



General Description

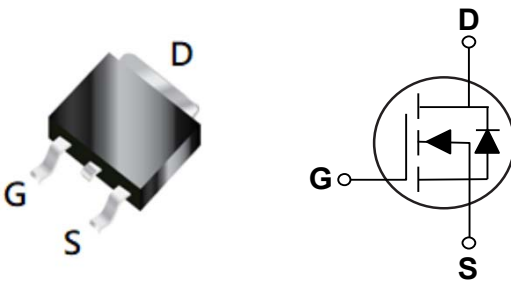
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BV_{DSS}	$R_{DS(ON)}$	I_D
30 V	5.1 m Ω	54 A

Features

- $R_{DS(ON)} \leq 5.1 m\Omega @ V_{GS}=10V$
- Improved dv/dt Capability
- Fast Switching
- Green Device Available

TO-252 Pin Configuration



Applications

- NB / VGA / V_{CORE}
- POL Applications
- SMPS 2nd SR

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Drain Current - Continuous ($T_C=25^\circ C$)	54	A
I_{DM}	Drain Current - Pulsed (NOTE 1)	112.5	A
E_{AS}	Single Pulse Avalanche Energy (NOTE 2)	31.25	mJ
I_{AS}	Single Pulse Avalanche Current (NOTE 2)	25	A
P_D	Power Dissipation ($T_C=25^\circ C$)	18.1	W
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
Marking Code		NC5P1	

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	---	50	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	6.9	$^\circ C/W$

**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	30	---	---	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =24V, 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 =8A	---	---	5.1	mΩ
		V _{GS} =4.5V, I _D =8A	---	---	11	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.0	---	2.5	V
g _{fs}	Forward Transconductance	V _{DS} =10V, I _D =8A	---	8.6	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q _g	Total Gate Charge	V _{DS} =10V, V _{GS} =10V, I _D =30A	---	40.8	---	nC
Q _{gs}	Gate-Source Charge		---	8.1	---	
Q _{gd}	Gate-Drain Charge		---	7.4	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} =10V, V _{GS} =10V, R _{GEN} =2.7Ω, I _D =30A	---	7.3	---	nS
T _r	Rise Time		---	75.3	---	
T _{d(off)}	Turn-Off Delay Time		---	36.6	---	
T _f	Fall Time		---	53	---	
C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V, f=1MHz	---	2117	---	pF
C _{oss}	Output Capacitance		---	324	---	
C _{rss}	Reverse Transfer Capacitance		---	223	---	
R _g	Gate Resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz	---	2.8	---	Ω

Drain-Source Diode Characteristics and Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =1A	---	---	1	V

NOTES :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=25A.
3. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
4. Essentially independent of operating temperature.



