MT58P02N3

P-Channel Enhancement Mode Field Effect Transistor

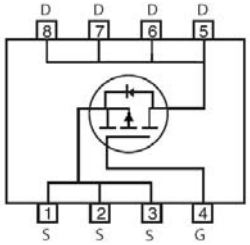
MT Semiconductor®

http://www.mtsemi.com

Product Summary

- V_{DS} = -20V
- I_D= -55A
- $R_{DS(ON)}$ 8.3mΩ @V_{GS}= -4.5V
- $R_{DS(ON)}$ 10.5 mΩ @V_{GS}= -2.5V

Simplified Schematic



Features

Advanced Trench Process Technology.

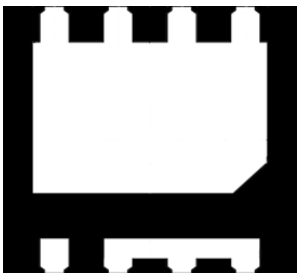
- High Density Cell Design for Ultra Low
- On-Resistance.
- Lead free product is acquired.
- RoHS Compliant.

Applications

- Notebook Computer
- Portable Battery Pack

PDFN3.3X3.3-8L

MARKING DIAGRAM & PIN ASSIGNMENT



PIN1

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	±12	V
Drain Current-Continuous	I_D	-55	A
Drain Current-Pulsed (Note 1)	I_{DM}	-220	A
Maximum Power Dissipation	P_D	66	W
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Ambient (Note 2)	$R_{\theta JA}$	48	℃/W

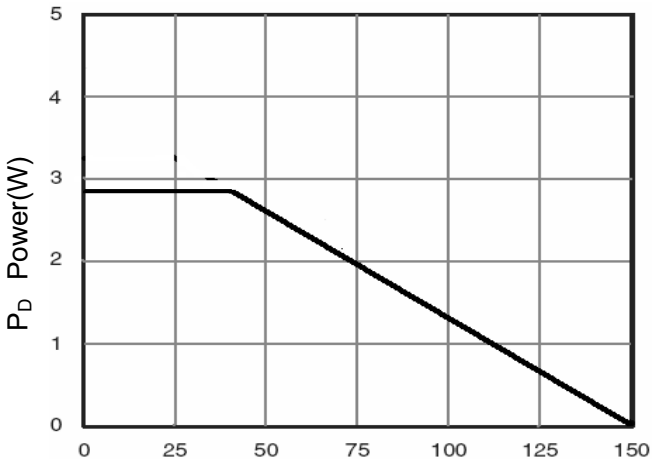
Electrical Characteristics (T_A=25℃unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=-250μA	-20	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-20V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±12V,V_{DS}=0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=-250μA	-	-0.8	-1.2	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=-4.5V, I_D=-10A	-	6.5	10	mΩ
		V_{GS}=-2.5V, I_D= -5A	-	8.0	15	mΩ
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=-10V,V_{GS}=0V, F=1.0MHz	-	4470	-	PF
Output Capacitance	C_{oss}		–	570	–	PF
Reverse Transfer Capacitance	C_{rss}		–	502	–	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-10V, ,R_L=2Ω V_{GS}=-10V,R_{GEN}=3Ω	–	11	–	nS
Turn-on Rise Time	t_r		–	110	–	nS
Turn-Off Delay Time	$t_{d(off)}$		–	157	–	nS
Turn-Off Fall Time	t_f		–	160	–	nS
Total Gate Charge	Q_g	V_{DS}=-10V,I $_D$=-15A, V_{GS}=-4.5V	–	56	–	nS
Gate-Source Charge	Q_{gs}		–	8	–	nS
Gate-Drain Charge	Q_{gd}		–	16	–	nS
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=-30A	-	-0.7	-1.3	V
Diode Forward Current (Note 2)	I_S		-	-	-55	A

Notes

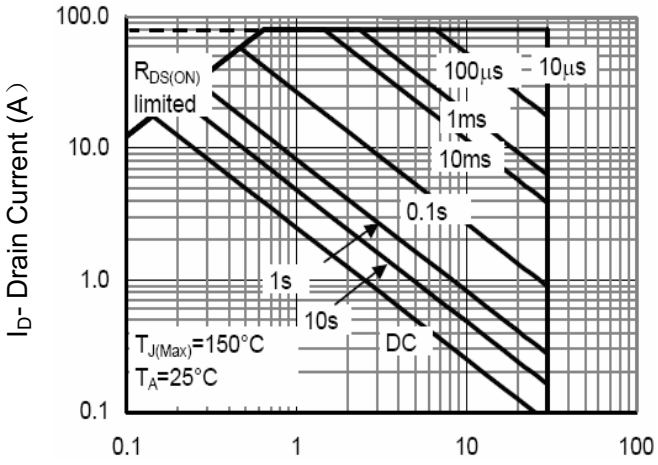
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production

