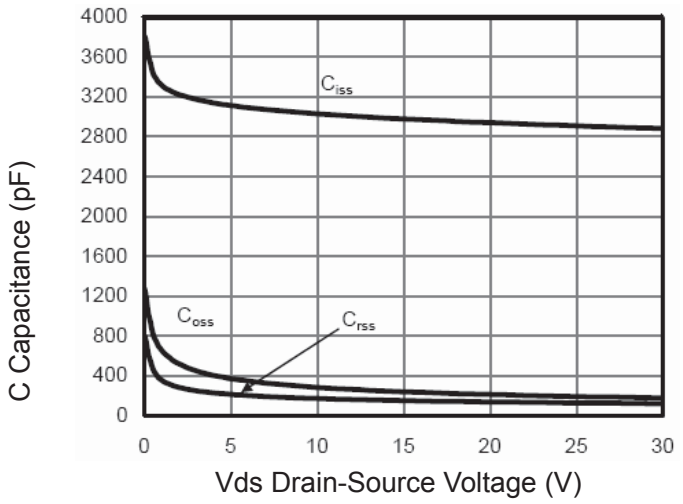


Figure 7 Capacitance vs Vds

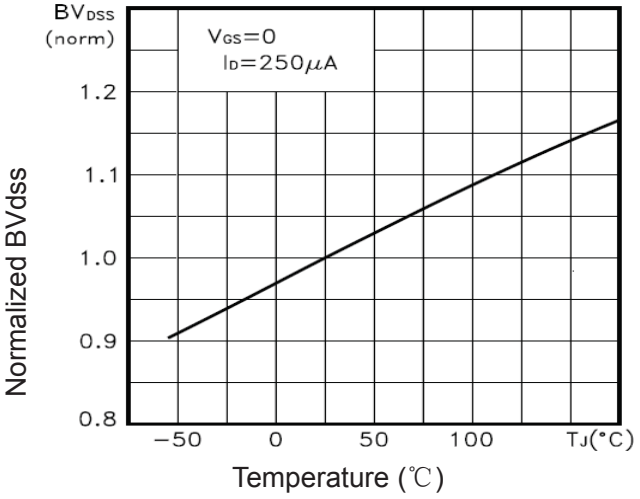


Figure 9 BV_{DSS} vs Junction Temperature

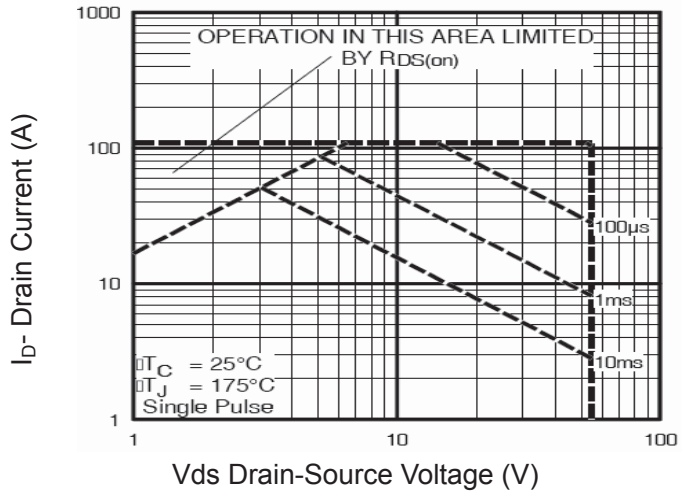


Figure 8 Safe Operation Area

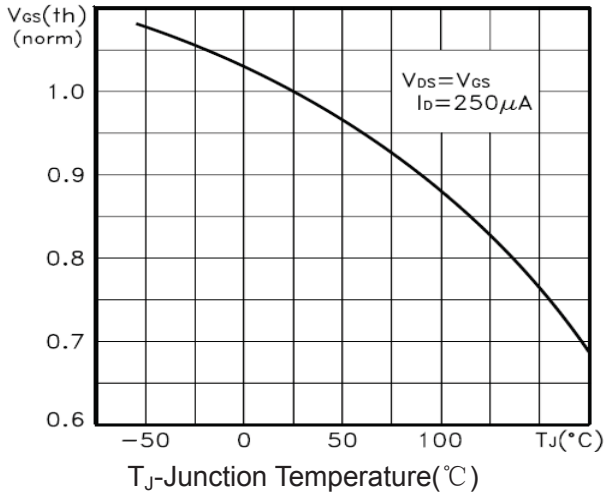


Figure 10 $V_{GS(th)}$ vs Junction Temperature

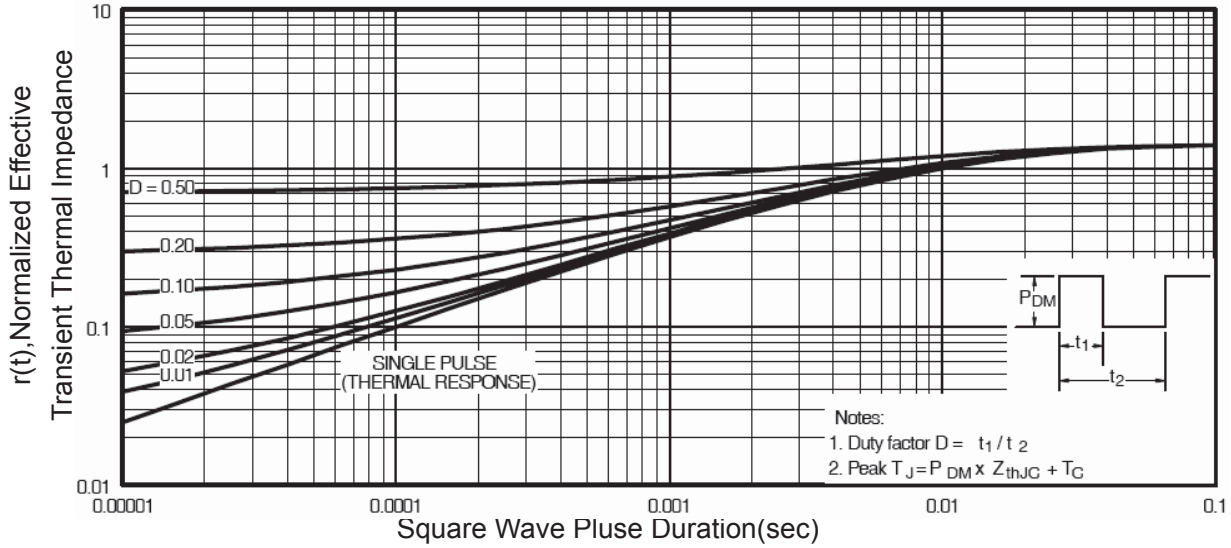


