



General Description

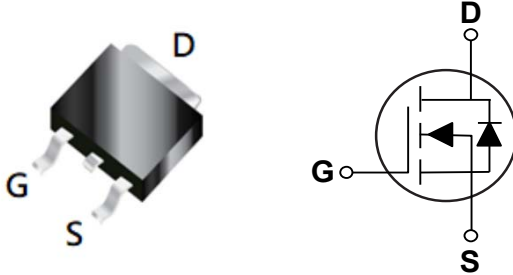
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BV_{DSS}	$R_{DS(ON)}$	I_D
150 V	105 m Ω	20 A

Features

- $R_{DS(ON)} \leq 105m\Omega @ V_{GS}=10V$
- Improved dv/dt Capability
- Fast Switching
- Green Device Available

TO-252 Pin Configuration



Applications

- Battery Protection
- Load Switch
- Uninterruptible Power Supply

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	150	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Drain Current - Continuous ($T_C=25^\circ\text{C}$)	20	A
I_{DM}	Drain Current - Pulsed (NOTE 1)	40	A
EAS	Single Pulse Avalanche Energy (NOTE 2)	48.6	mJ
IAS	Single Pulse Avalanche Current (NOTE 2)	18	A
P_D	Power Dissipation ($T_C=25^\circ\text{C}$)	72.6	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		NP105	

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	60	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction to Case	1.72	$^\circ\text{C/W}$



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	150	---	---	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =120V, 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 =10A	---	---	105	mΩ
		V _{GS} =4.5V, I _D =10A	---	---	115	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.2	---	2.5	V
gfs	Forward Transconductance	V _{DS} =5V, I _D =10A	---	33	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q _g	Total Gate Charge	V _{DS} =75V, V _{GS} =4.5V, I _D =10A	---	25.1	---	nC
Q _{gs}	Gate-Source Charge		---	6.8	---	
Q _{gd}	Gate-Drain Charge		---	12.6	---	
T _{d(on)}	Turn-On Delay Time	V _{DS} =75V, V _{GS} =10V, R _G =3.3Ω, I _D =10A	---	13	---	nS
T _r	Rise Time		---	8.2	---	
T _{d(off)}	Turn-Off Delay Time		---	25	---	
T _f	Fall Time		---	11	---	
C _{iss}	Input Capacitance	V _{DS} =25V, V _{GS} =0V, f=1MHz	---	2285	---	pF
C _{oss}	Output Capacitance		---	110	---	
C _{rss}	Reverse Transfer Capacitance		---	83	---	

Drain-Source Diode Characteristics and Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current	V _G =V _D =0V, Force Current	---	---	20	A
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =1A	---	---	1.2	V
t _{rr}	Reverse Recovery Time	I _F =10A, dI/dt=100A/us	---	37	---	nS
Q _{rr}	Reverse Recovery Charge		---	263	---	nC

NOTES :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=25V, V_{GS}=10V, L=0.3mH, I_{AS}=18A.
3. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
4. The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation.



