



# 200V N-Channel MOSFETs

### General Description

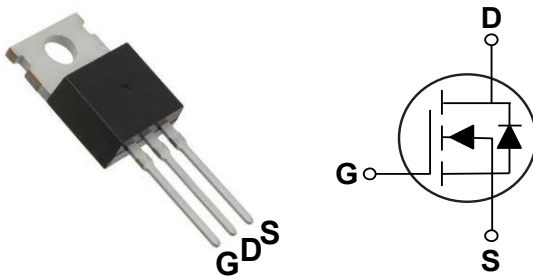
These N-Channel enhancement mode power field effect transistors are using trench MOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BV <sub>DSS</sub>	R <sub>DS(ON)</sub>	I <sub>D</sub>
200 V	85 mΩ	28 A

### Features

- R<sub>DS(ON)</sub> ≤ 85mΩ@V<sub>GS</sub>=10V
- Fast Switching
- Green Device Available

TO-220 Pin Configuration



### Applications

- UPS
- Synchronous Rectification
- Automotive
- Isolated DC/DC Converters in Telecom and Industrial

### Absolute Maximum Ratings T<sub>C</sub>=25°C unless otherwise noted

Symbol	Parameter	Rating	Units
V <sub>DS</sub>	Drain-Source Voltage	200	V
V <sub>GS</sub>	Gate-Source Voltage	±30	V
I <sub>D</sub>	Drain Current – Continuous (T <sub>C</sub> =25°C)	28	A
I <sub>DM</sub>	Drain Current – Pulsed (NOTE 1)	112	A
EAS	Single Pulse Avalanche Energy (NOTE 2)	39.2	mJ
P <sub>D</sub>	Power Dissipation (T <sub>C</sub> =25°C)	208	W
T <sub>J</sub>	Operating Junction Temperature Range	-55 to 150	°C
T <sub>STG</sub>	Storage Temperature Range	-55 to 150	°C
Marking Code		NS085	

### Thermal Characteristics

Symbol	Parameter	Rating	Unit
R <sub>θJA</sub>	Thermal Resistance Junction to Ambient	62.5	°C/W
R <sub>θJC</sub>	Thermal Resistance Junction to Case	0.6	°C/W

**Electrical Characteristics (T<sub>J</sub>=25°C, unless otherwise noted)****Off Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	200	---	---	V
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =200V, V <sub>GS</sub> =0V	---	---	10	uA
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> =±30V, V <sub>DS</sub> =0V	---	---	±100	nA

**On Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =28A	---	---	85	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	3.5	---	5.5	V

**Dynamic and switching Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =100V, V <sub>GS</sub> =10V, I <sub>D</sub> =14A	---	52	---	nC
Q <sub>gs</sub>	Gate-Source Charge		---	22	---	
Q <sub>gd</sub>	Gate-Drain Charge		---	19	---	
T <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DD</sub> =100V, R <sub>G</sub> =25Ω, I <sub>D</sub> =14A, V <sub>GS</sub> =10V	---	58	---	nS
T <sub>r</sub>	Rise Time		---	104	---	
T <sub>d(off)</sub>	Turn-Off Delay Time		---	74	---	
T <sub>f</sub>	Fall Time		---	58	---	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, F=1MHz	---	3000	---	pF
C <sub>oss</sub>	Output Capacitance		---	240	---	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	90	---	
R <sub>g</sub>	Gate Resistance	V <sub>DS</sub> =0V, V <sub>GS</sub> =0V, F=1MHz	---	1.4	---	Ω

**Drain-Source Diode Characteristics and Ratings**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I <sub>S</sub>	Continuous Body Diode Current		---	---	28	A
I <sub>SM</sub>	Pulsed Diode Forward Current		---	---	112	A
V <sub>SD</sub>	Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =28A	---	---	1.2	V

**NOTES :**

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The EAS data shows Max. rating .The test condition is V<sub>DD</sub>=25V, L=0.1mH, R<sub>G</sub>=25Ω, I<sub>AS</sub>=28A.
3. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.