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



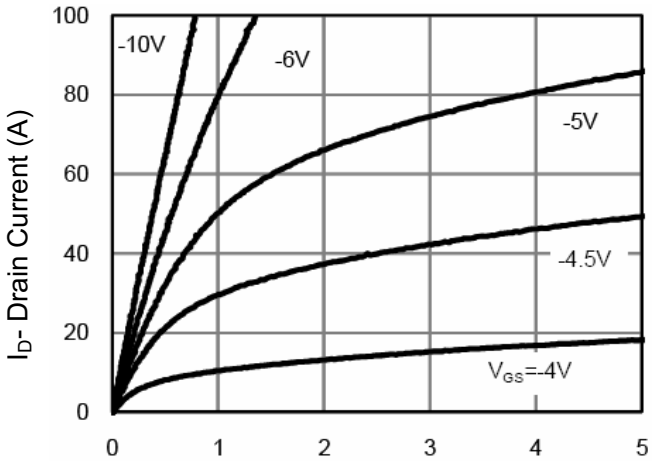
T_J-Junction Temperature(℃)

Figure 1 Power Dissipation



Vds Drain-Source Voltage (V)

Figure 2 Safe Operation Area



Vds Drain-Source Voltage (V)

Figure 3 Output Characteristics

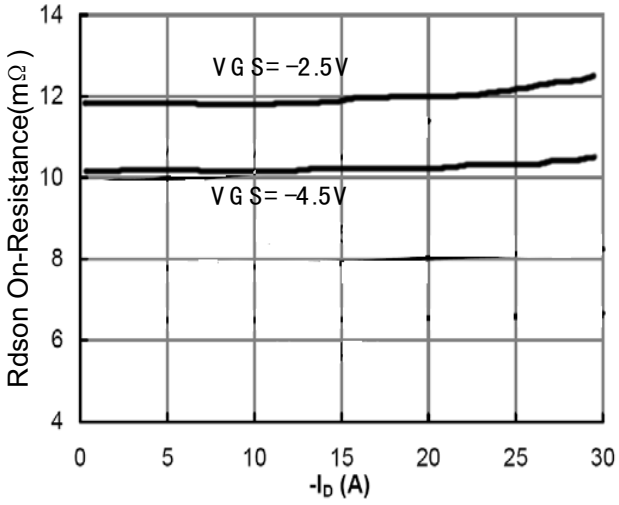
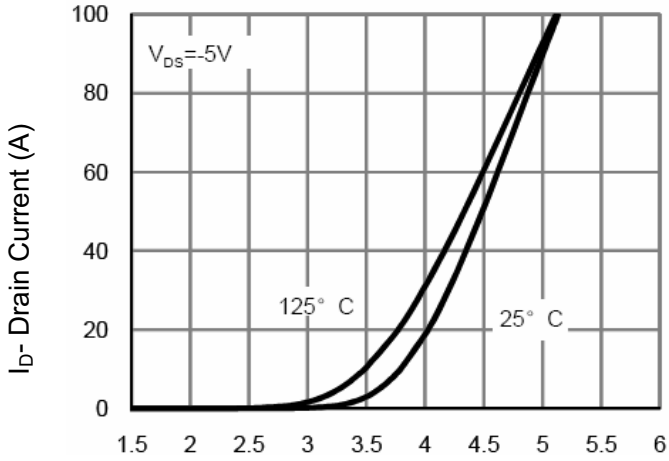
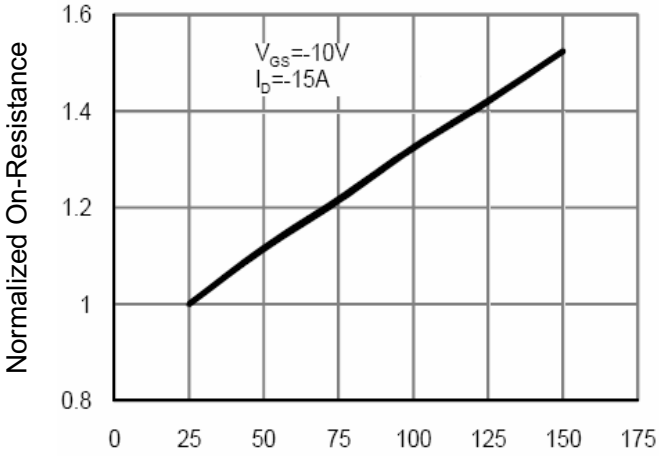


Figure 4 Drain-Source On-Resistance



Vgs Gate-Source Voltage (V)

Figure 5 Transfer Characteristics



T_J-Junction Temperature(℃)

