



General Description

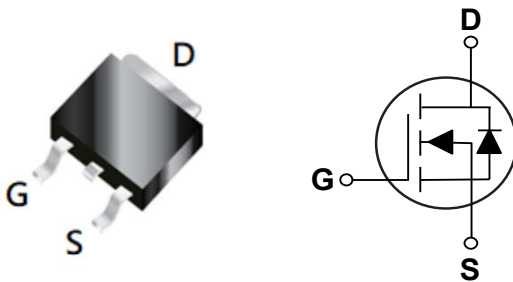
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BV_{DSS}	$R_{DS(ON)}$	I_D
150 V	52 m Ω	20 A

Features

- $R_{DS(ON)} \leq 52m\Omega @ V_{GS}=10V$
- Improved dv/dt Capability
- Fast Switching
- Green Device Available

TO-252 Pin Configuration



Applications

- Notebook
- Load Switch
- LED Applications
- Li Battery Pack Application

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
	Drain Current - Continuous ($T_C=100^\circ\text{C}$)	13	
I_{DM}	Drain Current - Pulsed (NOTE 1)	80	A
E_{AS}	Single Pulse Avalanche Energy (NOTE 2)	33	mJ
I_{AS}	Single Pulse Avalanche Current (NOTE 2)	26	A
P_D	Power Dissipation ($T_C=25^\circ\text{C}$)	76	W
	Power Dissipation – Derate above 25°C	0.61	
T_J	Operating Junction Temperature Range	-50 to 150	$^\circ\text{C}$
T_{STG}	Storage Temperature Range	-50 to 150	$^\circ\text{C}$
Marking Code		NP052	

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	---	62	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	1.64	$^\circ\text{C/W}$



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 =15A	---	---	52	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	2	3	4	V
gfs	Forward Transconductance	V _{DS} =10V, I _D =3A	---	7	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q _g	Total Gate Charge	V _{DS} =80V, V _{GS} =10V, I _D =10A (NOTE 3 · 4)	---	13.5	---	nC
Q _{gs}	Gate-Source Charge		---	3.3	---	
Q _{gd}	Gate-Drain Charge		---	4.3	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} =80V, V _{GS} =10V, R _G =6Ω, I _D =10A (NOTE 3 · 4)	---	4.6	---	nS
T _r	Rise Time		---	15	---	
T _{d(off)}	Turn-Off Delay Time		---	27	---	
T _f	Fall Time		---	8	---	
C _{iss}	Input Capacitance	V _{DS} =80V, V _{GS} =0V, f=1MHz	---	1050	---	pF
C _{oss}	Output Capacitance		---	80	---	
C _{rss}	Reverse Transfer Capacitance		---	6.5	---	
R _g	Gate Resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz	---	0.8	---	Ω

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
I _{SM}	Pulsed Source Current		---	---	40	A
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =1A	---	---	1	V
t _{rr}	Reverse Recovery Time	V _R =100V, I _S =10A,	---	95	---	nS
Q _{rr}	Reverse Recovery Charge	di/dt=100A/us	---	370	---	nC

NOTES :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=50V, L=0.1mH, I_{AS}=26A, R_G=25Ω, Starting T_J=25°C.
3. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
4. Essentially independent of operating temperature.



