D2MNK3P4

80V N-Channel MOSFETs

Pb RoHS

| BV$_{DSS}$	R$_{DS(ON)}$	I$_D$
80 V	3.4 mΩ	165 A

General Description

These N-Channel enhancement mode power field effect transistors are using trench MOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

Features

· R$_{DS(ON)}$ ≦ 3.4mΩ@V$_{GS}$=10V
· Fast Switching
· Green Device Available

TO-263 Pin Configuration
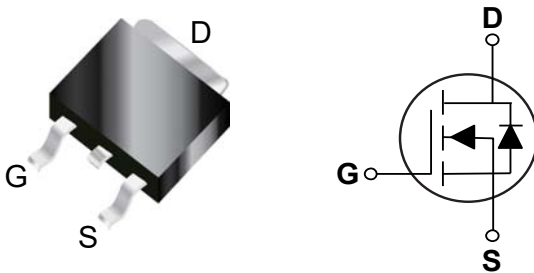
Applications

· Networking
· Load Switch
· LED Applications
· Quick Charger

Absolute Maximum Ratings T$_C$=25°C unless otherwise noted

Symbol	Parameter	Rating	Units
V$_{DS}$	Drain-Source Voltage	80	V
V$_{GS}$	Gate-Source Voltage	±20	V
I$_D$	Drain Current – Continuous (T$_C$=25°C)	165	A
I$_{DM}$	Drain Current – Pulsed (NOTE 1)	660	A
EAS	Single Pulse Avalanche Energy (NOTE 2)	520	mJ
P$_D$	Power Dissipation (T$_C$=25°C)	240	W
T$_J$	Operating Junction Temperature Range	-55 to 150	^{o}C
T$_{STG}$	Storage Temperature Range	-55 to 150	^{o}C
Marking Code		NK3P4	

Thermal Characteristics

Symbol	Parameter	Rating	Unit
R$_{θJA}$	Thermal Resistance Junction to Ambient	62	^{o}C/W
R$_{θJC}$	Thermal Resistance Junction to Case	0.52	^{o}C/W

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Electrical Characteristics (T$_J$=25°C, unless otherwise noted)

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV$_{DSS}$	Drain-Source Breakdown Voltage	V$_{GS}$=0V , I$_D$=250uA	80	---	---	V
I$_{DSS}$	Drain-Source Leakage Current	V$_{DS}$=80V , V$_{GS}$=0V	---	---	1	uA
I$_{GSS}$	Gate-Source Leakage Current	V$_{GS}$=±20V , V$_{DS}$=0V	---	---	±100	nA

On Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
R$_{DS(ON)}$	Static Drain-Source On-Resistance	V$_{GS}$=10V , I$_D$=20A	---	---	3.4	mΩ
V$_{GS(th)}$	Gate Threshold Voltage	V$_{GS}$=V$_{DS}$, I$_D$=250uA	2	---	4	V
gfs	Forward Transconductance	V$_{DS}$=10V , I$_D$=3A	---	13	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q$_g$	Total Gate Charge	V$_{DS}$=40V , V$_{GS}$=10V , I$_D$=80A	---	68	---	nC
Q$_{gs}$	Gate-Source Charge		---	19	---	
Q$_{gd}$	Gate-Drain Charge		---	20	---	
T$_{d(on)}$	Turn-On Delay Time	V$_{DD}$=40V , R$_G$=6Ω , I$_D$=80A , V$_{GS}$=10V	---	30	---	nS
T$_r$	Rise Time		---	25	---	
T$_{d(off)}$	Turn-Off Delay Time		---	45	---	
T$_f$	Fall Time		---	25	---	
C$_{iss}$	Input Capacitance	V$_{DS}$=40V , V$_{GS}$=0V , F=1MHz	---	4600	---	pF
C$_{oss}$	Output Capacitance		---	990	---	
C$_{rss}$	Reverse Transfer Capacitance		---	16	---	
R$_g$	Gate Resistance	V$_{DS}$=0V , V$_{GS}$=0V , F=1MHz	---	1.8	---	Ω

