



250V N-Channel MOSFETs

General Description

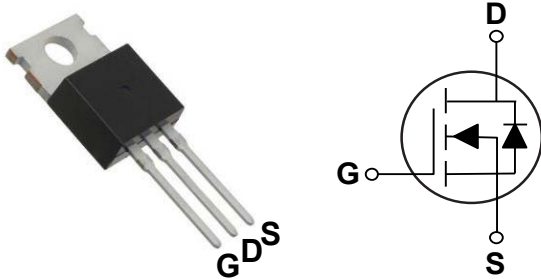
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BV_{DSS}	$R_{DS(ON)}$	I_D
250 V	33 mΩ	60 A

Features

- $R_{DS(ON)} \leq 33m\Omega @ V_{GS}=10V$
- Improved dv/dt Capability
- Fast Switching
- Green Device Available

TO-220 Pin Configuration



Applications

- UPS
- BLDC

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	250	V
V_{GS}	Gate-Source Voltage	± 30	V
I_D	Drain Current – Continuous ($T_A=25^\circ C$)	60	A
I_{DM}	Drain Current – Pulsed (NOTE 1)	230	A
EAS	Single Pulse Avalanche Energy (NOTE 2)	300	mJ
P_D	Power Dissipation ($T_C=25^\circ C$)	125	W
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
Marking Code		NT033	

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	60	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction to Case	1	$^\circ C/W$

**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	250	---	---	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =250V, 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 =35A	---	---	33	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	3.6	---	5.0	V

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q _g	Total Gate Charge	V _{DD} =100V, V _{GS} =10V, I _D =35A	---	200	---	nC
Q _{gs}	Gate-Source Charge		---	28	---	
Q _{gd}	Gate-Drain Charge		---	60	---	
T _{d(on)}	Turn-On Delay Time	V _{DS} =50V, R _G =2.5Ω, I _D =35A, V _{GS} =10V	---	45	---	nS
T _r	Rise Time		---	70	---	
T _{d(off)}	Turn-Off Delay Time		---	110	---	
T _f	Fall Time		---	90	---	
C _{iss}	Input Capacitance	V _{DS} =25V, V _{GS} =0V, F=1MHz	---	7000	---	pF
C _{oss}	Output Capacitance		---	480	---	
C _{rss}	Reverse Transfer Capacitance		---	210	---	

Drain-Source Diode Characteristics and Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Body Diode Current		---	---	58	A
I _{SM}	Pulsed Diode Forward Current		---	---	230	A
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =35A	---	---	1.2	V
t _{rr}	Reverse Recovery Time	V _{GS} =0V, I _S =30A, V _{DD} =50V,	---	120	---	nS
Q _{rr}	Reverse Recovery Charge	di _F /dt=100A/us	---	0.55	---	uC

NOTES :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=50V, I_{AS}=35A, R_G=25Ω, 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_A

