



# T2MNM7P6



## 100V N-Channel MOSFETs

### General Description

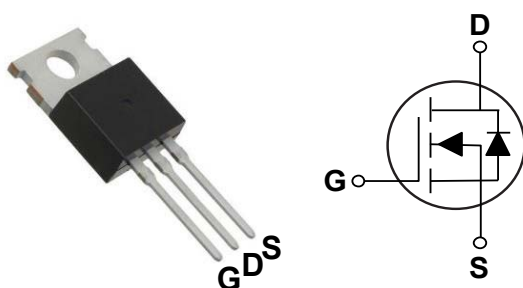
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

$BV_{DSS}$	$R_{DS(ON)}$	$I_D$
100 V	7.6 m $\Omega$	80 A

### Features

- $R_{DS(ON)} \leq 7.6m\Omega @ V_{GS}=10V$
- Improved dv/dt Capability
- Fast Switching
- Green Device Available

TO-220 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	100	V
$V_{GS}$	Gate-Source Voltage	+20 / -12	V
$I_D$	Drain Current - Continuous ( $T_c=25^\circ\text{C}$ )	80	A
	Drain Current - Continuous ( $T_c=100^\circ\text{C}$ )	50.6	A
$I_{DM}$	Drain Current - Pulsed (NOTE 1)	320	A
EAS	Single Pulse Avalanche Energy (NOTE 2)	231	mJ
IAS	Single Pulse Avalanche Current (NOTE 2)	68	A
$P_D$	Power Dissipation ( $T_c=25^\circ\text{C}$ )	173	W
	Power Dissipation - Derate above $25^\circ\text{C}$	1.39	W/ $^\circ\text{C}$
$T_J$	Operating Junction Temperature Range	-50 to 150	$^\circ\text{C}$
$T_{STG}$	Storage Temperature Range	-50 to 150	$^\circ\text{C}$
Marking Code		DP0978	

### Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	---	62	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	0.72	$^\circ\text{C}/\text{W}$

**Electrical Characteristics ( $T_J=25^\circ\text{C}$ , unless otherwise noted)****Off Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	100	---	---	V
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=80V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	1	$\mu A$
		$V_{DS}=80V, V_{GS}=0V, T_J=125^\circ\text{C}$	---	---	10	$\mu A$
$I_{GSS}$	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	$V_{GS}=10V, I_D=18A$	---	---	7.6	m $\Omega$
		$V_{GS}=4.5V, I_D=10A$	---	---	11.4	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1.0	1.5	2.5	V
gfs	Forward Transconductance	$V_{DS}=10V, I_D=3A$	---	15	---	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)	---	53.5	---	nC
$Q_{gs}$	Gate-Source Charge		---	7.5	---	
$Q_{gd}$	Gate-Drain Charge		---	13.3	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=50V, V_{GS}=10V, R_G=6\Omega,$ $I_D=1A$ (NOTE 3 · 4)	---	14.6	---	ns
$T_r$	Rise Time		---	32.8	---	
$T_{d(off)}$	Turn-Off Delay Time		---	62.2	---	
$T_f$	Fall Time		---	28.4	---	
$C_{iss}$	Input Capacitance	$V_{DS}=25V, V_{GS}=0V, F=1\text{MHz}$	---	3250	---	pF
$C_{oss}$	Output Capacitance		---	867	---	
$C_{rss}$	Reverse Transfer Capacitance		---	58	---	
Rg	Gate resistance	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$	---	1.25	---	$\Omega$

**Drain-Source Diode Characteristics and Ratings**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$I_S$	Continuous Source Current	$V_G=V_D=0V, \text{Force Current}$	---	---	80	A
$I_{SM}$	Pulsed Source Current		---	---	160	A
$V_{SD}$	Diode Forward Voltage	$V_{GS}=0V, I_S=1A, T_J=25^\circ\text{C}$	---	---	1	V

## NOTES :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2.  $V_{DD}=50V, V_{GS}=10V, L=0.1\text{mH}, I_{AS}=68A, R_G=25\Omega$ , Starting  $T_J=25^\circ\text{C}$ .
3. The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$ .
4. Essentially independent of operating temperature.



