



### General Description

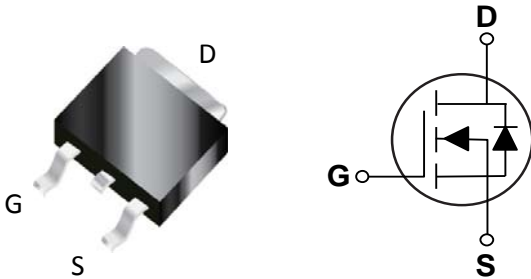
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

$BV_{DSS}$	$R_{DS(ON)}$	$I_D$
100 V	3.5 m $\Omega$	190 A

### Features

- $R_{DS(ON)} \leq 3.5 m\Omega @ V_{GS}=10V$
- Improved dv/dt capability
- Fast switching
- Green Device Available

TO-263 Pin Configuration



### Applications

- Networking
- Load Switch
- LED applications
- Quick Charger

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

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	100	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Drain Current - Continuous ( $T_C=25^\circ C$ )	190	A
	Drain Current - Continuous ( $T_C=100^\circ C$ )	120	
$I_{DM}$	Drain Current - Pulsed (NOTE 1)	840	A
$E_{AS}$	Single Pulse Avalanche Energy (NOTE 2)	280	mJ
$I_{AS}$	Single Pulse Avalanche Current (NOTE 2)	75	A
$P_D$	Power Dissipation ( $T_C=25^\circ C$ )	463	W
	Power Dissipation - Derate above $25^\circ C$	3.7	
$T_J$	Operating Junction Temperature Range	-50 to 150	$^\circ C$
$T_{STG}$	Storage Temperature Range	-50 to 150	$^\circ C$
Marking Code		NM3P5	

### Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	---	62	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	0.27	$^\circ C/W$



### 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	100	---	---	V
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =100V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	---	---	1	uA
		V <sub>DS</sub> =80V, V <sub>GS</sub> =0V, T <sub>J</sub> =125°C	---	---	10	uA
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> =±20V, 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> =20A	---	3	3.5	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	1.5	2.5	3.5	V
gfs	Forward Transconductance	V <sub>DS</sub> =10V, I <sub>D</sub> =3A	---	15	---	S

#### Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =80V, V <sub>GS</sub> =10V, I <sub>D</sub> =10A (NOTE 3 · 4)	---	295	450	nC
Q <sub>gs</sub>	Gate-Source Charge		---	70	140	
Q <sub>gd</sub>	Gate-Drain Charge		---	75	150	
T <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DD</sub> =50V, V <sub>GS</sub> =10V, R <sub>G</sub> =6Ω, I <sub>D</sub> =1A (NOTE 3 · 4)	---	66.2	120	nS
T <sub>r</sub>	Rise Time		---	79.6	160	
T <sub>d(off)</sub>	Turn-Off Delay Time		---	242	480	
T <sub>f</sub>	Fall Time		---	103	200	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =50V, V <sub>GS</sub> =0V, f=1MHz	---	19000	38000	pF
C <sub>oss</sub>	Output Capacitance		---	680	1360	
C <sub>riss</sub>	Reverse Transfer Capacitance		---	270	540	
R <sub>g</sub>	Gate Resistance		V <sub>DS</sub> =0V, V <sub>GS</sub> =0V, f=1MHz	---	1.8	

#### Drain-Source Diode Characteristics and Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I <sub>S</sub>	Continuous Source Current	V <sub>G</sub> =V <sub>D</sub> =0V, Force Current	---	---	190	A
I <sub>SM</sub>	Pulsed Source Current		---	---	380	A
V <sub>SD</sub>	Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =1A, T <sub>J</sub> =25°C	---	---	1	V
t <sub>rr</sub>	Reverse Recovery Time	V <sub>GS</sub> =0V, I <sub>S</sub> =10A, di/dt=100A/μs , T <sub>J</sub> =25°C	---	64	---	nS
Q <sub>rr</sub>	Reverse Recovery Charge		---	150	---	nC

#### NOTES :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V<sub>DD</sub>=50V, V<sub>GS</sub>=10V, L=0.1mH, I<sub>AS</sub>=75A, R<sub>G</sub>=25Ω, Starting T<sub>J</sub>=25°C.
3. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
4. Essentially independent of operating temperature.