Characteristics Curves

FIG. 1-Continuous Drain Current vs. T_C

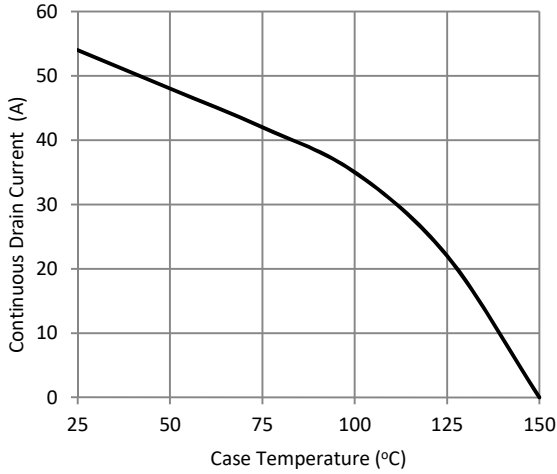


FIG. 2-Normalized $R_{DS(ON)}$ vs. T_J

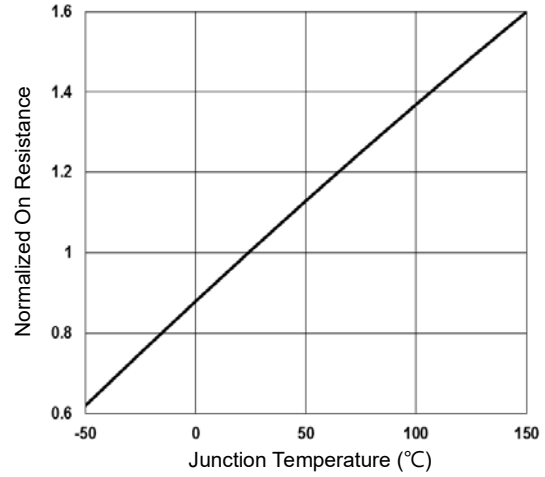


FIG. 3-Normalized V_{th} vs. T_C

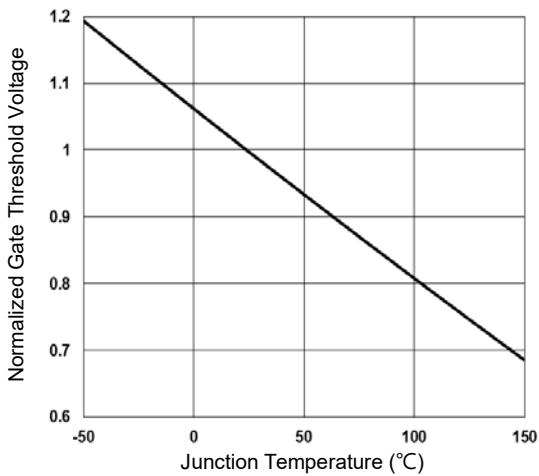


FIG. 4-Gate Charge Characteristics

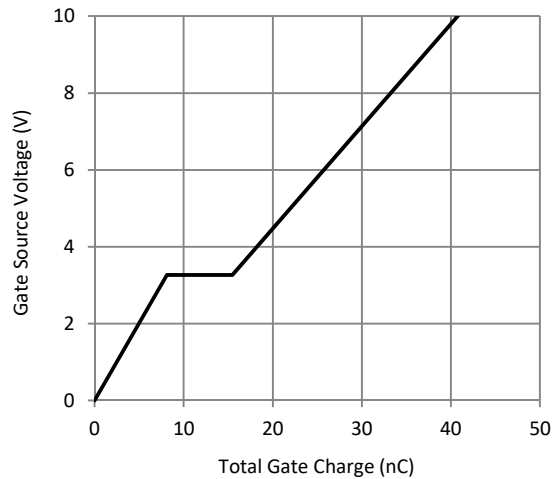


FIG. 5-Capacitance

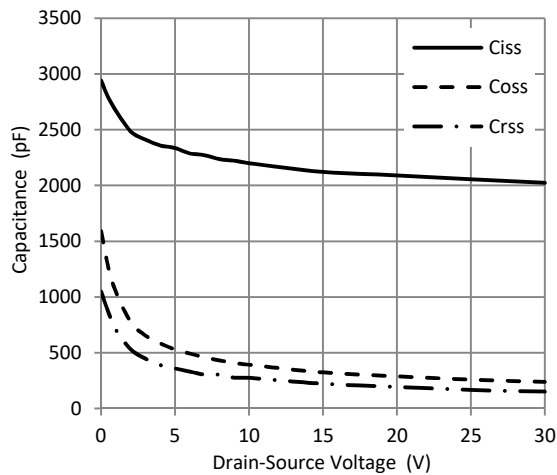
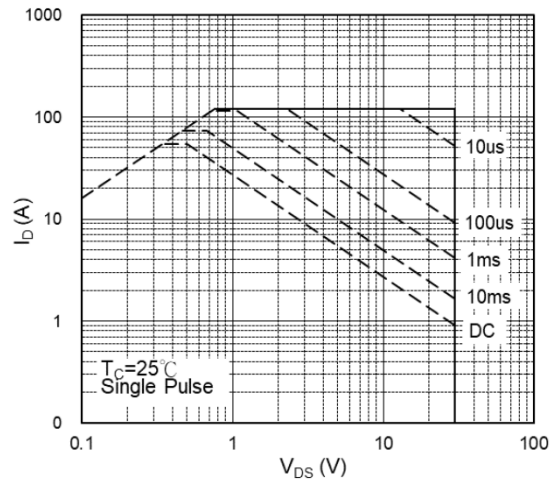


