



120V N-Channel MOSFETs

General Description

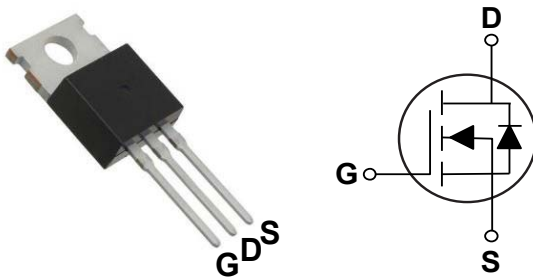
These N-Channel enhancement mode power field effect transistors are using trench MOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BV_{DSS}	$R_{DS(ON)}$	I_D
120 V	7.2 m Ω	125 A

Features

- $R_{DS(ON)} \leq 7.2m\Omega @ V_{GS}=10V$
- Fast Switching
- Green Device Available

TO-220 Pin Configuration



Applications

- DC/DC Converter
- Power Management Switches
- Synchronous Rectification in SMPS

Absolute Maximum Ratings $T_C=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	120	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Drain Current – Continuous ($T_C=25^\circ\text{C}$)	125	A
I_{DM}	Drain Current – Pulsed (NOTE 1)	500	A
EAS	Single Pulse Avalanche Energy (NOTE 2)	461	mJ
P_D	Power Dissipation ($T_C=25^\circ\text{C}$)	225	W
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
Marking Code		NN7P2	

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	52	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction to Case	0.555	$^\circ\text{C/W}$

Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	120	---	---	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=120V, V_{GS}=0V$	---	---	1	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA

On Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10V, I_D=20A$	---	---	7.2	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	2	---	4	V

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q_g	Total Gate Charge	$V_{DD}=60V, V_{GS}=10V, I_D=20A$	---	43	---	nC
Q_{gs}	Gate-Source Charge		---	7.7	---	
Q_{gd}	Gate-Drain Charge		---	6.7	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=60V, R_G=3\Omega, I_D=20A, V_{GS}=10V$	---	14.3	---	nS
T_r	Rise Time		---	7.8	---	
$T_{d(off)}$	Turn-Off Delay Time		---	29	---	
T_f	Fall Time		---	8.6	---	
C_{iss}	Input Capacitance	$V_{DS}=60V, V_{GS}=0V, F=1MHz$	---	3600	---	pF
C_{oss}	Output Capacitance		---	530	---	
C_{riss}	Reverse Transfer Capacitance		---	19	---	
R_g	Gate Resistance	$V_{DS}=0V, V_{GS}=0V, F=1MHz$	---	2.4	---	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	---	---	125	A
V_{SD}	Diode Forward Voltage	$V_{GS}=0V, I_S=20A$	---	---	1.2	V
t_{rr}	Reverse Recovery Time	$V_R=60V, I_F=20A$,	---	46	---	nS
Q_{rr}	Reverse Recovery Charge	$dI_F/dt=500A/\mu s$	---	278	---	nC

NOTES :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The EAS data shows Max. rating .The test condition is $V_{DD}=50V, L=0.4mH, V_{GS}=10V, I_{AS}=48A$.
3. The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.