Characteristics Curves

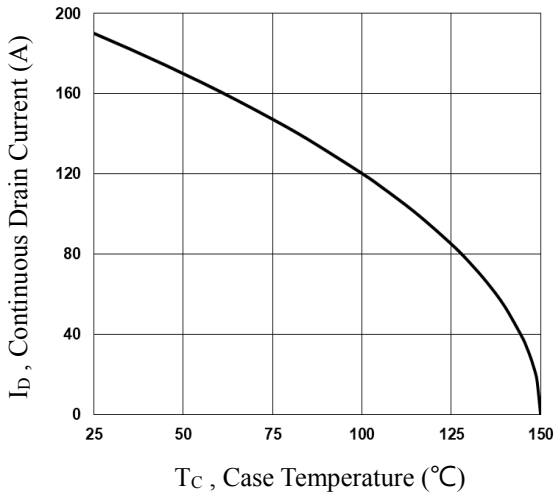


Fig.1 Continuous Drain Current vs.  $T_C$

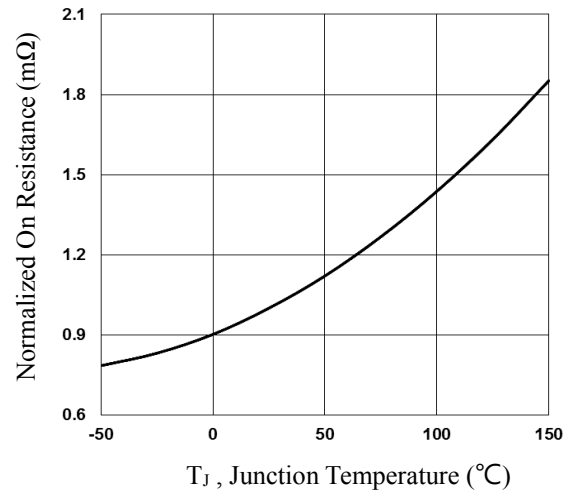


Fig.2 Normalized  $R_{DS(ON)}$  vs.  $T_J$

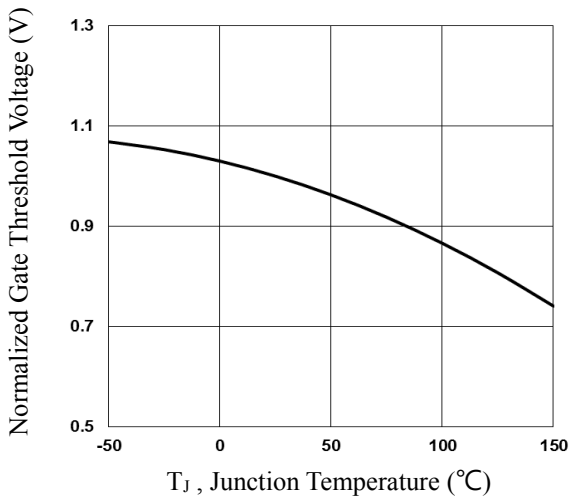


Fig.3 Normalized  $V_{th}$  vs.  $T_J$

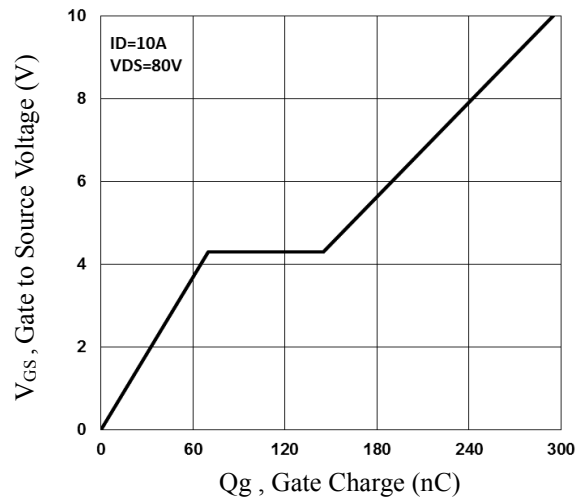


Fig.4 Gate Charge Characteristics

