



## 100V N-Channel MOSFETs

### General Description

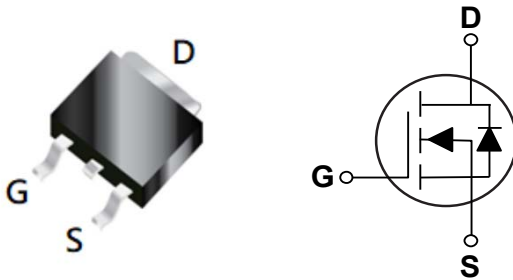
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

$BV_{DSS}$	$R_{DS(ON)}$	$I_D$
100 V	48 m $\Omega$	30 A

### Features

- $R_{DS(ON)} \leq 48m\Omega @ V_{GS}=10V$
- Improved dv/dt Capability
- Fast Switching
- Green Device Available

TO-252 Pin Configuration



### Applications

- Automotive Lighting
- 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	100	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Drain Current - Continuous ( $T_C=25^\circ\text{C}$ )	30	A
$I_{DM}$	Drain Current - Pulsed (NOTE 1)	90	A
$P_D$	Power Dissipation ( $T_C=25^\circ\text{C}$ )	34.7	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		NM048	

### Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	62.5	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction to Case	3.6	$^\circ\text{C/W}$



### 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	---	---	1	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> =10A	---	---	48	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =6A	---	---	55	
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	1.0	---	2.2	V

#### 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> =4.5V, I <sub>D</sub> =20A	---	20	---	nC
Q <sub>gs</sub>	Gate-Source Charge		---	3.1	---	
Q <sub>gd</sub>	Gate-Drain Charge		---	14	---	
T <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DS</sub> =80V, V <sub>GS</sub> =4.5V, R <sub>G</sub> =3.1Ω, I <sub>D</sub> =20A	---	11	---	nS
T <sub>r</sub>	Rise Time		---	91	---	
T <sub>d(off)</sub>	Turn-Off Delay Time		---	40	---	
T <sub>f</sub>	Fall Time		---	71	---	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHz	---	1964	---	pF
C <sub>oss</sub>	Output Capacitance		---	90	---	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	74	---	

#### 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	---	---	30	A
V <sub>SD</sub>	Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =20A	---	---	1.2	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>F</sub> =20A, di/dt=100A/us	---	64	---	nS
Q <sub>rr</sub>	Reverse Recovery Charge		---	152	---	nC

#### NOTES :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
3. The data is theoretically the same as I<sub>D</sub> and I<sub>DM</sub>, in real applications, should be limited by total power dissipation.



