

MT4002N5

N-Channel Enhancement Mode Field Effect Transistor

Product Summary

- $V_{DS} = 40V$
- $I_D = 60A$ ($V_{GS} = 10V$)
- $R_{DS(ON)} = 3.1 m\Omega @ V_{GS} = 10V$
- $R_{DS(ON)} = 3.5m\Omega @ V_{GS} = 4.5V$

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

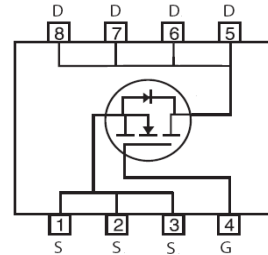
- Portable Equipment and Battery Powered Systems.
- Power Management in Notebook Computers.



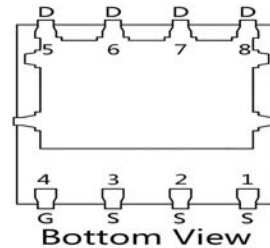
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Simplified Schematic



MARKING DIAGRAM & PIN ASSIGNMENT



Absolute Maximum Ratings ($T_A = 25^\circ C$ 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	60	A
I_{DM}	Pulsed Drain Current ²		
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	$T_A = 25^\circ C$	2
		$T_C = 25^\circ C$	89
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55~150	$^\circ C$

Notes:

1. Surface Mounted on 1" x 1" FR4 Board, $t \leq 10$ Sec.
2. Pulse width limited by maximum junction temperature.
3. The test condition is $T_J = 25^\circ C$, $V_{DD} = 30V$, $V_{GS} = 10V$, $L = 0.1mH$, $R_G = 25\Omega$, $I_{AS} = 50A$.

Thermal Resistance Ratings

Symbol	Parameter	Typical	Maximum	Unit
R _{thJA}	Maximum Junction-to-Ambient	-	62.5	°C/W
R _{thJC}	Maximum Junction-to-Case	-	1.4	

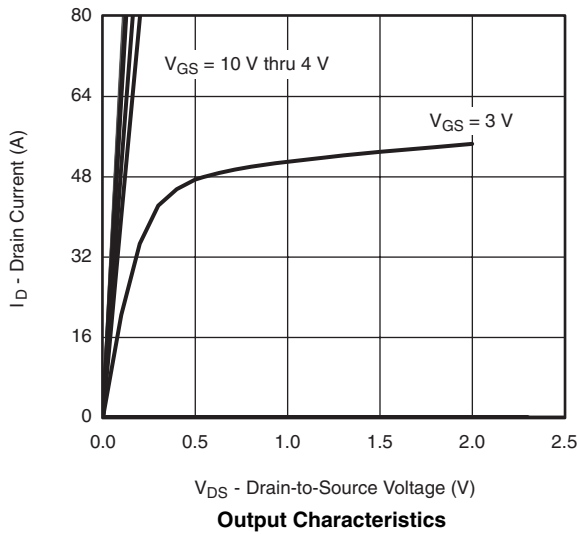
Electrical Characteristics (T_A=25°C, unless otherwise noted)

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°C	-	-	30	
R _{DS(on)}	Drain Source On State Resistance ^a	V _{GS} = 10V, I _D = 60A	-	3.1	4.1	mΩ
		V _{GS} = 4.5V, I _D = 30A	-	3.5	4.5	
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°C	-	33	-	nSec

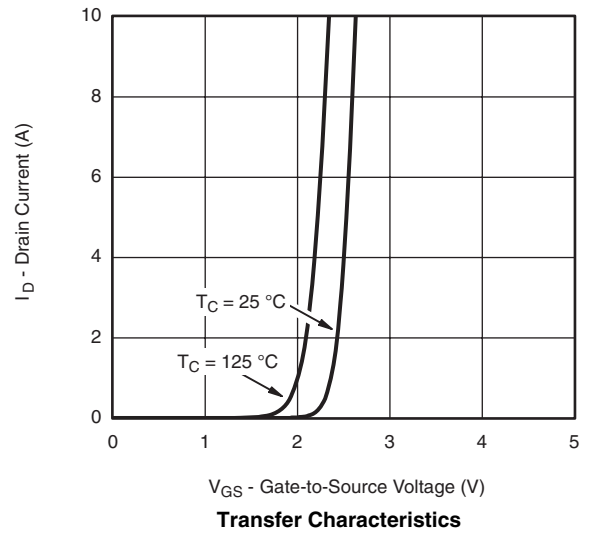
Note:

- Pulse test; pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
- Guaranteed by design, not subject to production testing.