Drain-Source Diode Characteristics and Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I$_S$	Continuous Body Diode Current	V$_G$=V$_D$=0V , Force Current	---	---	165	A
V$_{SD}$	Diode Forward Voltage	V$_{GS}$=0V , I$_S$=1A	---	---	1	V
t$_{rr}$	Reverse Recovery Time	V$_R$=50V , I$_S$=10A , dI$_F$/dt=100A/us	---	70	---	nS
Q$_{rr}$	Reverse Recovery Charge		---	160	---	nC

NOTES：

1. Repetitive Rating：Pulsed width limited by maximum junction temperature.

2. V$_{DD}$=50V, L=0.1mH, I$_{AS}$=102A, V$_{GS}$=10V.

3. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.

4. Essentially independent of operating temperature.

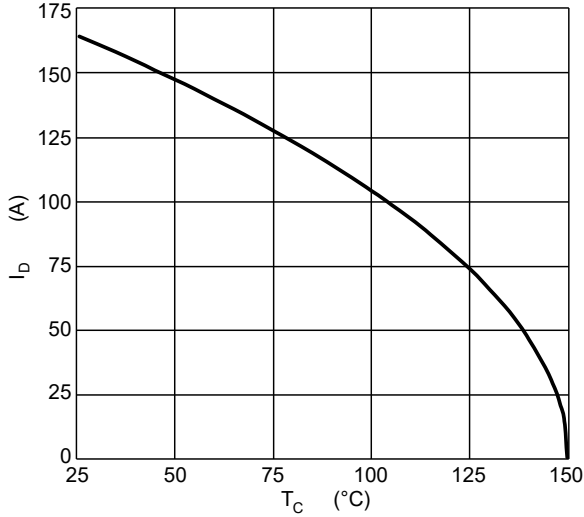## Characteristics Curves

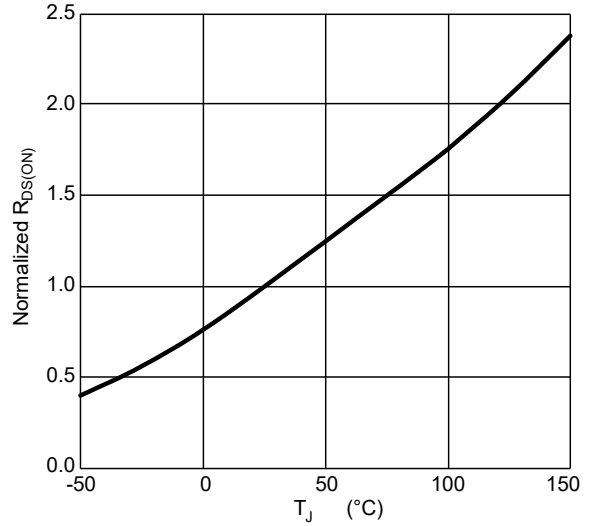FIG. 1- I_D vs. T_C

FIG. 2- Normalized $R_{DS(ON)}$ vs. T_J
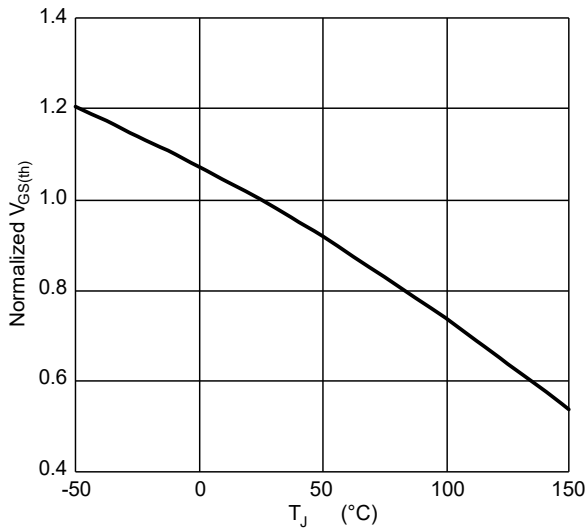

FIG. 3- Normalized $V_{GS(th)}$ vs. T_J

FIG. 4-Gate Charge Characteristics

ID=80A
VDS=40V

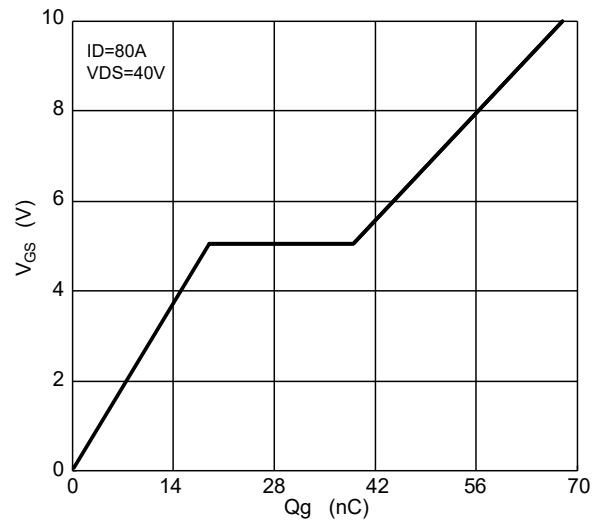FIG. 5- Normalized Transient Impedance

SINGLE PULSE

NOTES :
DUTY FACTOR : D = t1 / t2
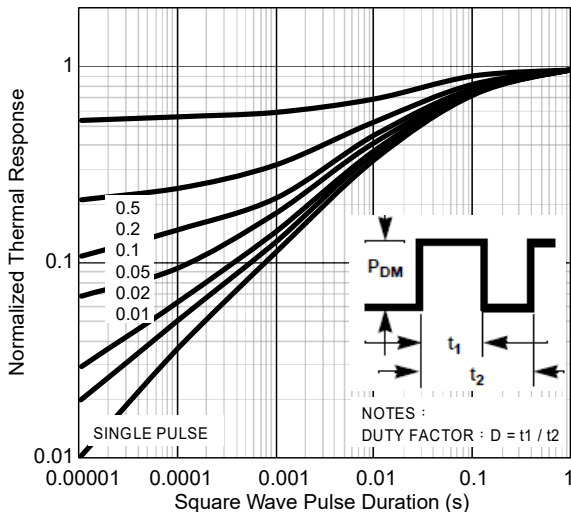
FIG. 6-Safe Operation Area