Characteristics Curves

FIG. 1-Normalized $R_{DS(ON)}$ vs. T_J

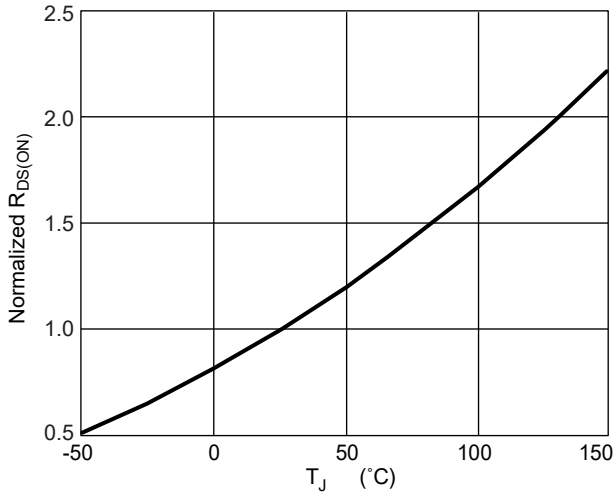


FIG. 2-Normalized $V_{GS(th)}$ vs. T_J

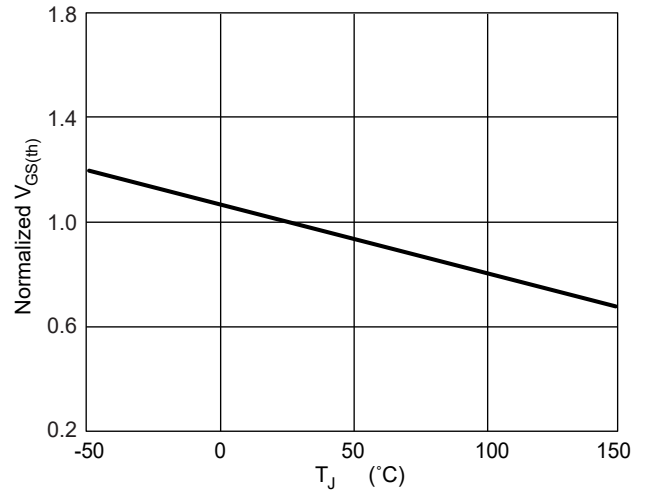


FIG. 3- $R_{DS(ON)}$ vs. V_{GS}

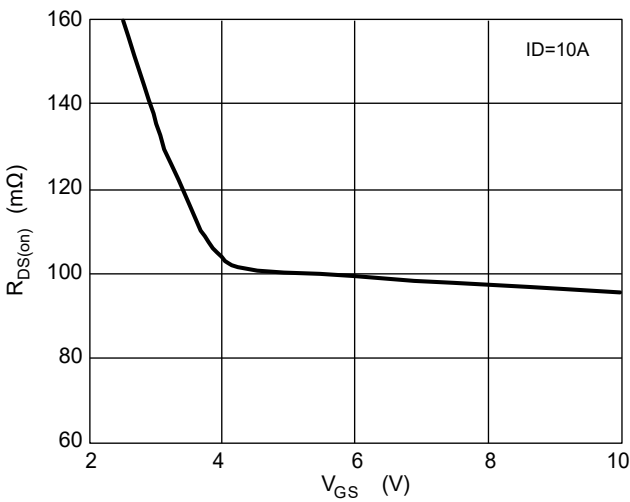


FIG. 4-Gate Charge Characteristics

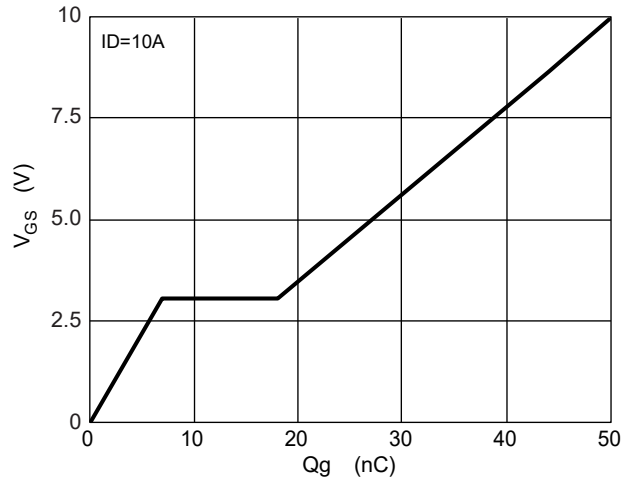


FIG. 5- I_S vs. V_{SD}