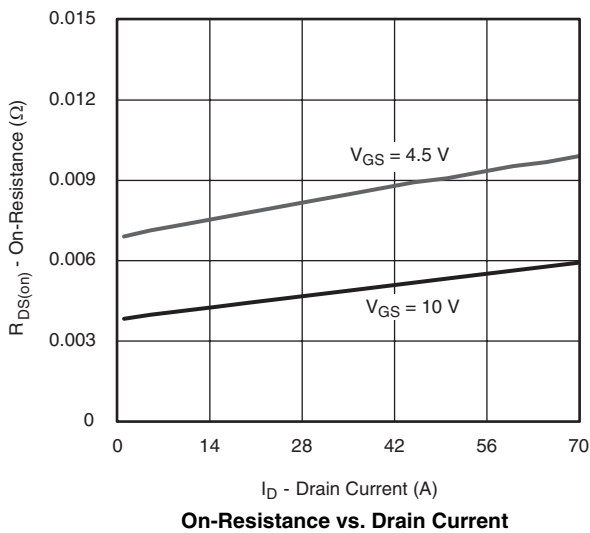
Characteristics Curve



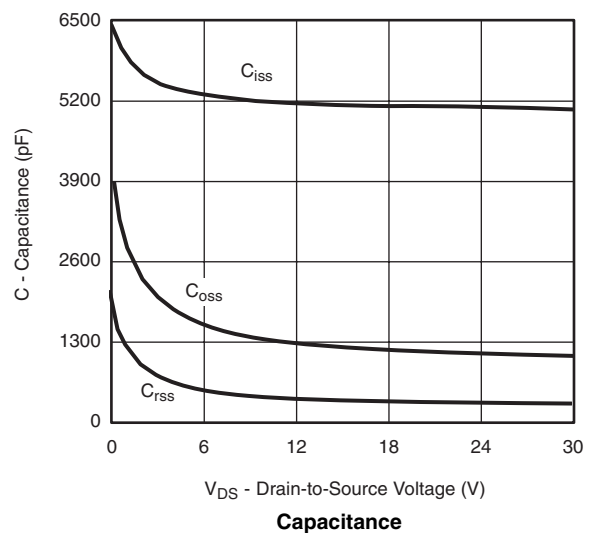
Output Characteristics



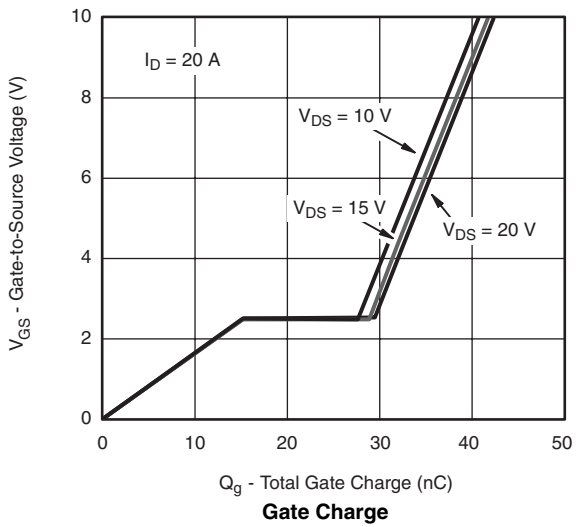
Transfer Characteristics



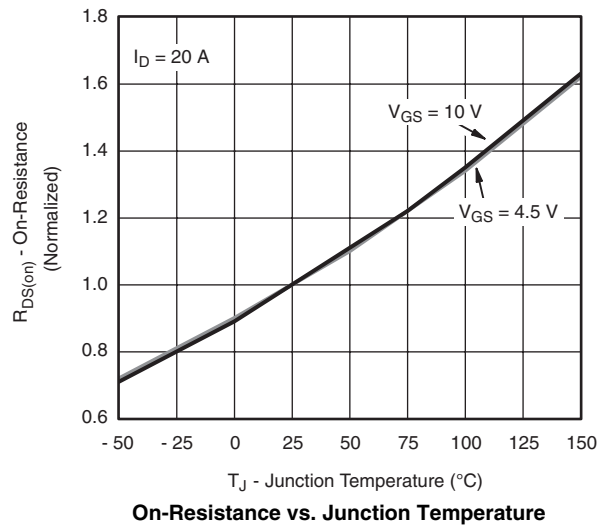
On-Resistance vs. Drain Current



Capacitance

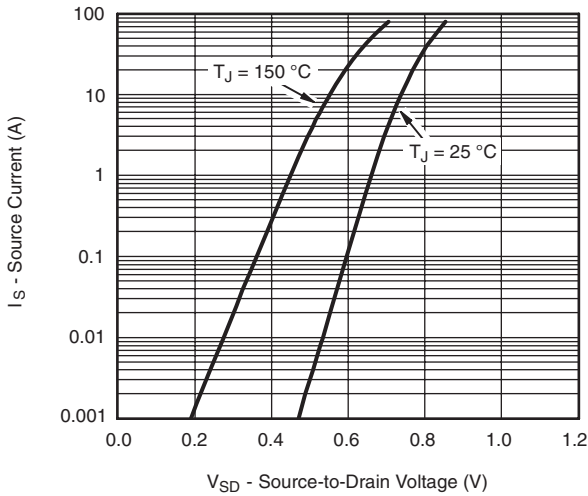


Gate Charge