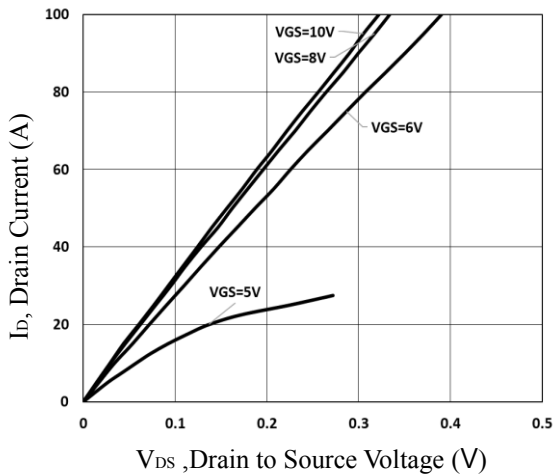


Fig.5 Typical Output Characteristics

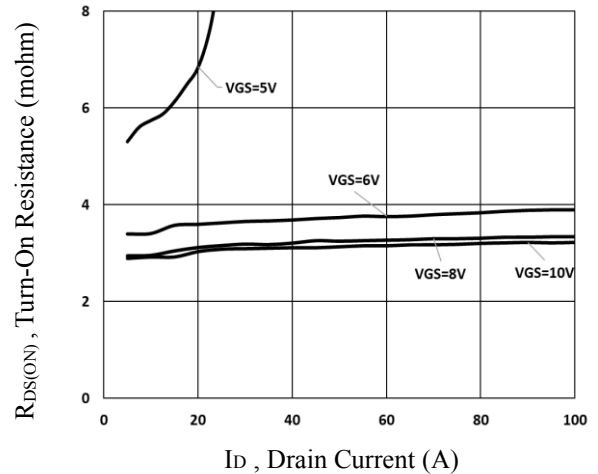


Fig.6 Turn-On Resistance vs.  $I_D$



Characteristics Curves

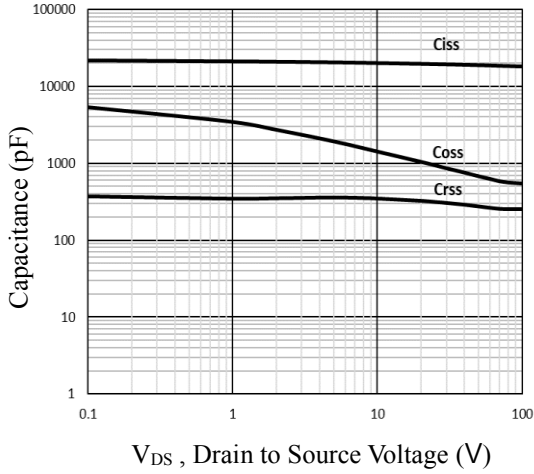


Fig.7 Capacitance Characteristics

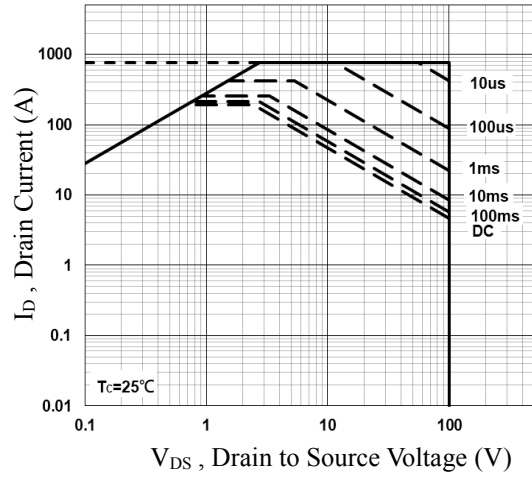


Fig.8 Maximum Safe Operation Area

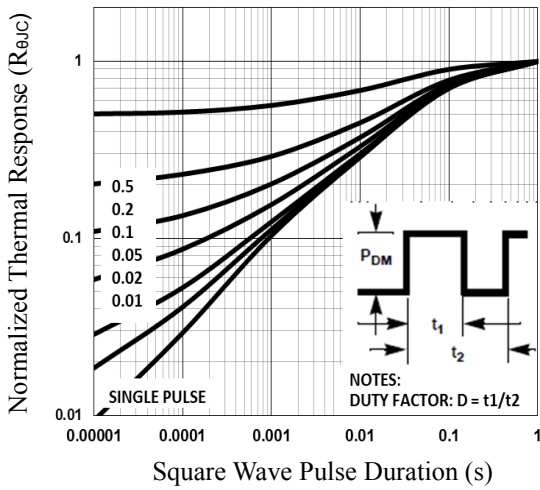