Characteristics Curves

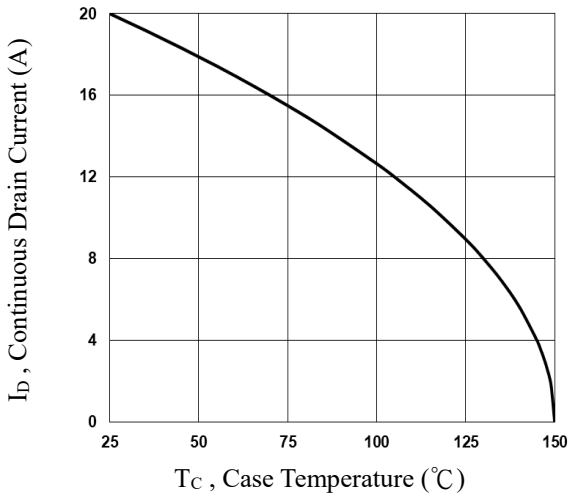


Fig.1 Continuous Drain Current vs. T_C

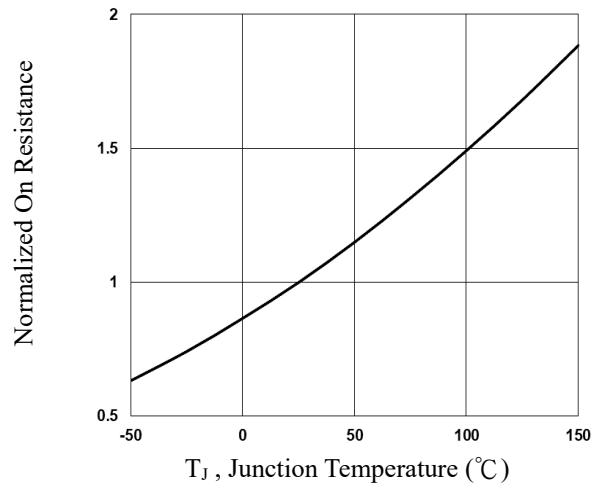


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

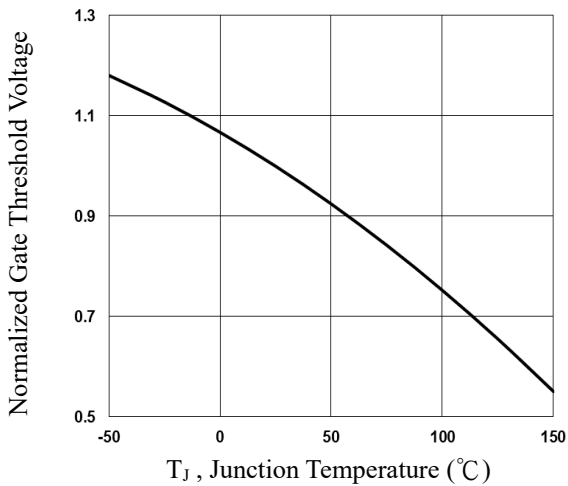


Fig.3 Normalized V_{th} vs. T_J

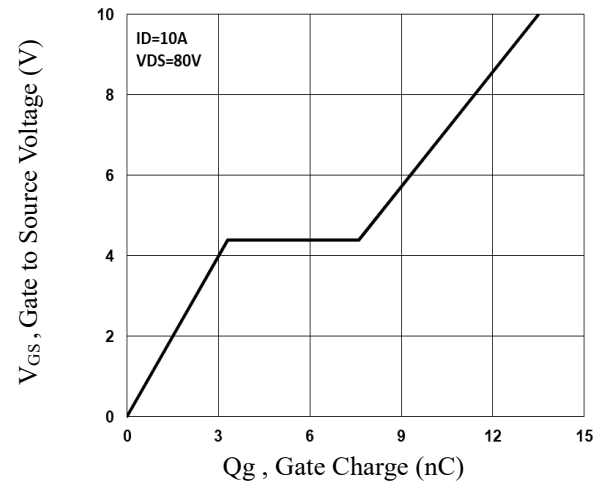


Fig.4 Gate Charge Characteristics

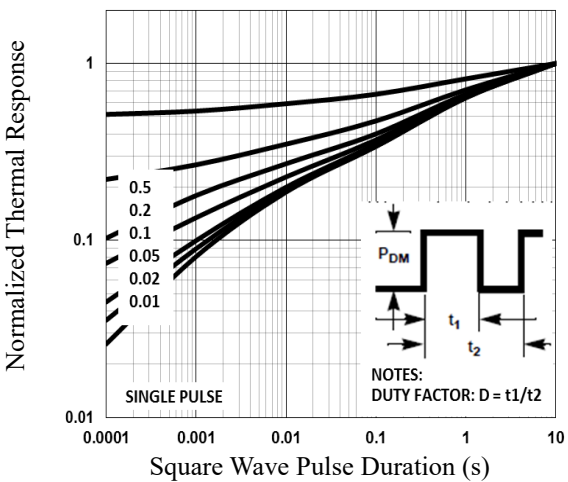


Fig.5 Normalized Transient Impedance