Characteristics Curves

FIG. 1-Transfer Characteristics

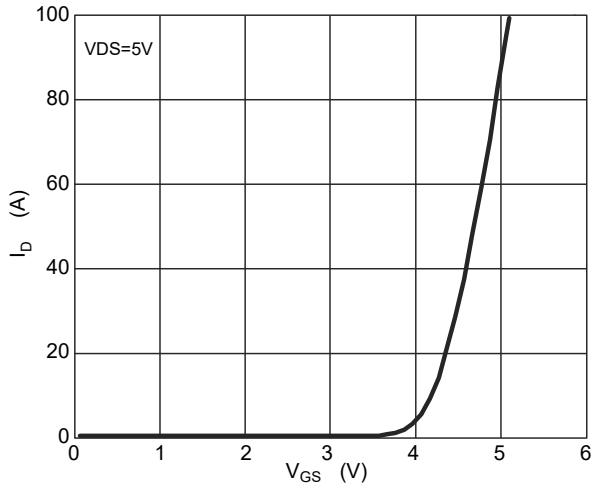


FIG. 2- I_S vs V_{SD}

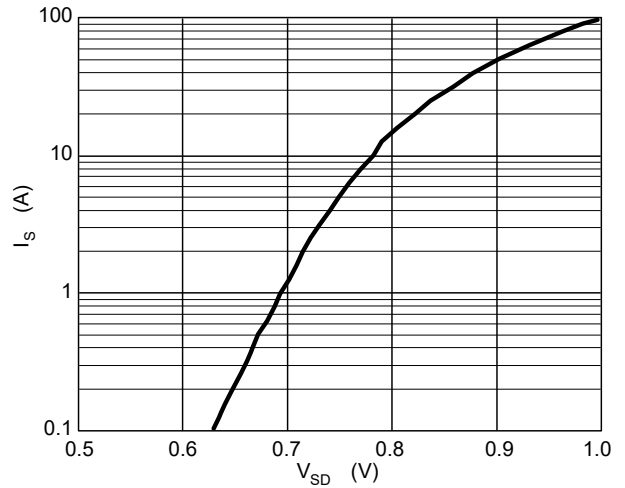


FIG. 3- $R_{DS(on)}$ vs I_D

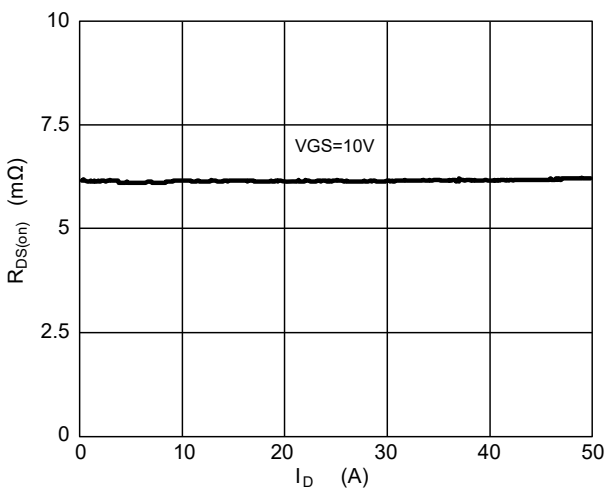


FIG. 4-Normalized $R_{DS(on)}$ vs T_J

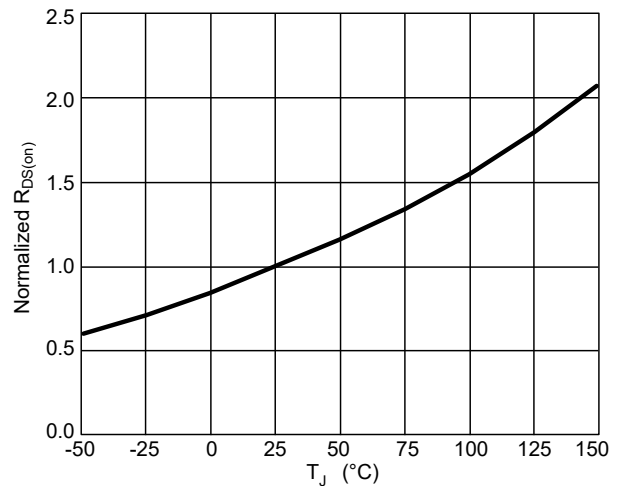


FIG. 5-Gate Charge Characteristics

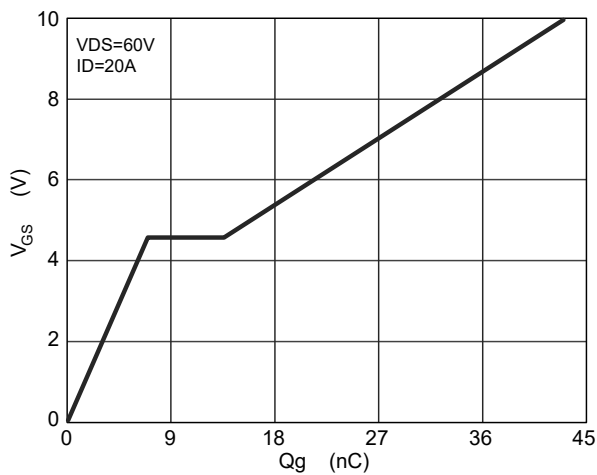
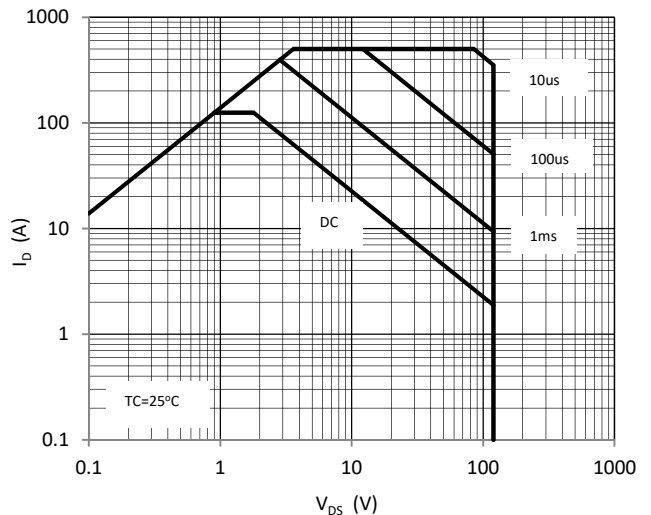