Characteristics Curves

FIG. 1-Output Characteristics

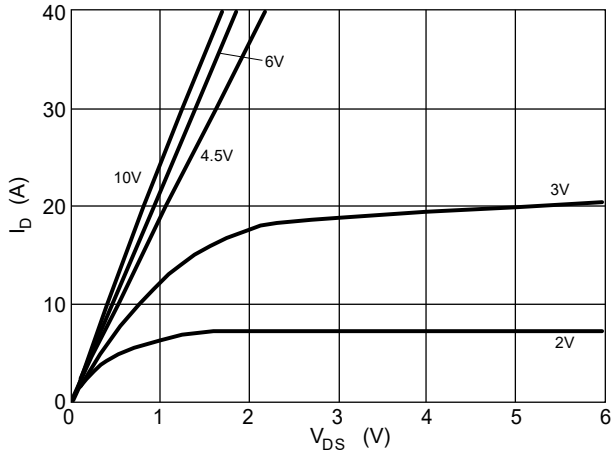


FIG. 2-Transfer Characteristics

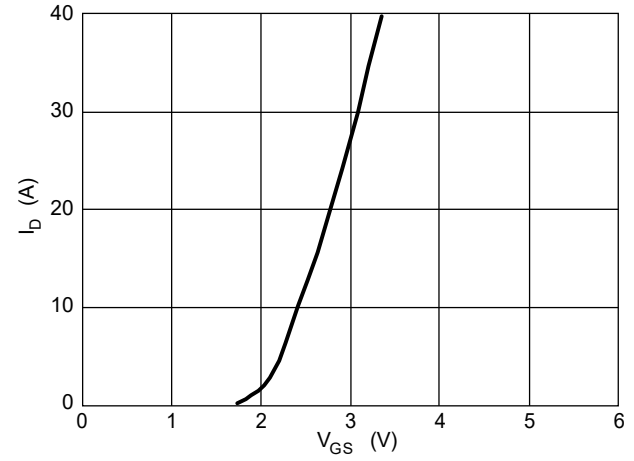


FIG. 3- $R_{DS(ON)}$  vs.  $I_D$

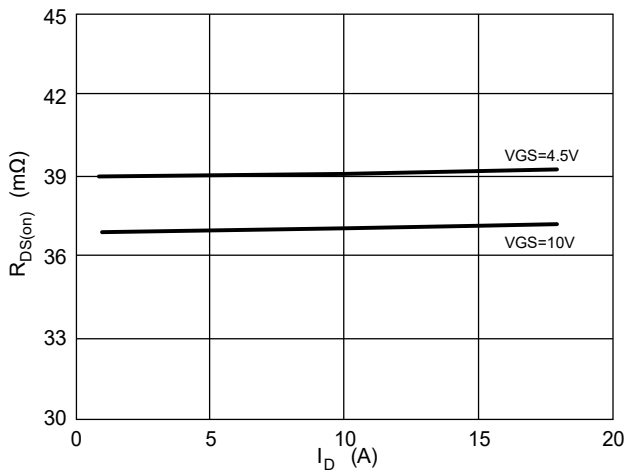


FIG. 4- $I_S$  vs.  $V_{SD}$

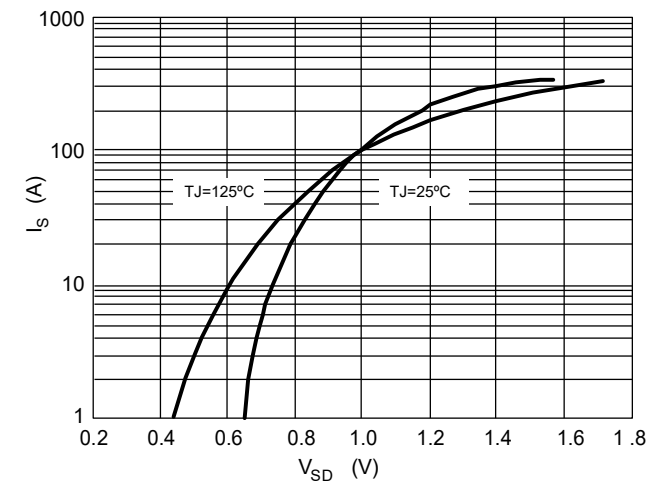


FIG. 5-Normalized  $BV_{DSS}$  vs.  $T_J$

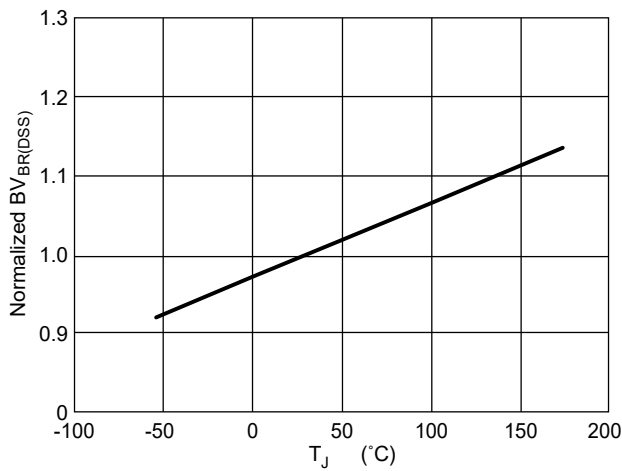
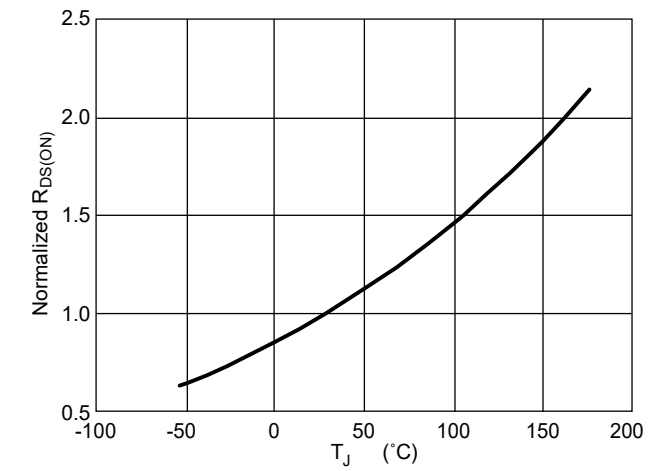


