MT81P03

P-Channel Enhancement Mode Field Effect Transistor

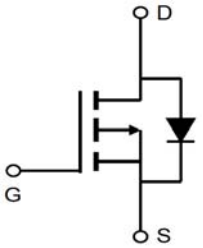
MT Semiconductor®

http://www.mtsemi.com

Product Summary

- V_{DS}= -30V
- I_D= -80A (VGS= -10V)
- $R_{DS(ON)}$ 6.7mΩ @VGS= -10V
- $R_{DS(ON)}$ 11 mΩ @VGS= -4.5V

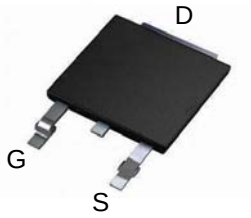
Simplified Schematic



Features

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

MARKING DIAGRAM & PIN ASSIGNMENT



TO-252-2L

Applications

- Notebook Computer
- Portable Battery Pack

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

Symbol	Parameter	10s	Steady State	Units
V_{DS}	Drain-Source Voltage	-30		V
V_{GS}	Gate-Source Voltage	±20		V
I_D	Continuous Drain Current	-80		A
I_{DM}	Pulsed Drain Current	-220		A
I_S	Continuous Source Current (Diode Conduction) [1]	-2.7	-1.36	A
P_D	Maximum Power Dissipation [1]	25		W
T_J, T_{stg}	Operating Junction and Storage Temperature Range	-55 to 150		℃

Thermal Resistance Ratings

Symbol	Parameter		Typical	Maximum	Unit
R_{thJA}	Maximum Junction-to-Ambient [1]	t≦10 Sec	33	42	℃/W
		Steady State	70	85	
R_{thJF}	Maximum Junction-to-Foot (Drain)	Steady State	16	21	

Notes:

1. Surface Mounted on 1” x 1” FR4 Board.

Electrical Characteristics (T_A=25°C, unless otherwise noted)

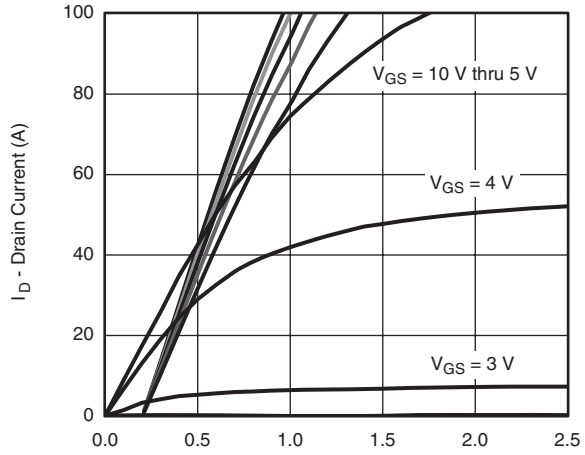
Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} =0V, I_D = -250μA	-30	-	-	V
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS} = V_{DS}, I_D = -250μA	-1.0	-1.5	-3.0	V
I_{GSS}	Gate-Body Leakage Current	V_{GS} = ±20V, V_{DS} = 0V	-	-	±100	nA
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = -24V, V_{GS} = 0V	-	-	-1	μA
		V_{DS} = -24V, V_{GS} = 0V, T_J = 70℃		-	-10	
$R_{DS(on)}$	Drain Source On State Resistance [a]	V_{GS} = -10V, I_D = -13A	-	6.7	12	mΩ
		V_{GS} = -4.5V, I_D = -10A	-	11	15	
g_{fs}	Forward Transconductance [a]	V_{DS} = -15V, I_D = -13A	-	40	-	S
V_{SD}	Diode Forward Voltage [a]	I_S = -2.7A, V_{GS} = 0V	-	-0.74	-1.1	V
Dynamic Characteristics [b]						
C_{iss}	Input Capacitance	V_{DS}= -8V, V_{GS}=0V, Frequency=1MHz	-	2700	-	pF
C_{oss}	Output Capacitance		-	515	-	
C_{rss}	Reverse Transfer Capacitance		-	445	-	
Q_g	Total Gate Charge	V_{DS} = -15V, V_{GS} = -5V, I_D = -13A	-	60	-	nC
Q_{gs}	Gate-Source Charge		-	9.3	-	
Q_{gd}	Gate-Drain Charge		-	15	-	
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = -15V, R_L = 1.5Ω I_D= -10A, V_{GEN} = -10V, R_G = 1Ω	-	12	-	nSec
t_r	Rise Time		-	11	-	
$T_{d(off)}$	Turn-Off Delay Time		-	40	-	
t_f	Fall Time		-	12	-	
R_g	Gate Resistance	V_{GS} =0, V_{DS} =0, f= 1MHz	-	3.4	-	Ω
t_{rr}	Source-Drain Reverse Recovery Time	I_F = -2.1A, di/dt = 100A/μs	-	60	100	nSec

