



General Description

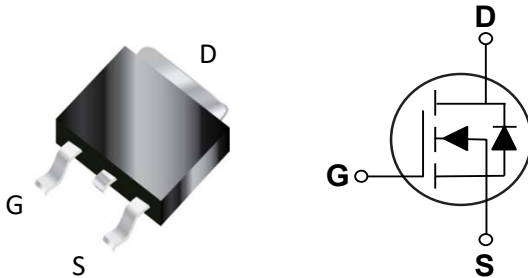
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BV_{DSS}	$R_{DS(ON)}$	I_D
80 V	3.2 m Ω	180 A

Features

- $R_{DS(ON)} \leq 3.2m\Omega @ V_{GS}=10V$
- Improved dv/dt capability
- Fast switching
- Green Device Available

TO-263 Pin Configuration



Applications

- Networking
- Load Switch
- LED applications
- Quick Charger

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	80	V
V_{GS}	Gate-Source Voltage	+20 / -12	V
I_D	Drain Current - Continuous ($T_C=25^\circ\text{C}$)	180	A
	Drain Current - Continuous ($T_C=100^\circ\text{C}$)	114	
I_{DM}	Drain Current - Pulsed (NOTE 1)	720	A
EAS	Single Pulse Avalanche Energy (NOTE 2)	660	mJ
IAS	Single Pulse Avalanche Current (NOTE 2)	115	A
P_D	Power Dissipation ($T_C=25^\circ\text{C}$)	278	W
	Power Dissipation - Derate above 25°C	2.22	
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		NK3P2	

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	---	0.45	$^\circ\text{C/W}$

**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	80	---	---	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =80V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =64V, V _{GS} =0V, T _J =85°C	---	---	10	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 =30A	---	---	3.2	mΩ
		V _{GS} =4.5V, I _D =20A	---	---	4.6	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.0	---	2.5	V
gfs	Forward Transconductance	V _{DS} =10V, I _D =3A	---	20	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q _g	Total Gate Charge	V _{DS} =40V, V _{GS} =10V, I _D =20A (NOTE 3 · 4)	---	138	---	nC
Q _{gs}	Gate-Source Charge		---	22.4	---	
Q _{gd}	Gate-Drain Charge		---	35.1	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} =40V, V _{GS} =10V, R _G =1Ω, I _D =1A (NOTE 3 · 4)	---	17.2	---	nS
T _r	Rise Time		---	18	---	
T _{d(off)}	Turn-Off Delay Time		---	76	---	
T _f	Fall Time		---	84.4	---	
C _{iss}	Input Capacitance	V _{DS} =40V, V _{GS} =0V, f=1MHz	---	7036	---	pF
C _{oss}	Output Capacitance		---	1490	---	
C _{rss}	Reverse Transfer Capacitance		---	86	---	
R _g	Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz	---	1.94	---	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	---	---	180	A
I _{SM}	Pulsed Source Current		---	---	360	A
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =1A, T _J =25°C	---	---	1	V
trr	Reverse Recovery Time	I _S =10A, di/dt=100A/μs, T _J =25°C	---	73.2	---	nS
Qrr	Reverse Recovery Charge		---	170.7	---	nC

NOTES :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=115A, 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