FIG. 6-Normalized  $R_{DS(ON)}$  vs.  $T_J$





### Characteristics Curves

FIG. 7-Switching Time Waveform

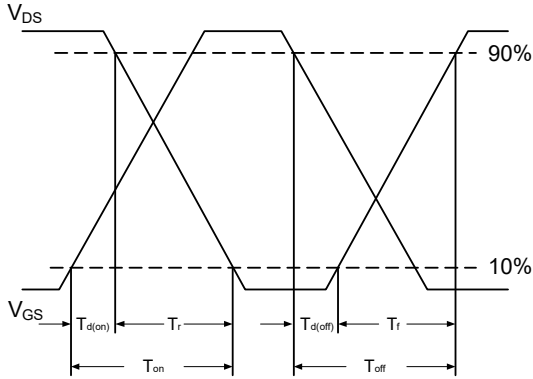
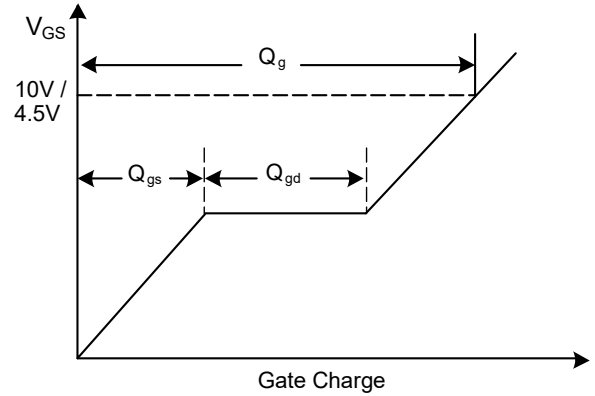
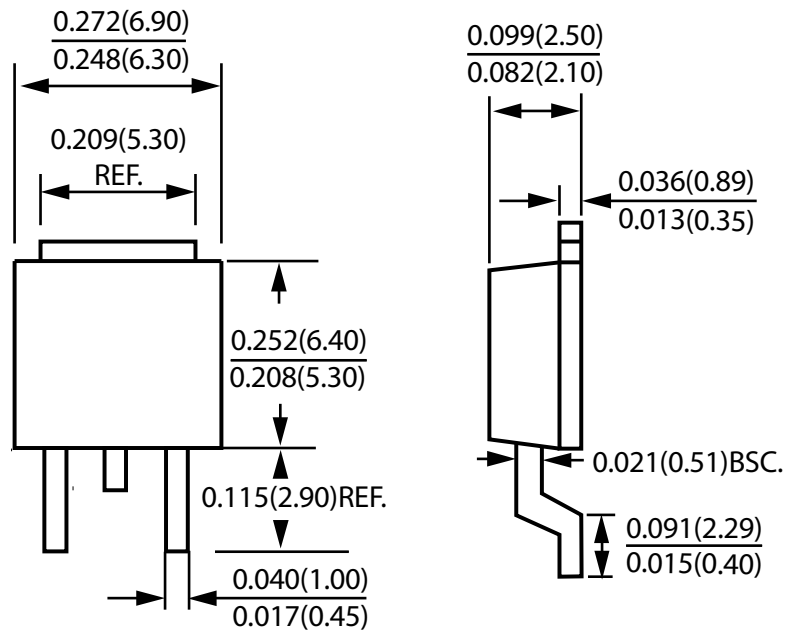


FIG. 8-Gate Charge Waveform



### Package Outline Dimensions



### TO-252

Dimensions in inches and (millimeters)



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