Characteristics Curves

FIG. 1-  $I_D$  vs.  $T_C$

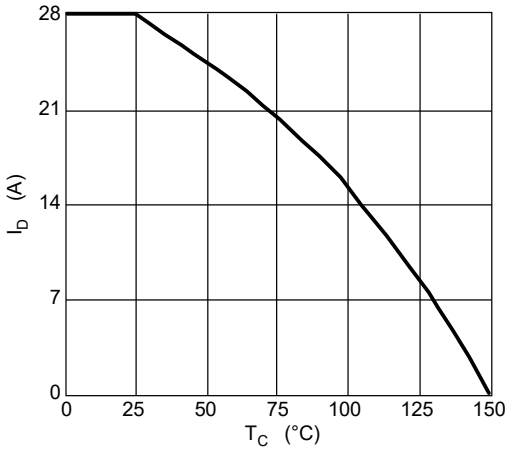


FIG. 2- Normalized  $R_{DS(ON)}$  vs.  $T_J$

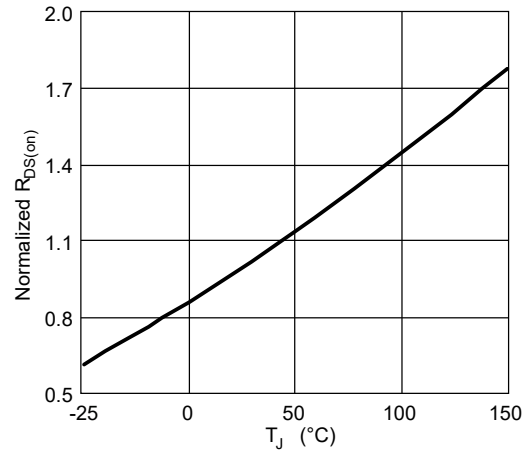


FIG. 3- Normalized  $V_{GS(th)}$  vs.  $T_J$

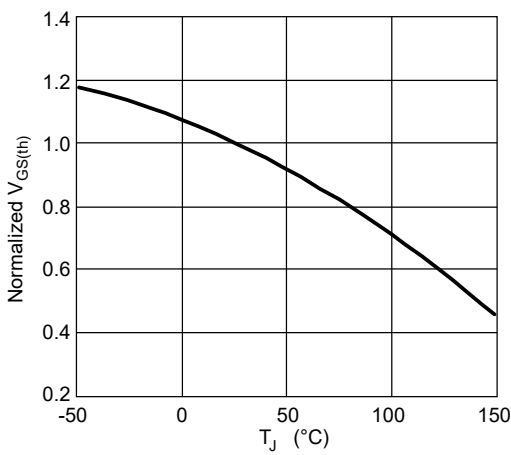


FIG. 4- Gate Charge Characteristics

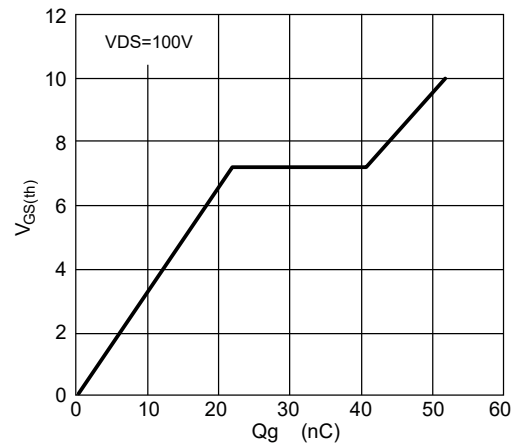