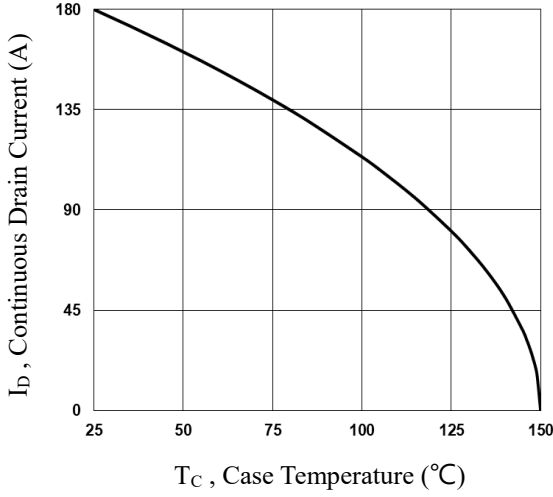


Fig.1 Continuous Drain Current vs. Tc

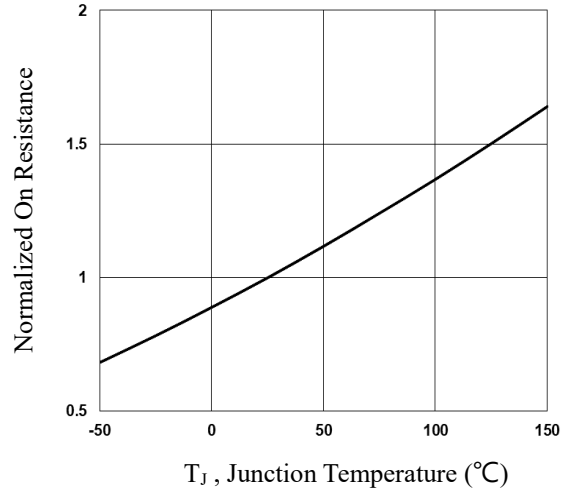


Fig.2 Normalized RDSON vs. Tj

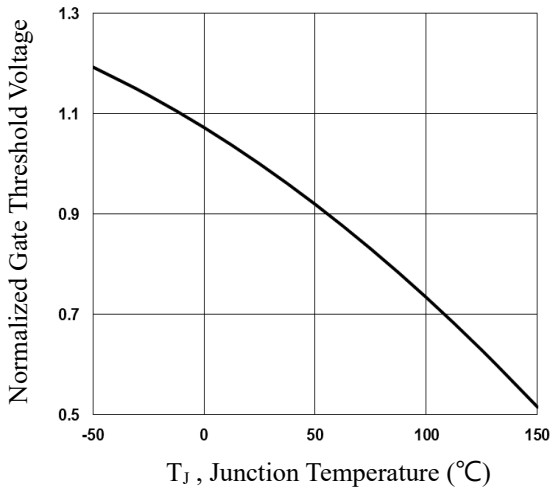


Fig.3 Normalized Vth vs. Tj

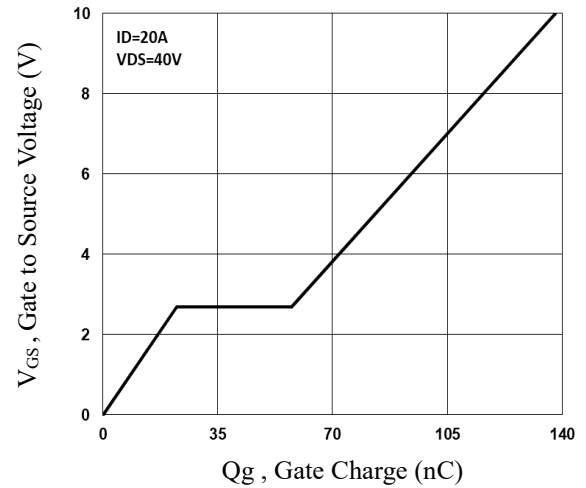


Fig.4 Gate Charge Characteristics

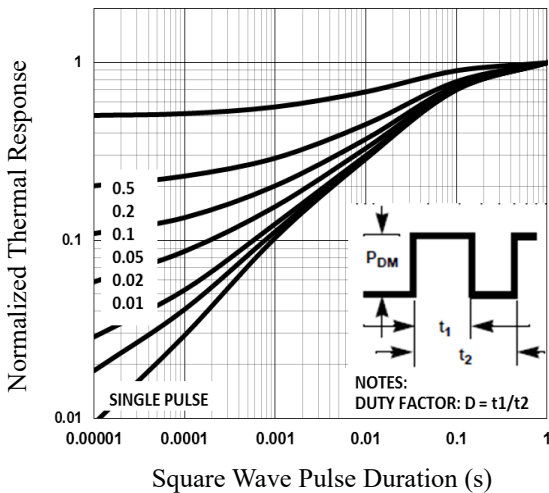


Fig.5 Normalized Transient Impedance