FIG. 6-Switching Time Waveform





Characteristics Curves

FIG. 7-Normalized Maximum Transient Thermal Impedance

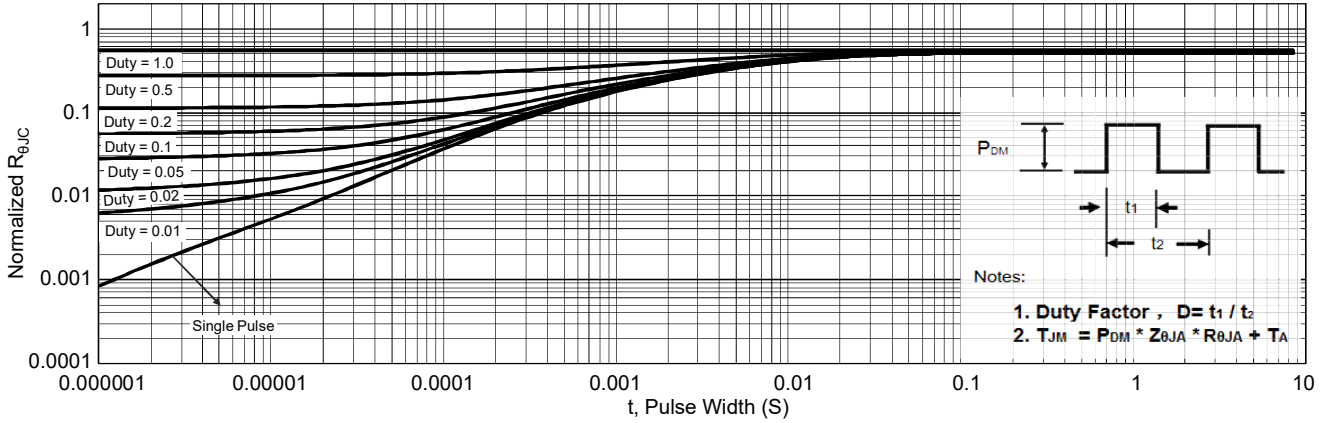


FIG. 8- Switching Time Waveform

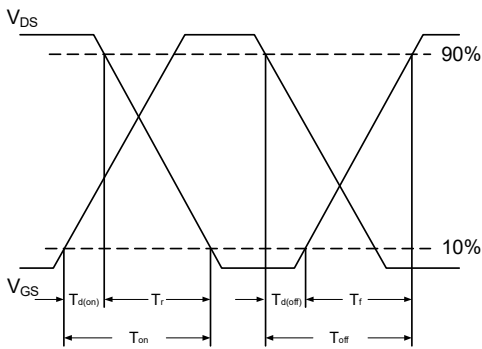
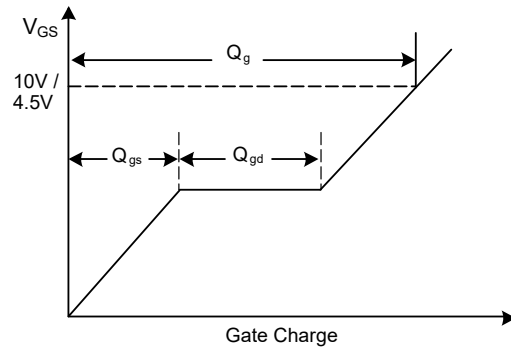
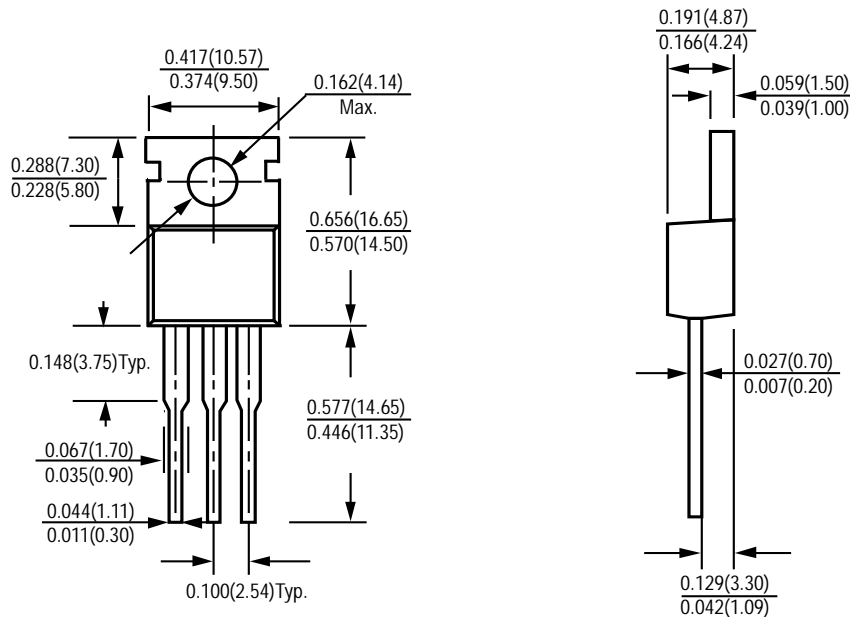


FIG. 9- Gate Charge Waveform



Package Outline Dimensions



TO-220

Dimensions in inches and (millimeters)



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