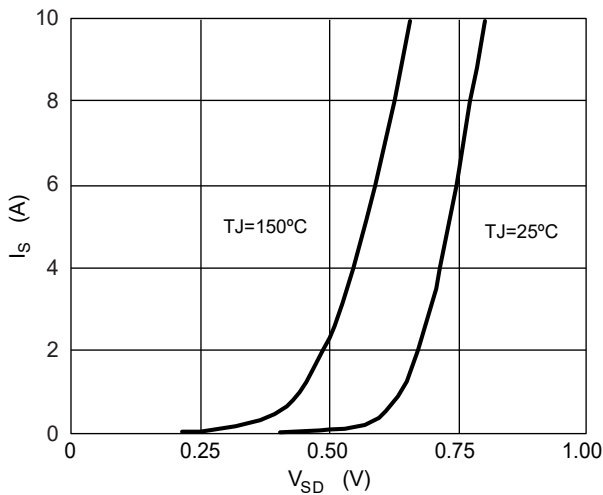
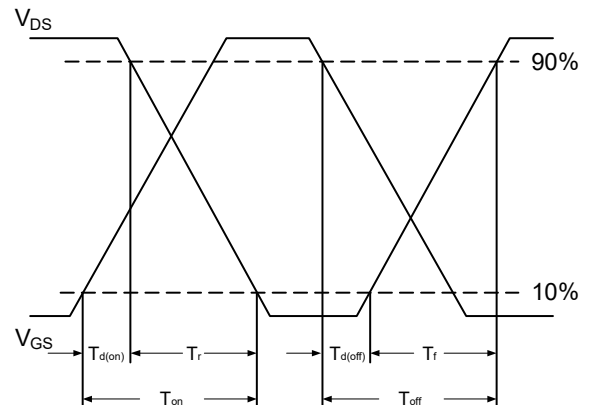


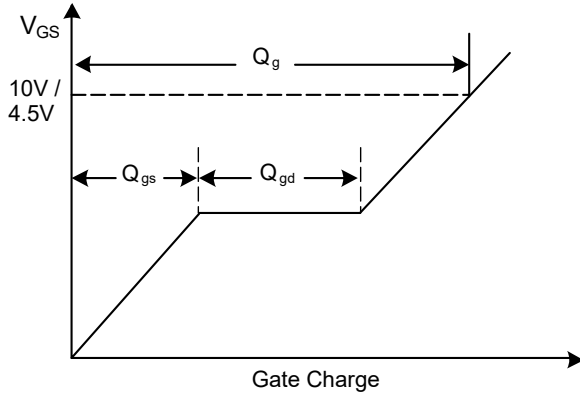
FIG. 6-Switching Time Waveform



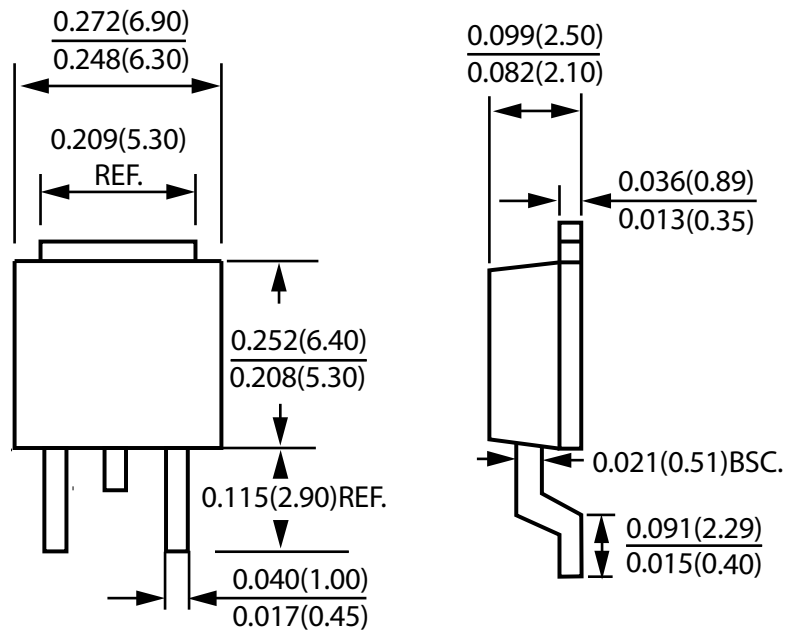


Characteristics Curves

FIG. 7-Gate Charge Waveform



Package Outline Dimensions



TO-252

Dimensions in inches and (millimeters)



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