Fig.9 Normalized Transient Impedance

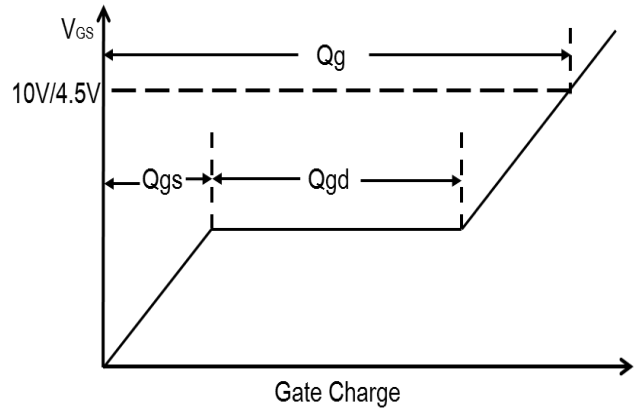


Fig.10 Gate Charge Waveform

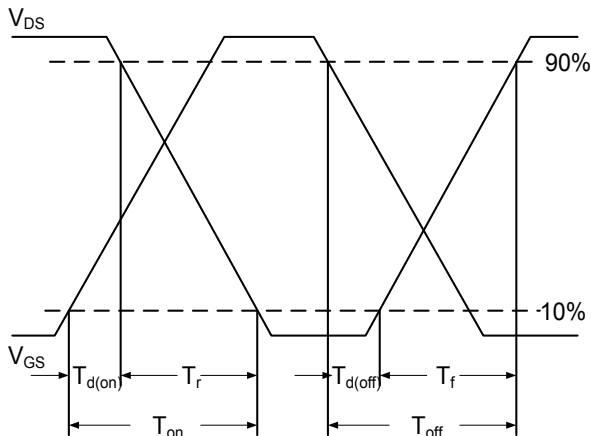
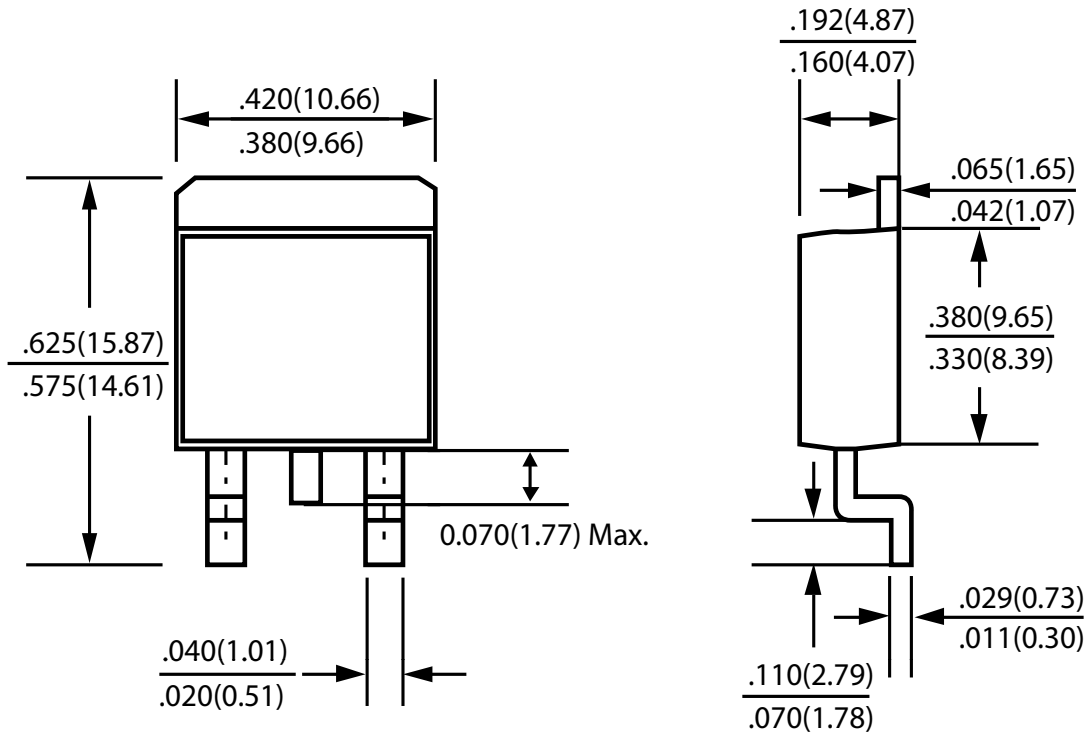


Fig.11 Switching Time Waveform



Package Outline Dimensions



TO-263

Dimensions in inches and (millimeters)



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