MT4002N5

N-Channel Enhancement Mode Field Effect Transistor

MT Semiconductor®

http://www.mtsemi.com

Product Summary

- V_{DS} = 40V
- I_D = 60A (V_{GS} = 10V)
- $R_{DS(ON)}$=3.3 mΩ @V_{GS} =10V
- $R_{DS(ON)}$ = 4.1mΩ @V_{GS} =4.5V

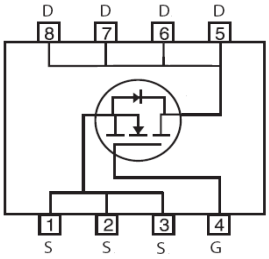
Features

- Advanced Trench Process Technology.
- High Density Cell Design for Ultra Low On-Resistance.
- Lead free product is acquired.
- RoHS Compliant.
- PDFN5x6-8L Package

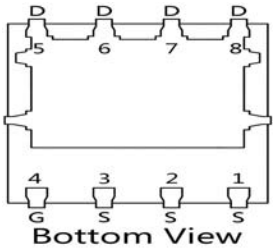
Applications

- Portable Equipment and Battery Powered Systems.
- Power Management in Notebook Computers.

Simplified Schematic



MARKING DIAGRAM & PIN ASSIGNMENT



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

Symbol	Parameter		Steady State	Units
V_{DS}	Drain-Source Voltage		40	V
V_{GS}	Gate-Source Voltage		±20	V
I_D	Continuous Drain Current [1]	T_C = 25℃	60	A
I_{DM}	Pulsed Drain Current [2]		300	A
I_S	Continuous Source Current (Diode Conduction) [1]		60	A
E_{AS}	Single Pulse Drain-Source Avalanche Energy [3]		110	mJ
P_D	Maximum Power Dissipation	T_A = 25℃	2	W
		T_C = 25℃	89	
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 Resistance Ratings

Symbol	Parameter	Typical	Maximum	Unit
R_{thJA}	Maximum Junction-to-Ambient	-	62.5	℃/W
R_{thJC}	Maximum Junction-to-Case	-	1.4	

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

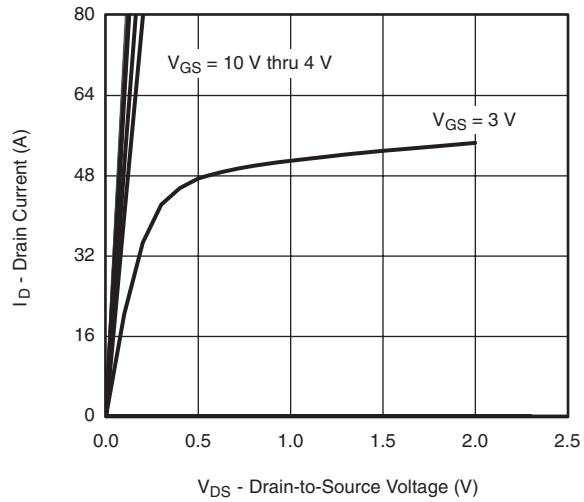
Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}= 0V, I_D= 250μA	40	-	-	V
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS} = V_{DS}, I_D = 250μA	1	1.4	2.2	V
I_{GSS}	Gate-Body Leakage Current	V_{GS} = ±20V, V_{DS} = 0V	-	-	±100	nA
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 32V, V_{GS} = 0V	-		1	μA
		V_{DS} = 32V, V_{GS} = 0V, T_J = 85℃	-		30	
$R_{DS(on)}$	Drain Source On State Resistance [a]	V_{GS} = 10V, I_D = 60A	-	3.3	4.5	mΩ
		V_{GS} = 4.5V, I_D = 30A	-	4.1	5.1	
V_{SD}	Diode Forward Voltage [a]	V_{GS} = 0V, I_S = 40A	-	0.82	1.3	V
Dynamic Characteristics [b]						
C_{iss}	Input Capacitance	V_{DS}= 15V, V_{GS}= 0V, f = 1MHz	-	5120	-	pF
C_{oss}	Output Capacitance		-	1210	-	
C_{rss}	Reverse Transfer Capacitance		-	390	-	
Q_g	Total Gate Charge	V_{DS} = 15V, V_{GS} = 10V, I_D = 20A	-	41	-	nC
Q_{gs}	Gate-Source Charge		-	15	-	
Q_{gd}	Gate-Drain Charge		-	12	-	
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 15V, V_{GS} = 4.5V I_D = 20A, R_{GEN} = 3Ω	-	22	-	nSec
t_r	Rise Time		-	35	-	
$t_{d(off)}$	Turn-Off Delay Time		-	50	-	
t_f	Fall Time		-	27	-	
t_{rr}	Body Diode Reverse Recovery Time	I_F =20A, di/dt= 100A/μA, T_J=25℃	-	33	-	nSec