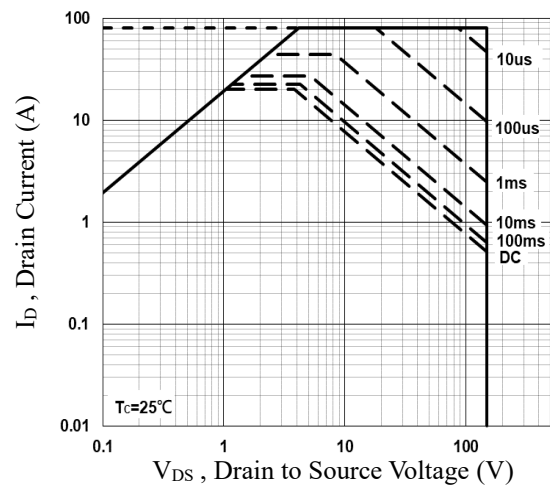


Fig.6 Maximum Safe Operation Area



Characteristics Curves

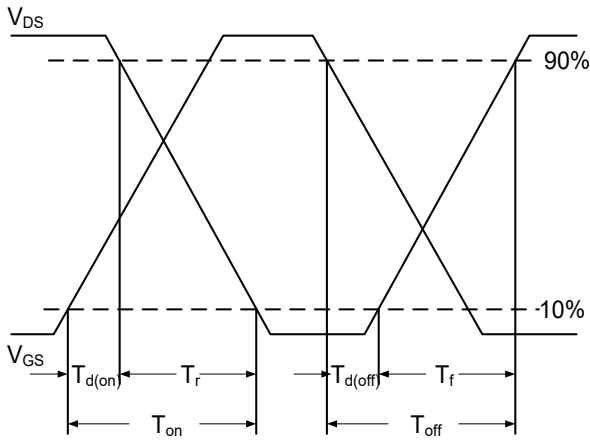


Fig.7 Switching Time Waveform

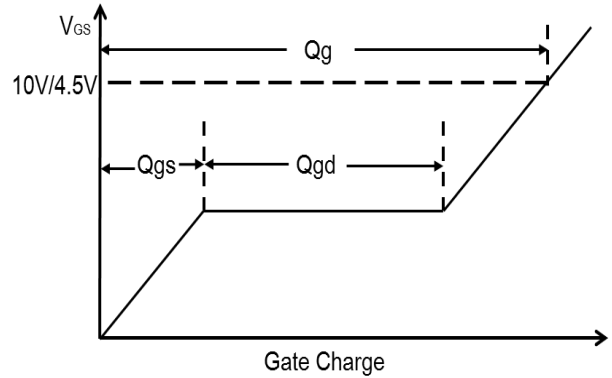
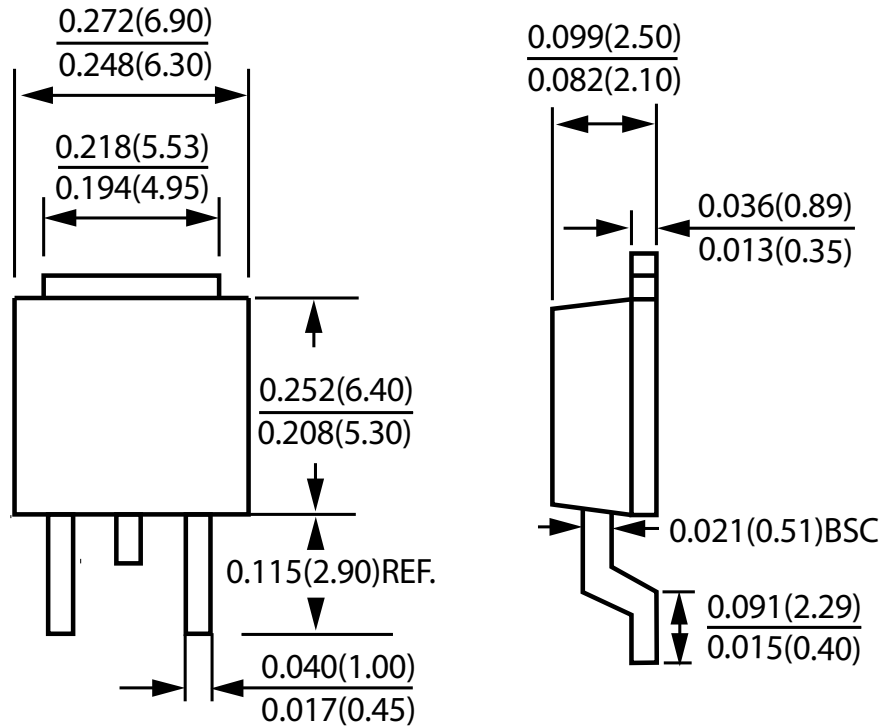


Fig.8 Gate Charge Waveform

Package Outline Dimensions



TO-252

Dimensions in inches and (millimeters)



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