FIG. 5- Switching Time Waveform

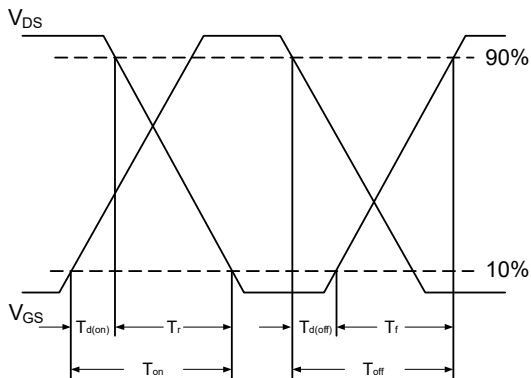
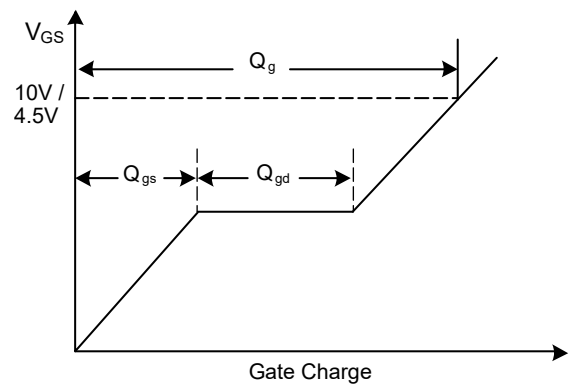
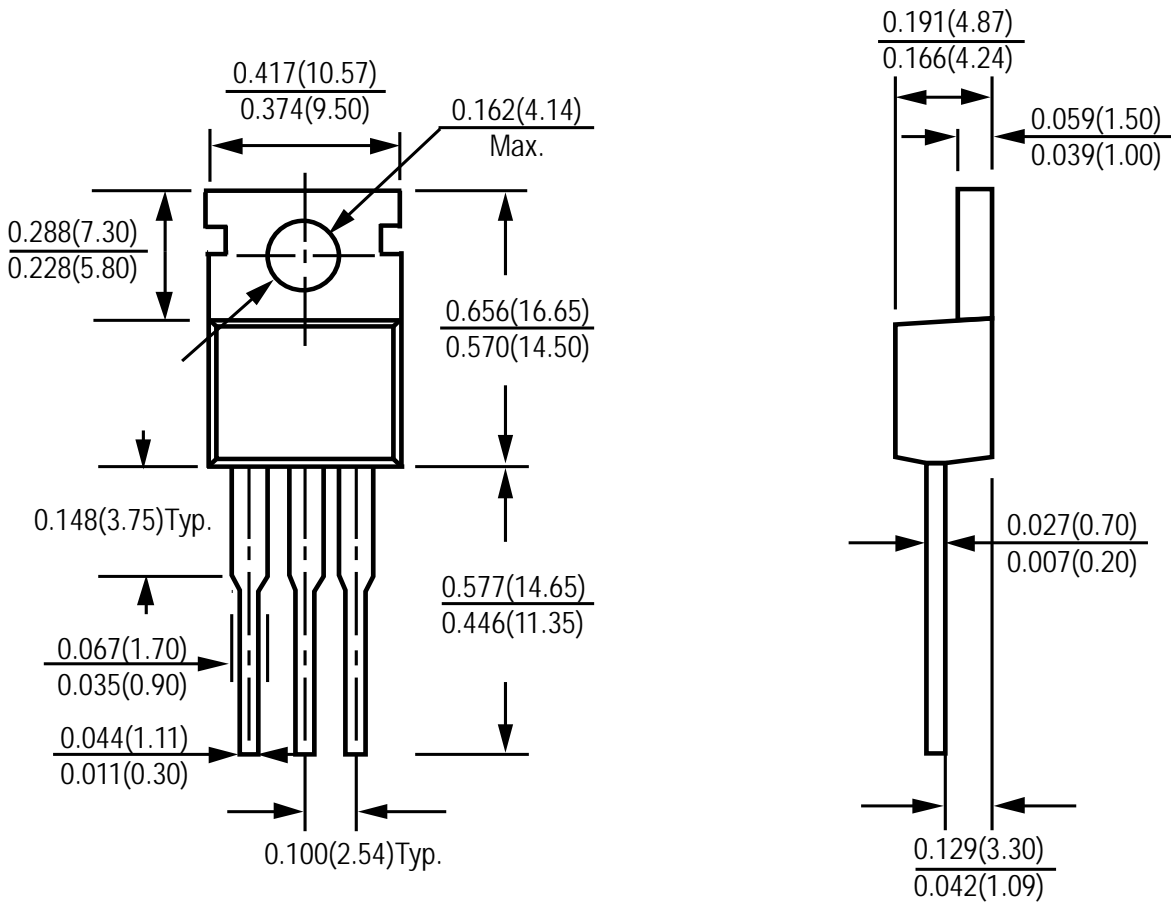


FIG. 6- Gate Charge Waveform





Package Outline Dimensions



TO-220

Dimensions in inches and (millimeters)



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