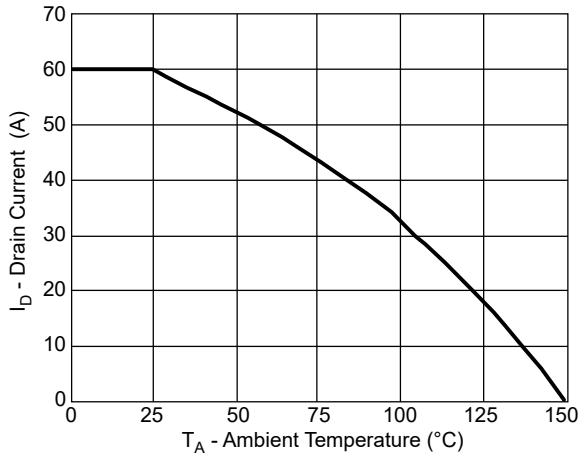


FIG. 2- Normalized BV_{DSS} vs. T_J

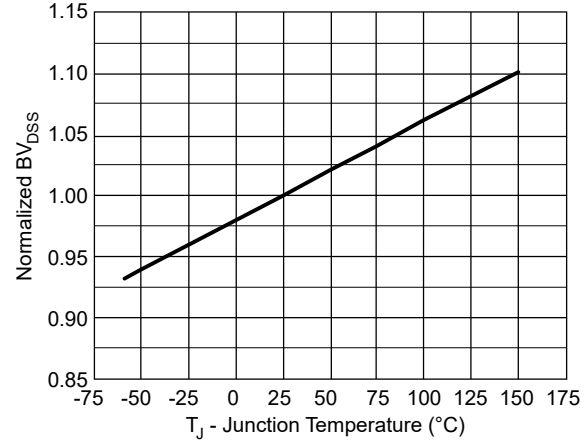


FIG. 3- Normalized $R_{DS(ON)}$ vs. T_J

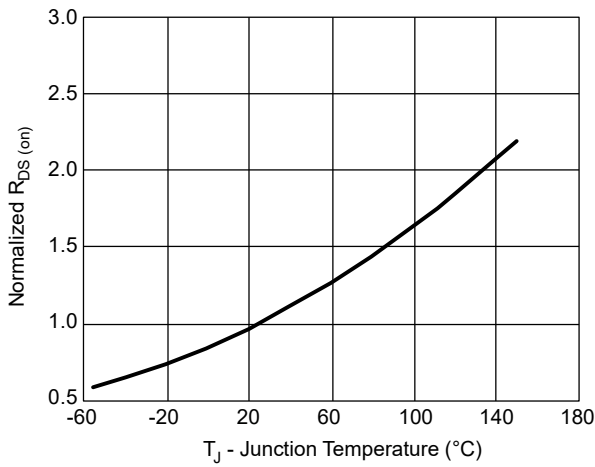


FIG. 4- Gate Charge Characteristics

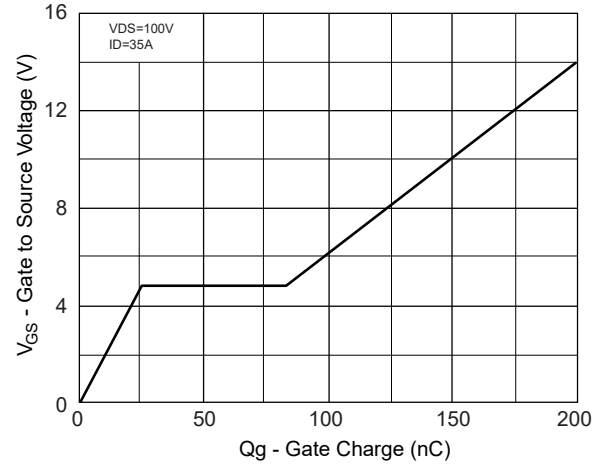


FIG. 5- Drain-Source Diode Forward

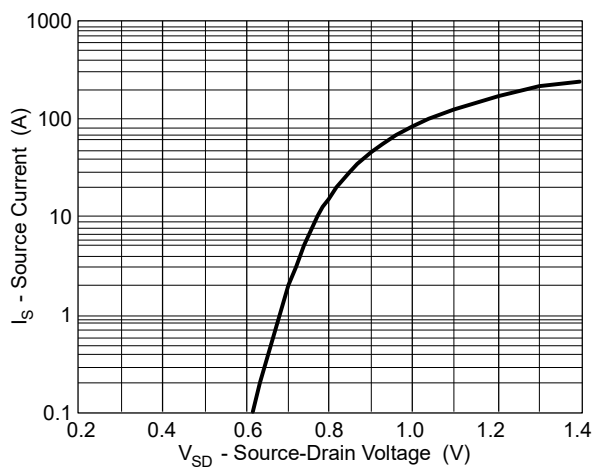
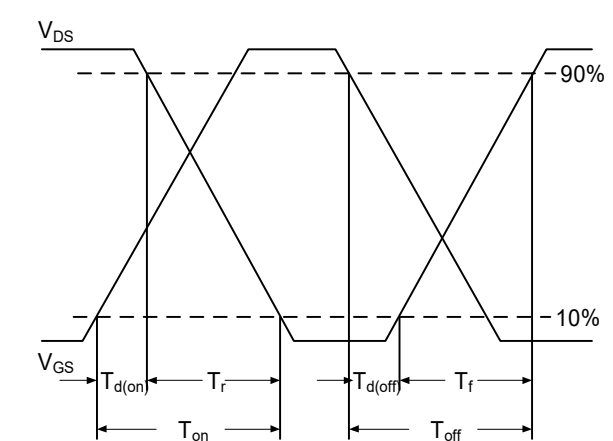