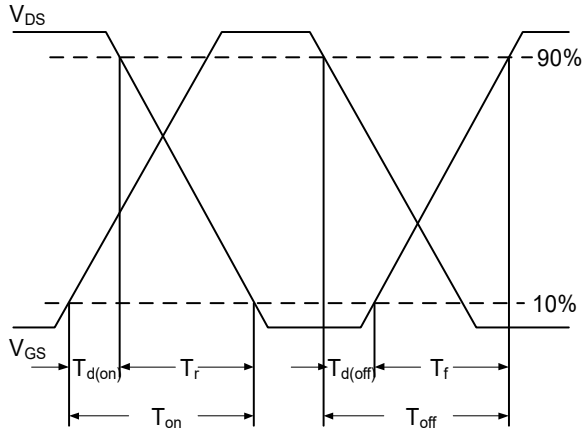
FIG. 6-Safe Operating Area



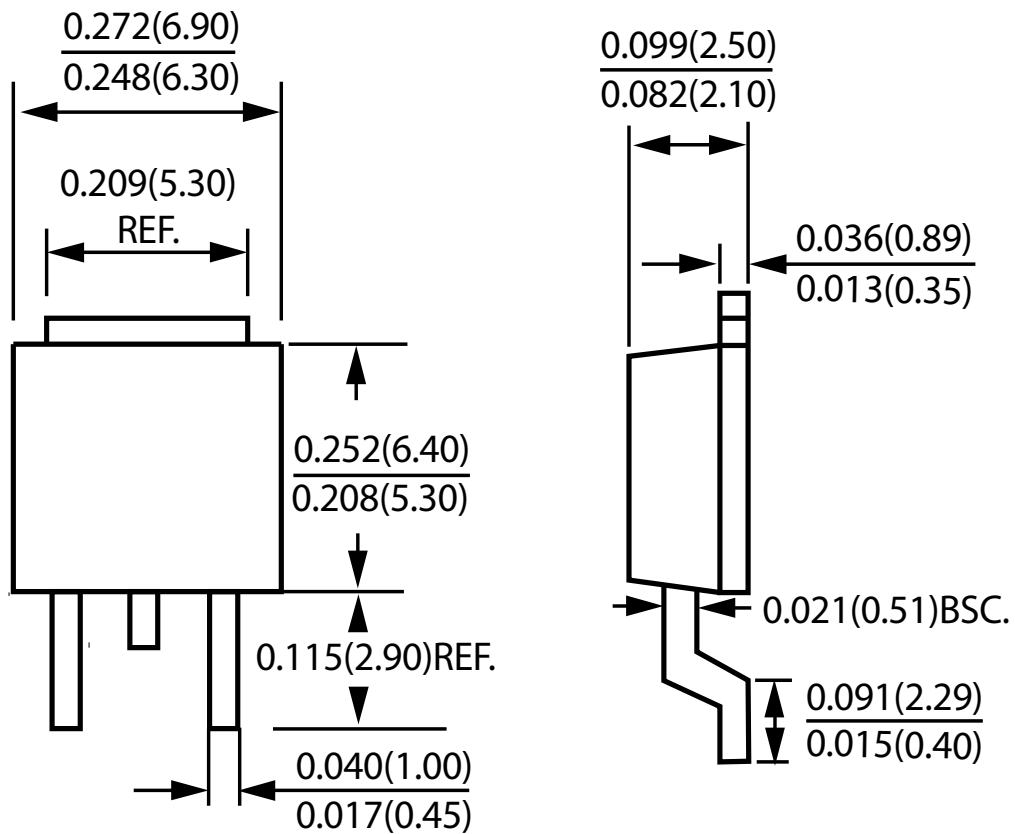


Characteristics Curves

FIG. 7-Switching Time Waveform



Package Outline Dimensions



TO-252

Dimensions in inches and (millimeters)



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