Note:

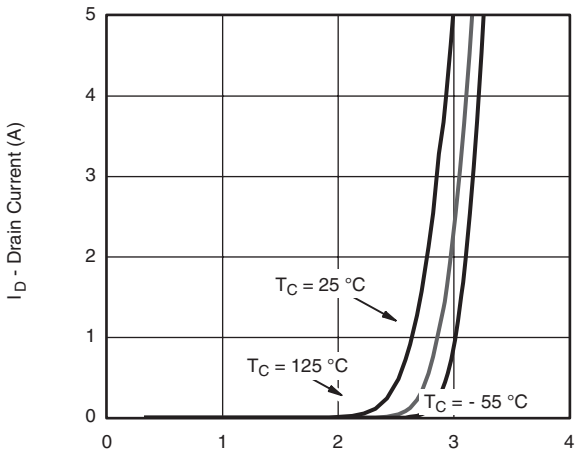
a. Pulse test; pulse width≦300μs, duty cycle≦2%.

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

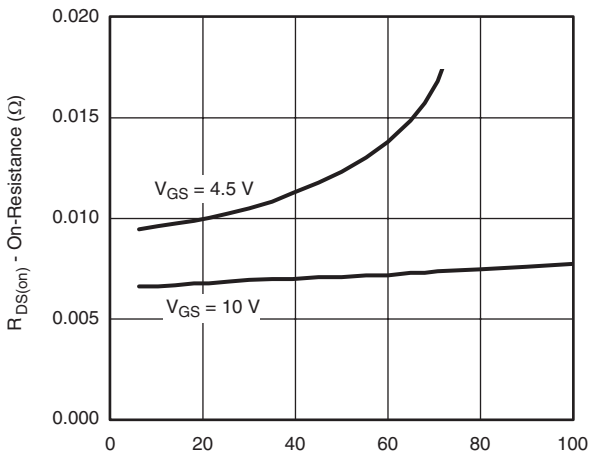
Characteristics Curve



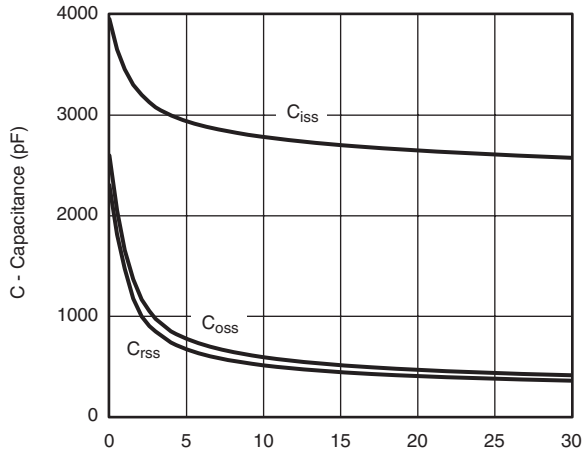
Output Characteristics



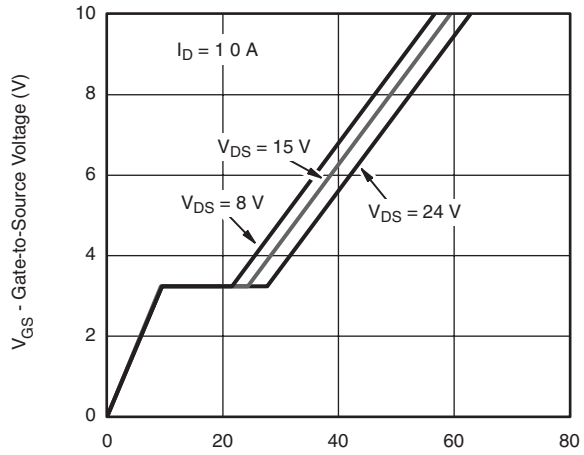
Transfer Characteristics



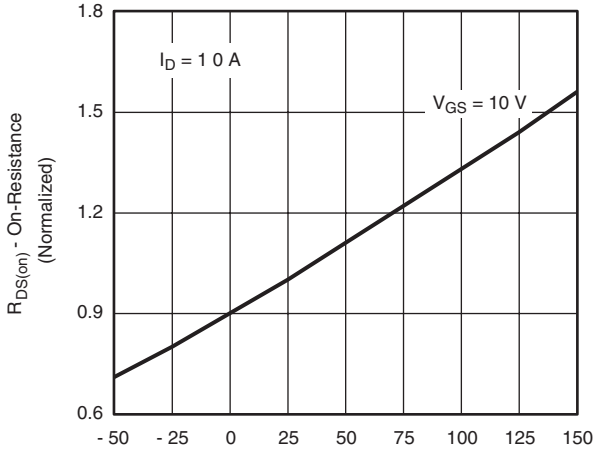