10us
100us
1ms
10ms
100ms
DC

T_c=25℃
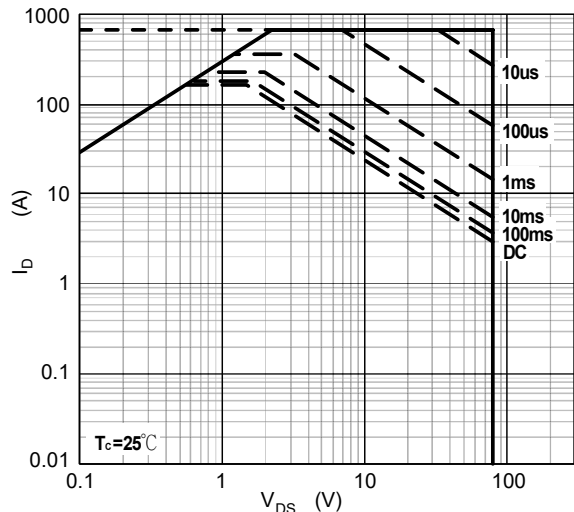
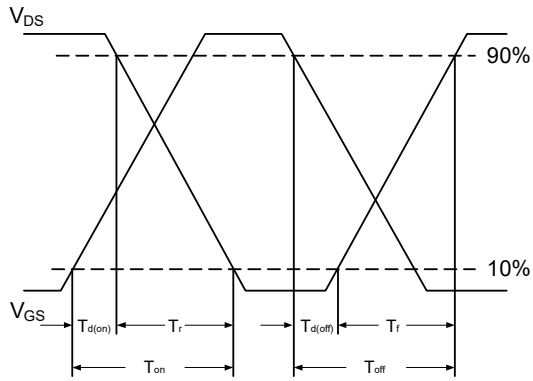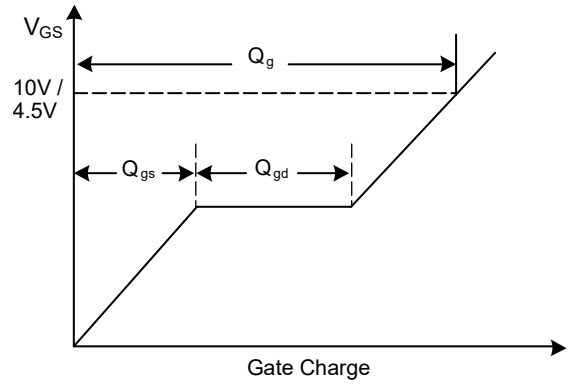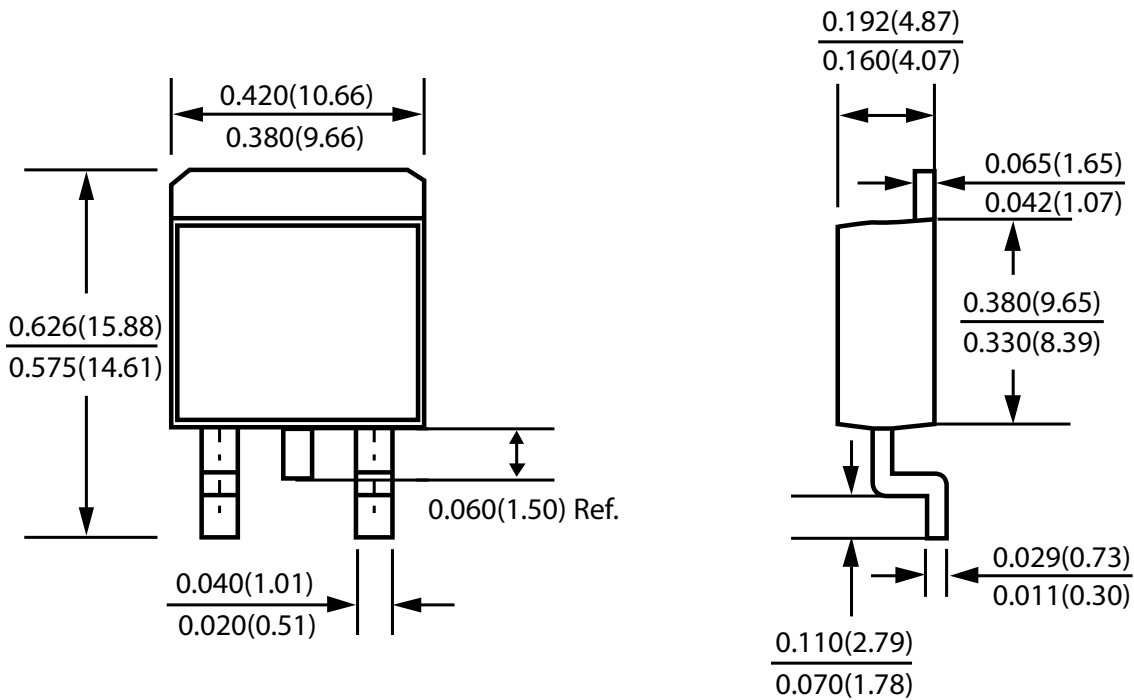## Characteristics Curves

FIG. 7- Switching Time Waveform

FIG. 8- Gate Charge Waveform

Package Outline Dimensions

TO-263

Dimensions in inches and (millimeters)

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