Figure 6 Drain-Source On-Resistance

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

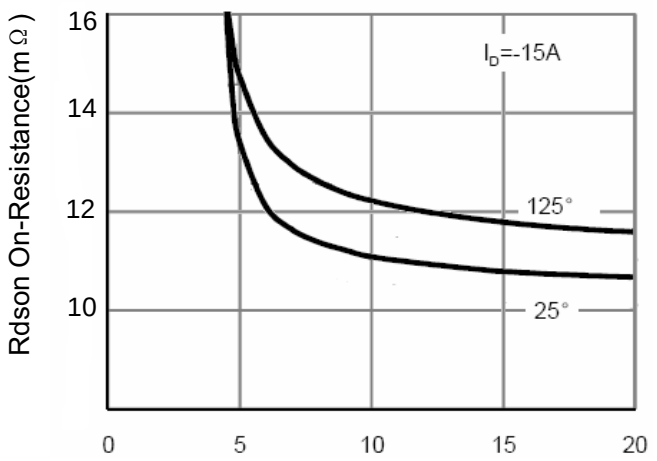


Figure 7 Rdson vs Vgs

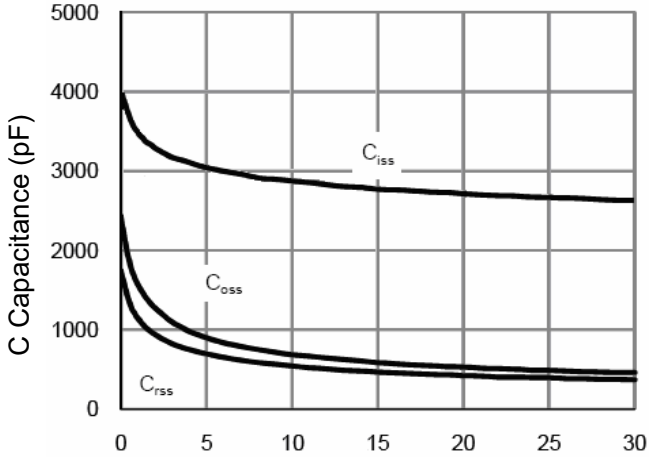


Figure 8 Capacitance vs Vds

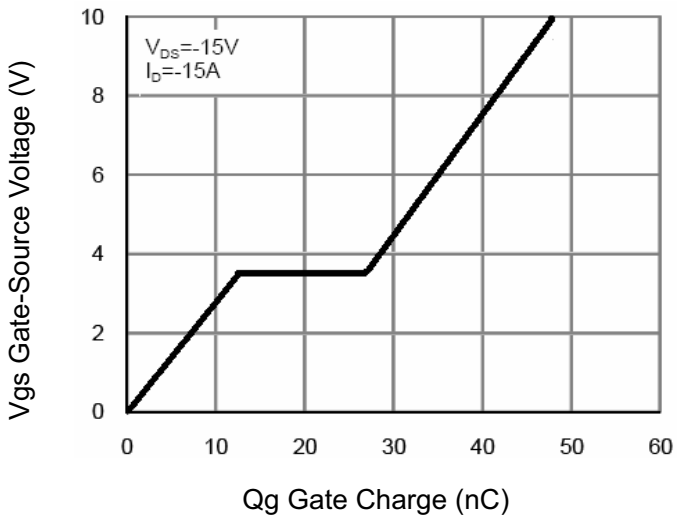


Figure 9 Gate Charge

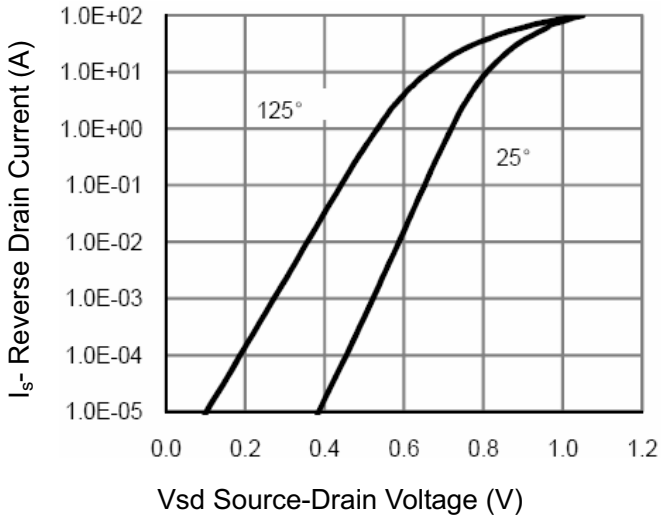


Figure 10 Source- Drain Diode Forward

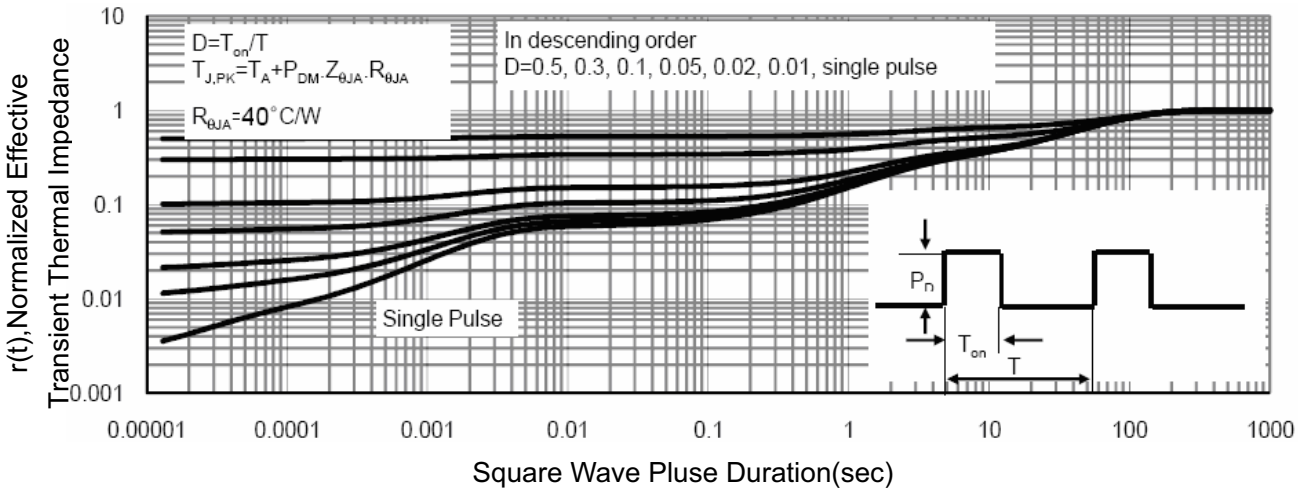
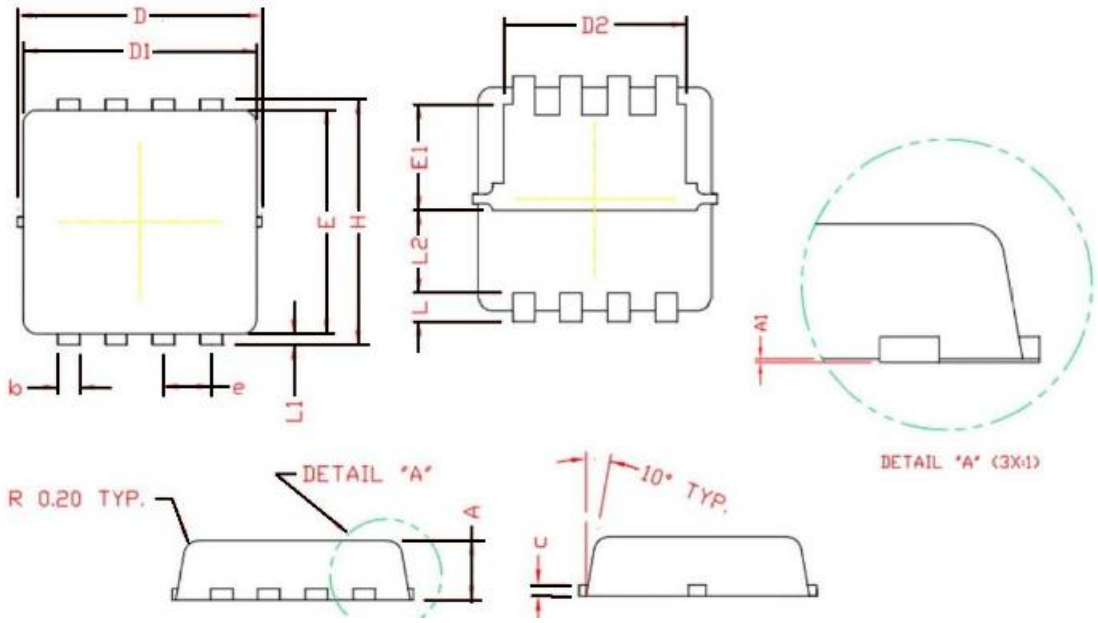


Figure 11 Normalized Maximum Transient Thermal Impedance

PDFN3.3X3.3-8L Package Information



COMMON DIMENSIONS

(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	0.70	0.80	0.90
A1	0.00	0.03	0.05
b	0.24	0.30	0.35
c	0.10	0.15	0.20
D	3.25	3.32	3.40
D1	3.05	3.15	3.25
D2	2.40	2.50	2.60
E	3.00	3.10	3.20
E1	1.35	1.45	1.55
e	0.65 BSC.		
H	3.20	3.30	3.40
L	0.30	0.40	0.50
L1	0.10	0.15	0.20
L2	1.13 REF.		

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