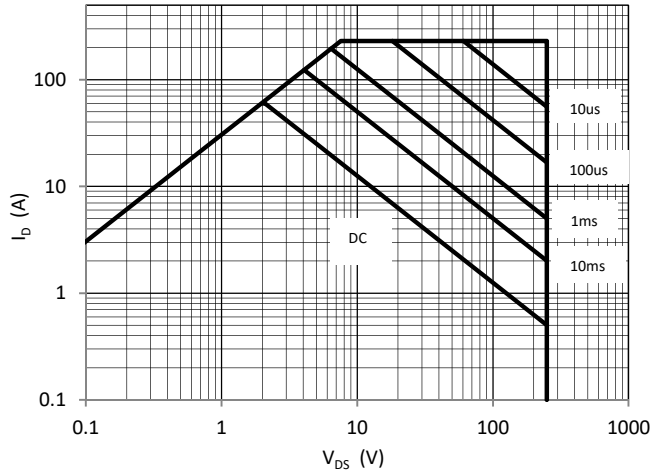
FIG. 6- Switching Time Waveform



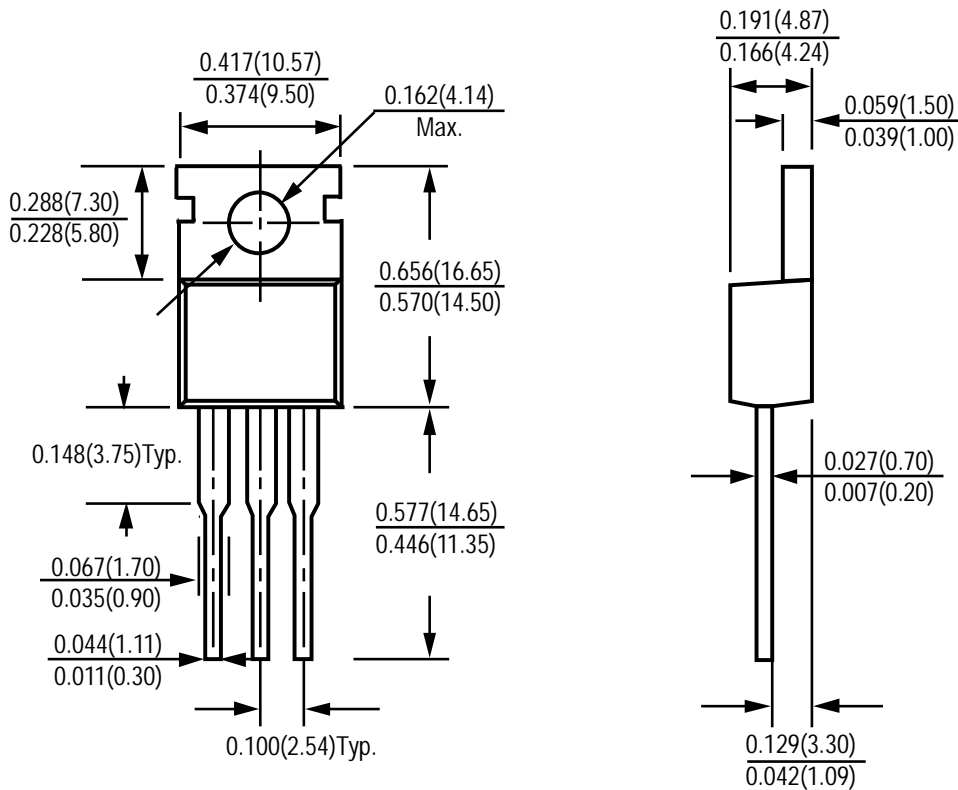


Characteristics Curves

FIG. 7- Safe Operation Area



Package Outline Dimensions



TO-220

Dimensions in inches and (millimeters)



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