Note:

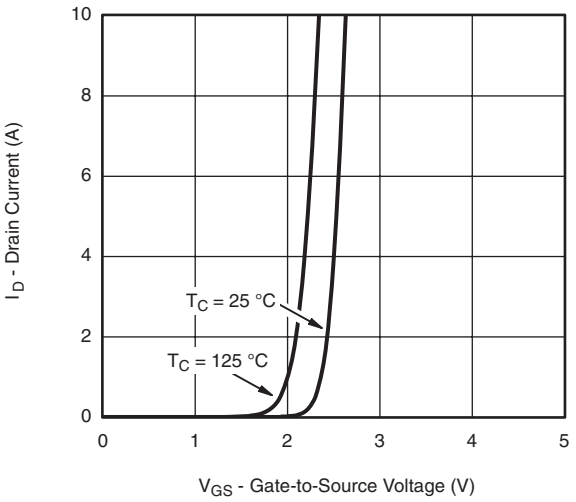
a. Pulse test; pulse width≦300μs, duty cycle≦2%.

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

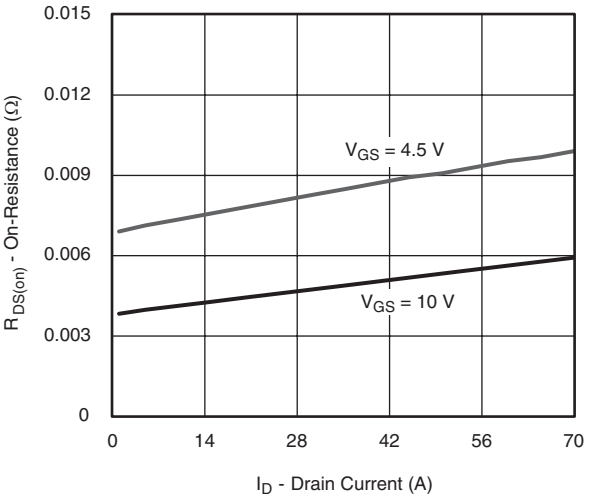
Characteristics Curve



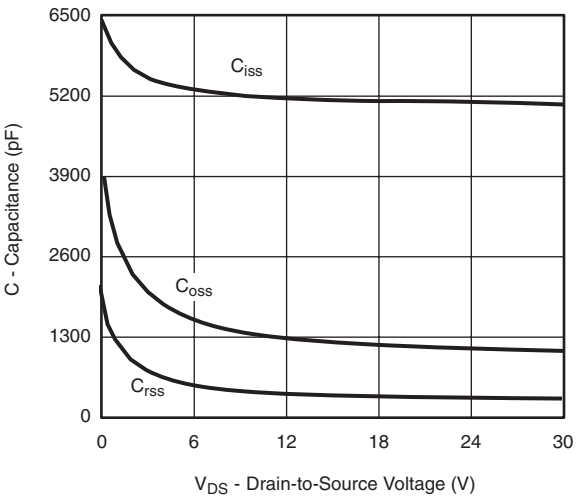
Output Characteristics



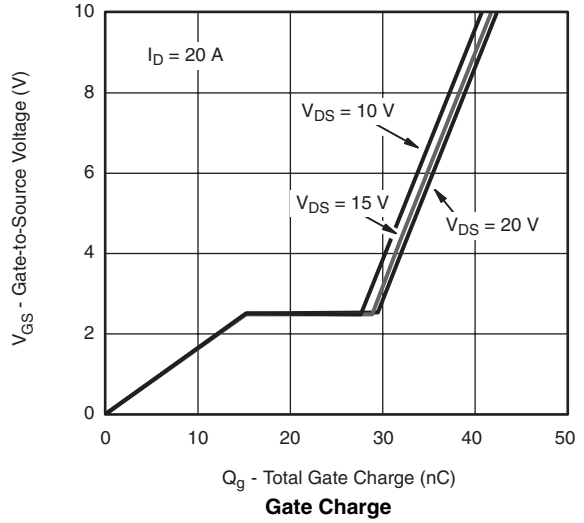
Transfer Characteristics



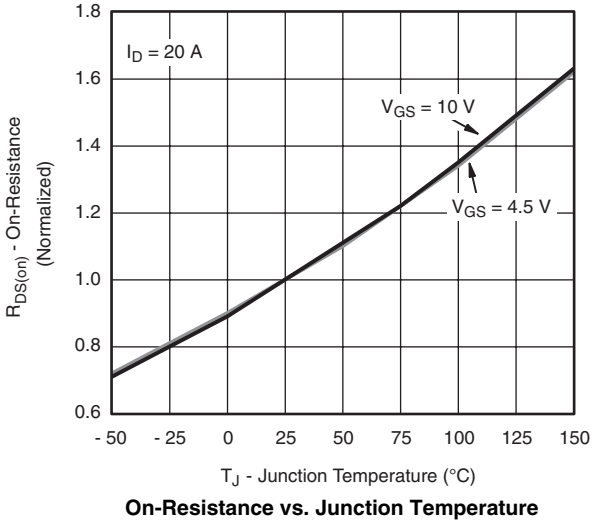