Figure 11 Normalized Maximum Transient Thermal Impedance

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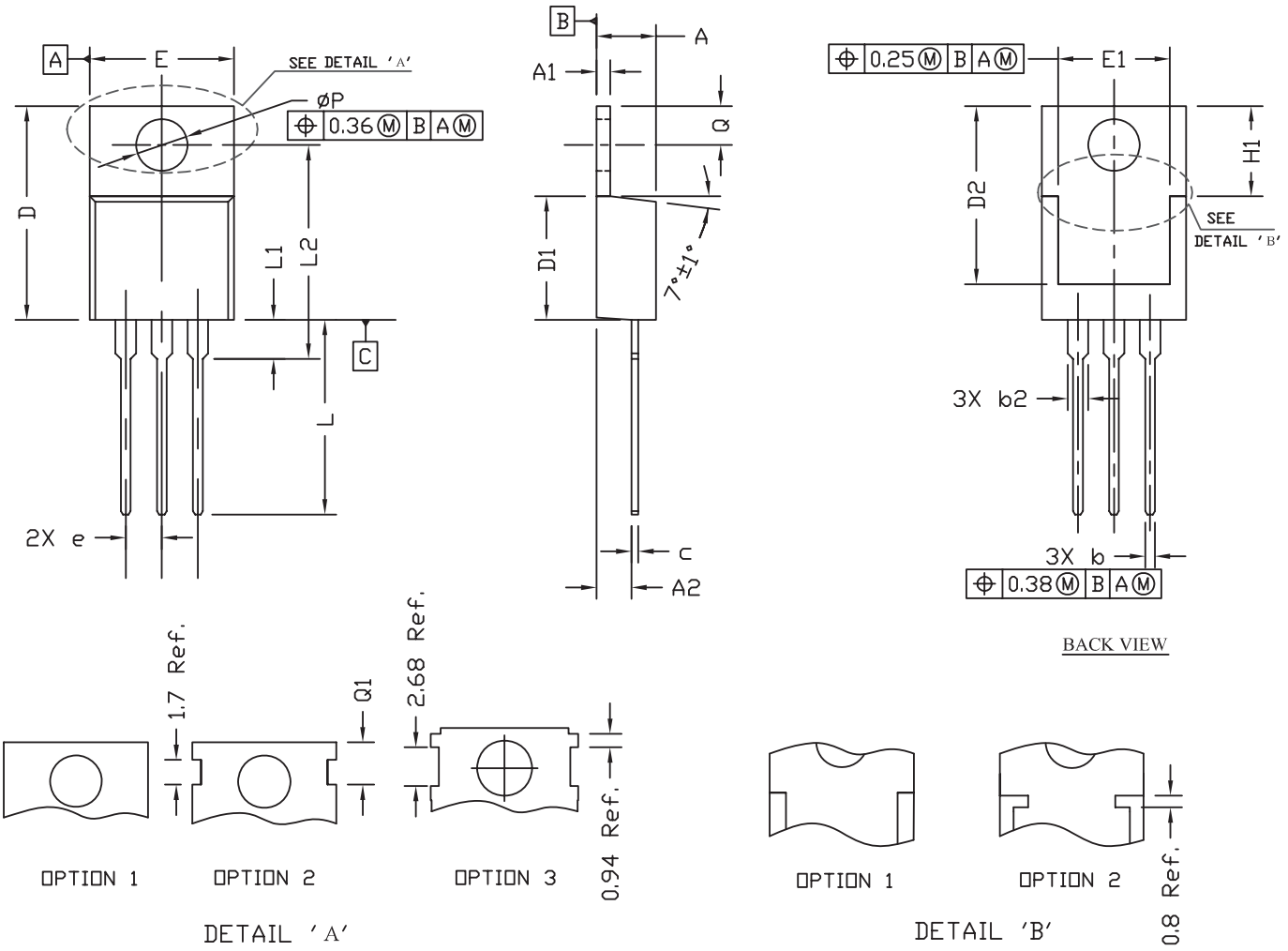
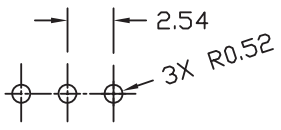
TO220 PACKAGE OUTLINE



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

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