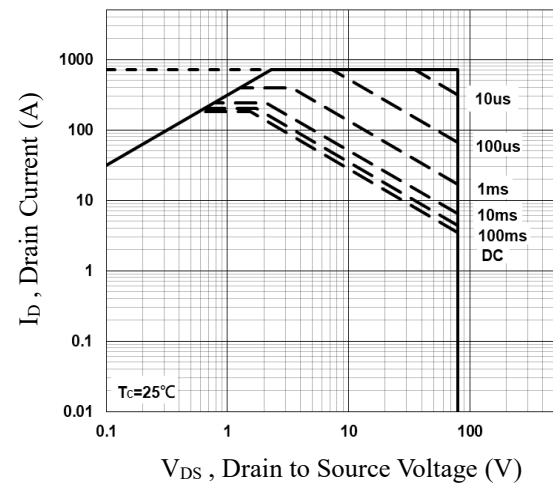


Fig.6 Maximum Safe Operation Area



Characteristics Curves

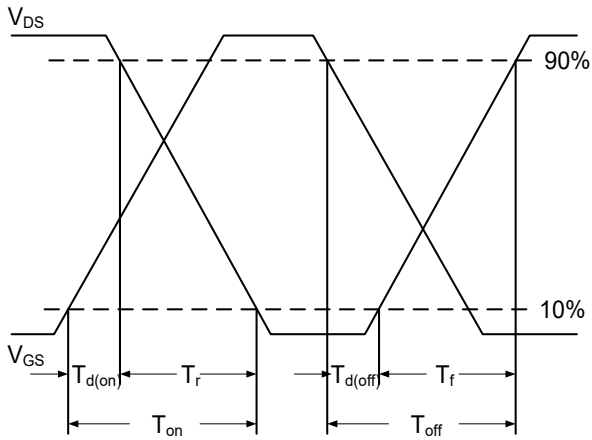


Fig.7 Switching Time Waveform

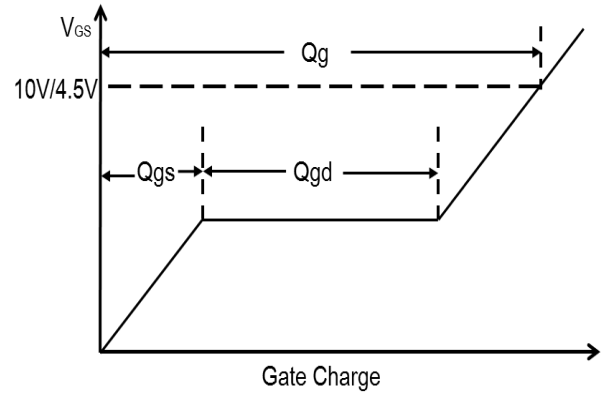
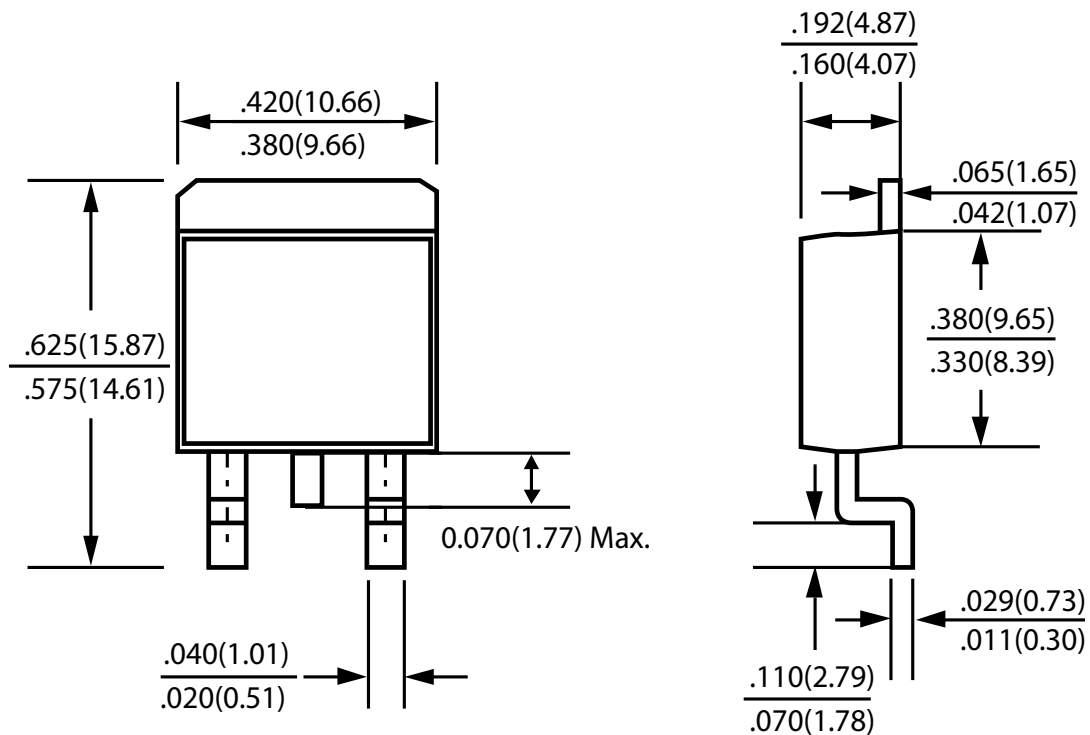


Fig.8 Gate Charge Waveform

Package Outline Dimensions



TO-263

Dimensions in inches and (millimeters)



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