On-Resistance vs. Drain Current



Capacitance

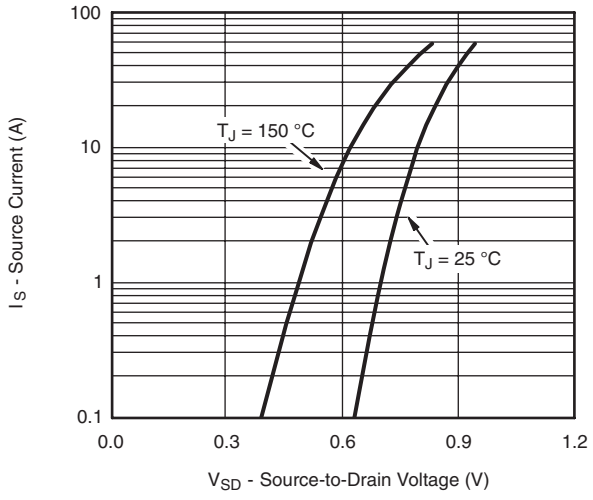


Gate Charge

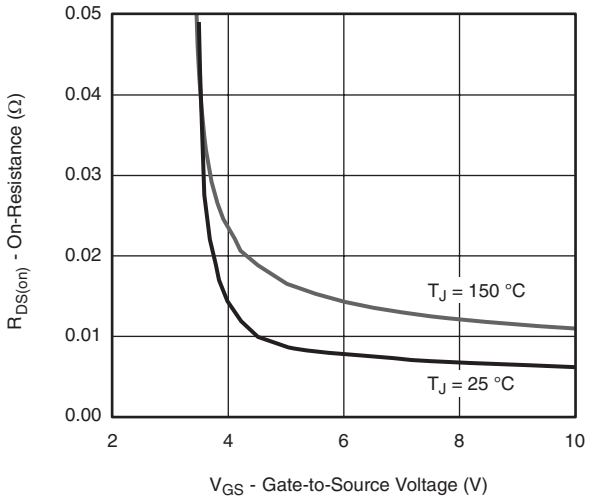


On-Resistance vs. Junction Temperature

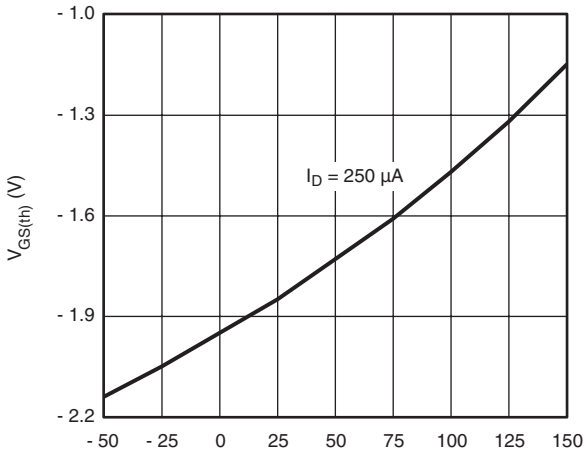
Characteristics Curve



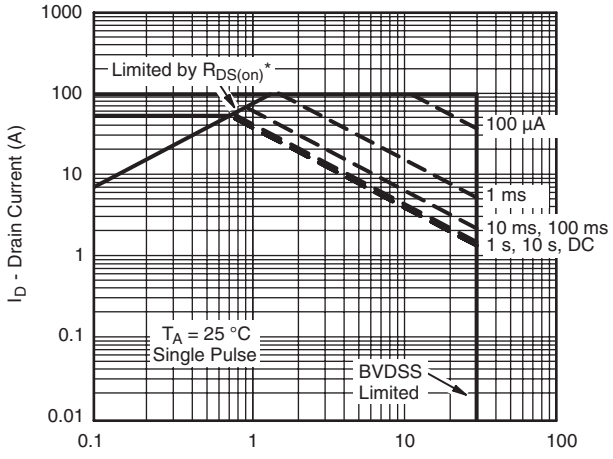
Source-Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage

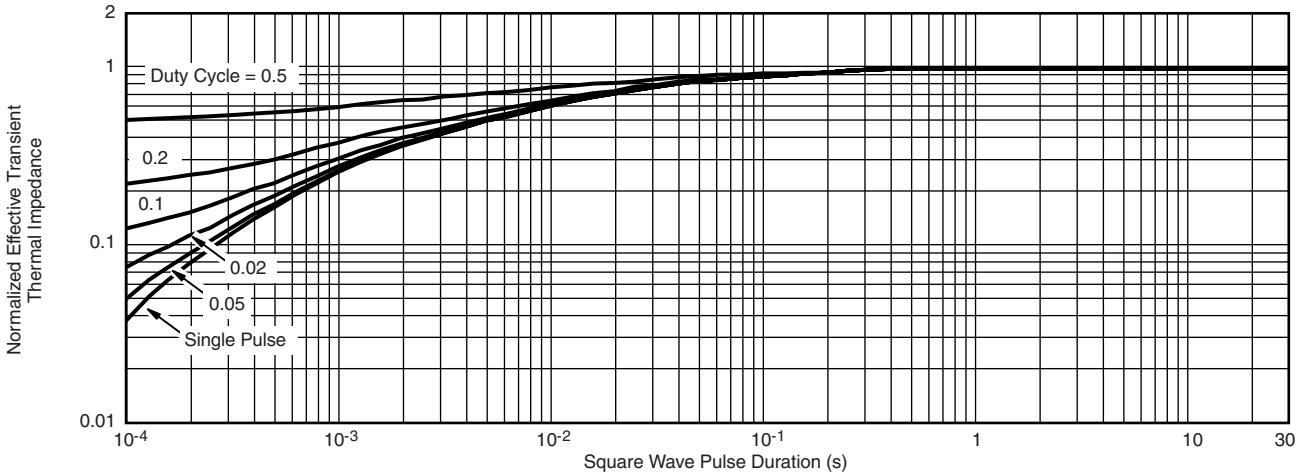


Threshold Voltage



* V_{GS} > minimum V_{GS} at which $R_{DS(on)}$ is specified

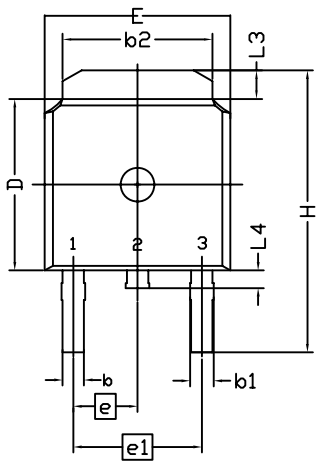
Safe Operating Area

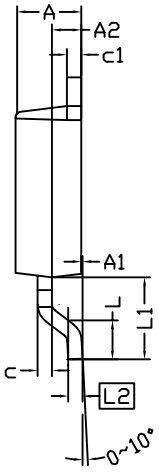


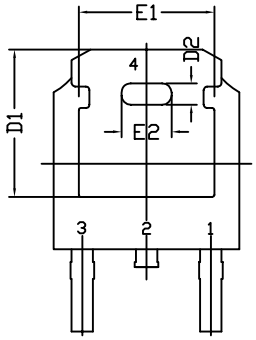
Normalized Thermal Transient Impedance, Junction-to-Case

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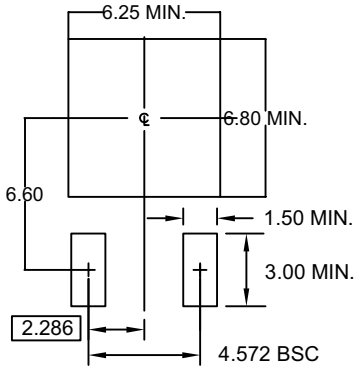
TO252(DPAK) PACKAGE OUTLINE







RECOMMENDED LAND PATTERN



UNIT: mm

SYMBOL	DIMENSION IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	2.184	2.286	2.388	0.086	0.090	0.094
A1	0.000	-----	0.127	0.000	-----	0.005
A2	0.889	1.041	1.143	0.035	0.041	0.045
b	0.635	0.762	0.889	0.025	0.030	0.035
b1	0.762	0.840	1.143	0.030	0.033	0.045
b2	4.953	5.340	5.461	0.195	0.210	0.215
c	0.450	0.508	0.610	0.018	0.020	0.024
c1	0.450	0.508	0.610	0.018	0.020	0.024