On-Resistance vs. Drain Current



Capacitance

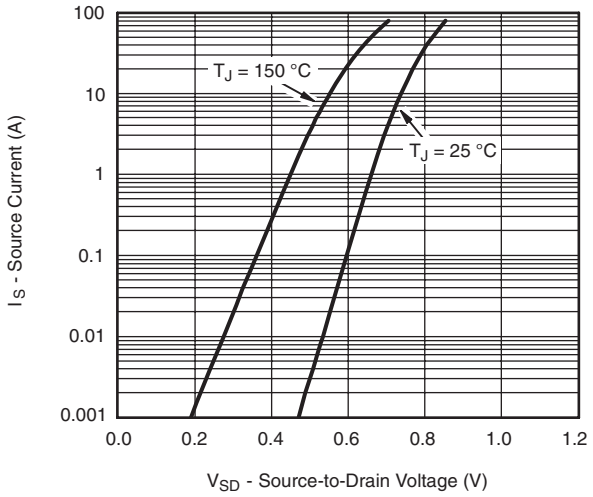


Gate Charge

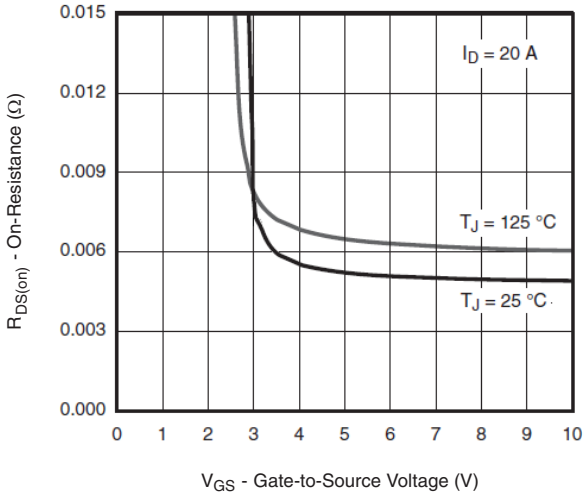


On-Resistance vs. Junction Temperature

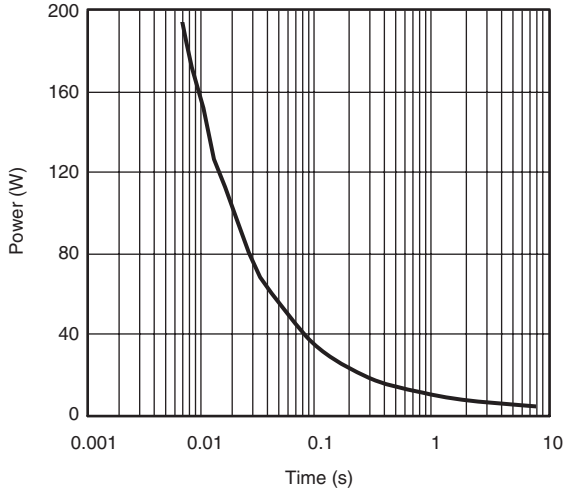
Characteristics Curve



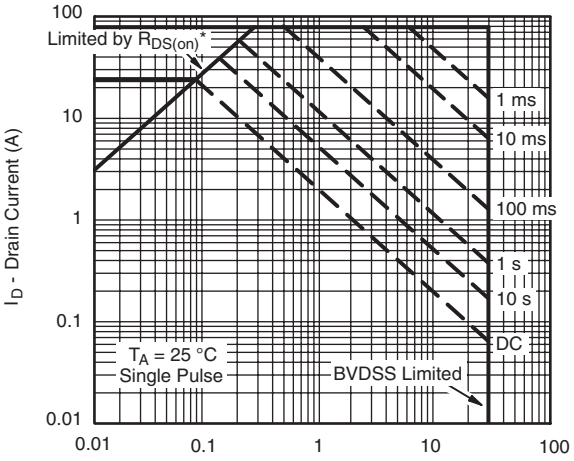
Source-Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage