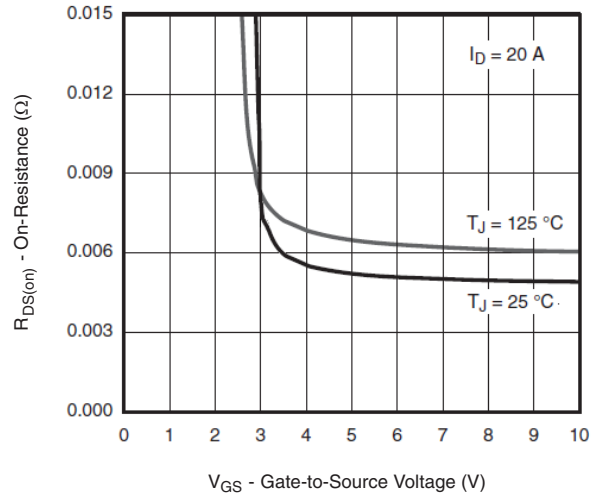


On-Resistance vs. Junction Temperature

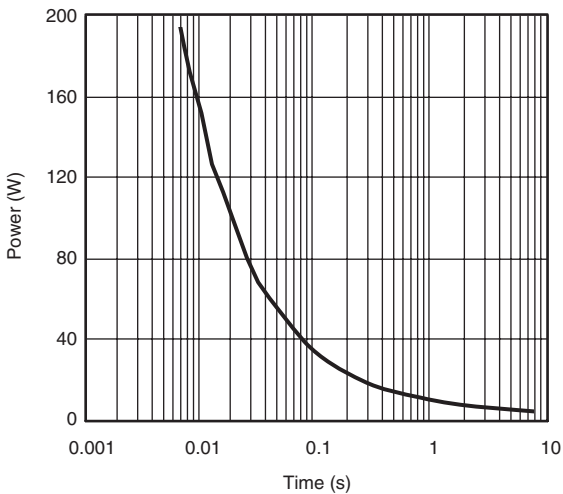
Characteristics Curve



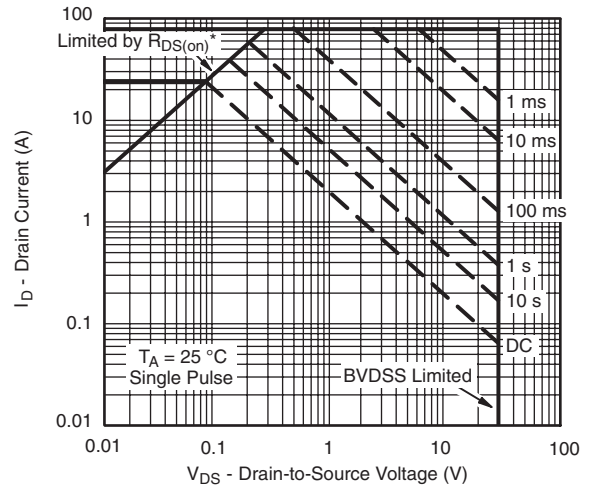
Source-Drain Diode Forward Voltage



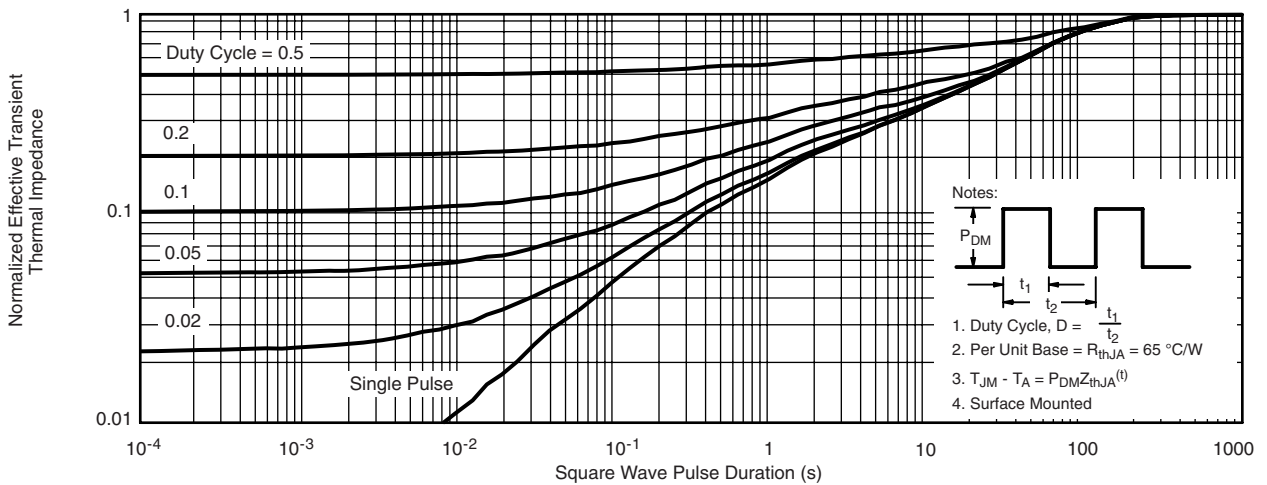
On-Resistance vs. Gate-to-Source Voltage



Single Pulse Power, Junction-to-Ambient

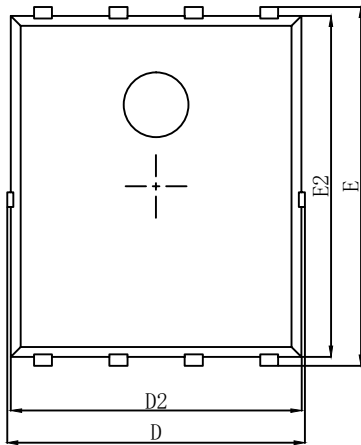


Safe Operating Area, Junction-to-Ambient

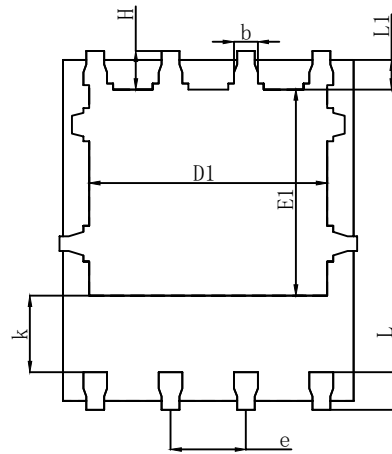


Normalized Thermal Transient Impedance, Junction-to-Ambient

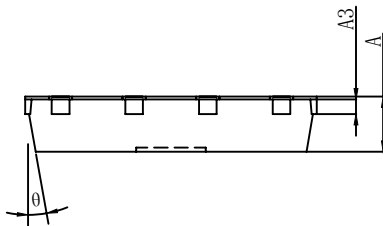
PDFNWB5×6-8L (P1. 27T0. 95) PACKAGE OUTLINE DIMENSIONS



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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