D	5.969	6.096	6.223	0.235	0.240	0.245
D1	5.210	5.249	5.380	0.205	0.207	0.212
D2	0.662	0.762	0.862	0.026	0.030	0.034
E	6.350	6.604	6.731	0.250	0.260	0.265
E1	4.318	4.826	4.901	0.170	0.190	0.193
E2	1.678	1.778	1.878	0.066	0.070	0.074
e	2.286 BSC			0.090 BSC		
e1	4.572 BSC			0.180 BSC		
H	9.398	10.033	10.414	0.370	0.395	0.410
L	1.270	1.520	2.032	0.050	0.060	0.080
L1	2.921 REF.			0.115REF.		
L2	0.408	0.508	0.608	0.016	0.020	0.024
L3	0.889	1.016	1.270	0.035	0.040	0.050
L4	0.635	-----	1.016	0.025	-----	0.040

NOTE
1. PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS. MOLD FLASH SHOULD BE LESS THAN 6 MILS.
2. DIMENSION L IS MEASURED IN GAUGE PLANE
3. TOLERANCE 0.10 mm UNLESS OTHERWISE SPECIFIED
4. CONTROLLING DIMENSION IS MILLIMETER. CONVERTED INCH DIMENSIONS ARE NOT NECESSARILY EXACT.
5. REFER TO JEDEC TO-252 (AA)

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