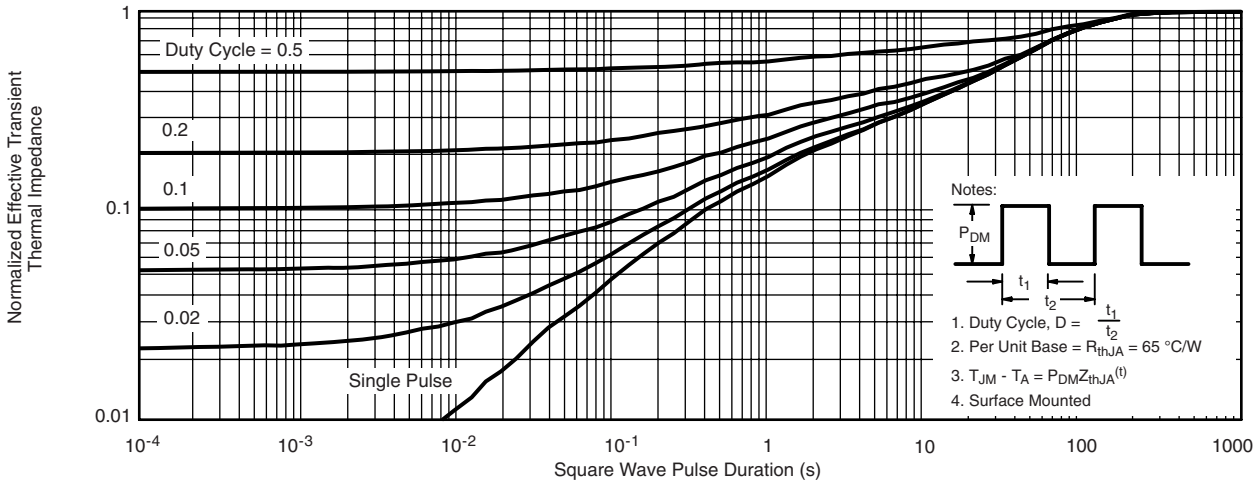


Single Pulse Power, Junction-to-Ambient



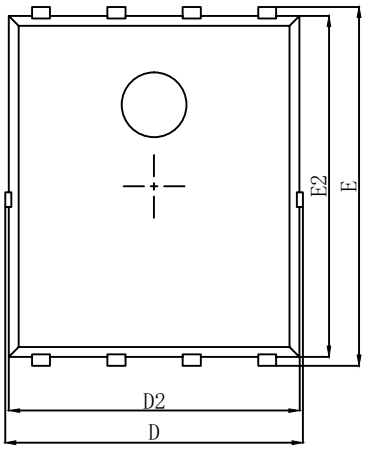
* V_{GS} > minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Ambient

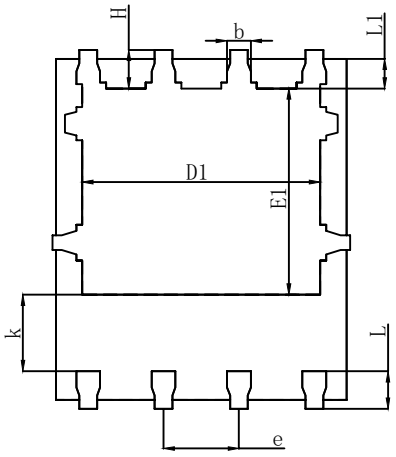


Normalized Thermal Transient Impedance, Junction-to-Ambient

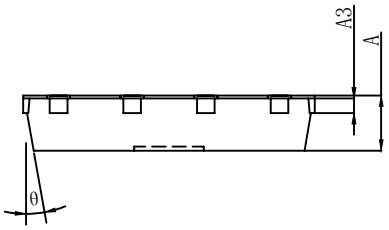
PDFNWB5×6-8L(P1.27T0.95) PACKAGE OUTLINE DIMENSIONS



Top View
[顶视图]



Bottom View
[背视图]



Side View
[侧视图]

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.000	0.035	0.039
A3	0.254REF.		0.010REF.	
D	4.944	5.096	0.195	0.201
E	5.974	6.126	0.235	0.241
D1	3.910	4.110	0.154	0.162
E1	3.375	3.575	0.133	0.141
D2	4.824	4.976	0.190	0.196
E2	5.674	5.826	0.223	0.229
k	1.190	1.390	0.047	0.055
b	0.350	0.450	0.014	0.018
e	1.270TYP.		0.050TYP.	
L	0.559	0.711	0.022	0.028
L1	0.424	0.576	0.017	0.023
H	0.574	0.726	0.023	0.029
θ	10°	12°	10°	12°

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