Characteristics Curves

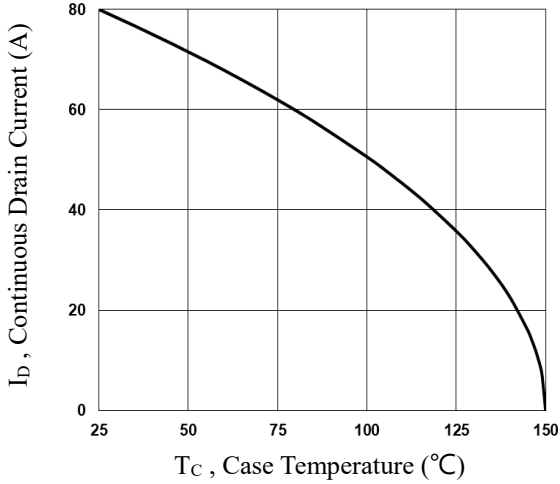


Fig.1 Continuous Drain Current vs.  $T_C$

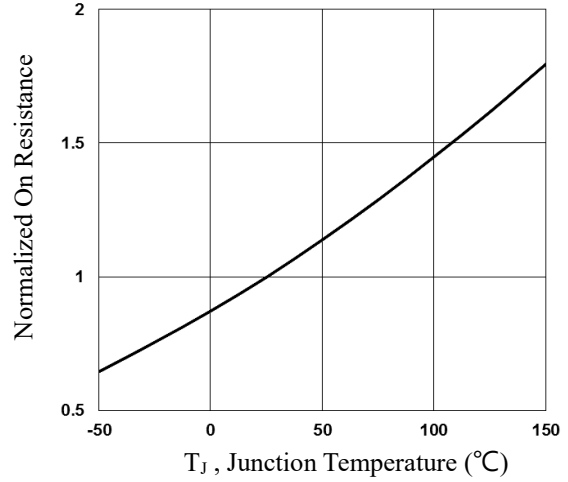


Fig.2 Normalized  $R_{DS(on)}$  vs.  $T_J$

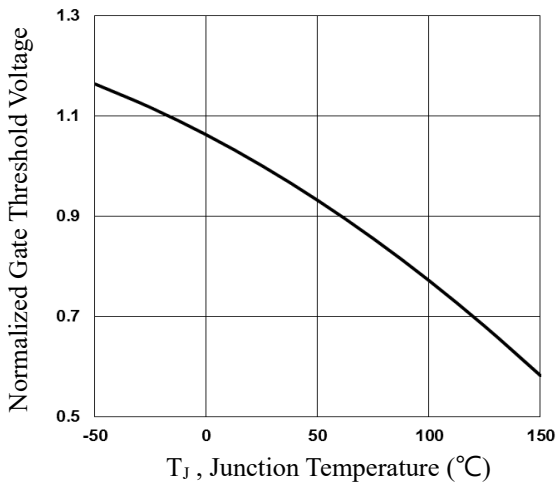


Fig.3 Normalized  $V_{th}$  vs.  $T_J$

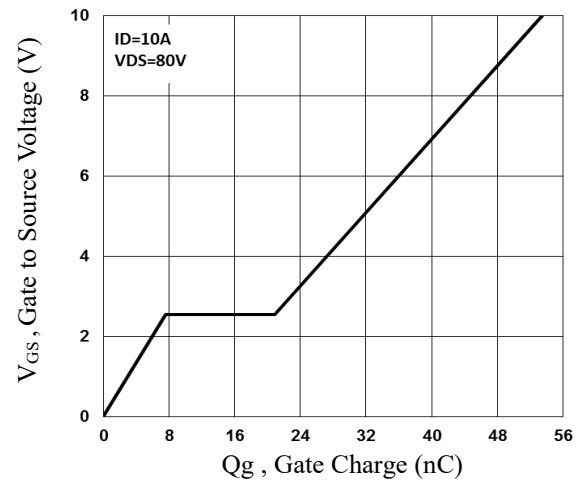


Fig.4 Gate Charge Characteristics

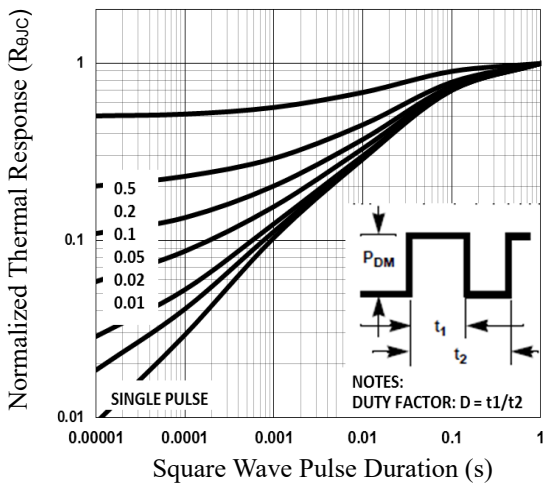


Fig.5 Normalized Transient Impedance

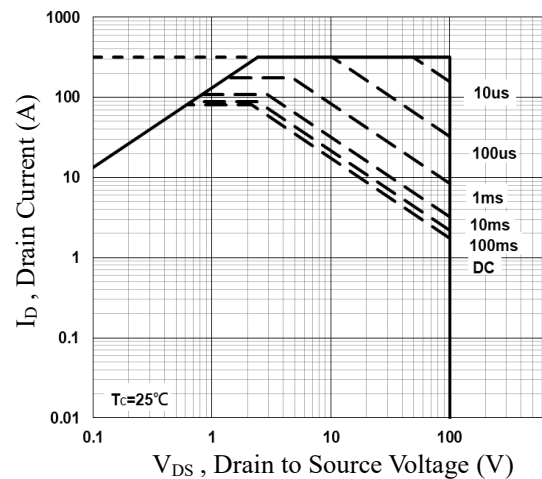


Fig.6 Maximum Safe Operation Area



Characteristics Curves

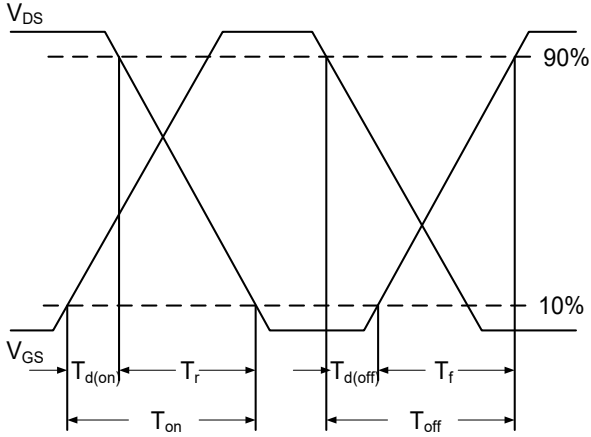


Fig.7 Switching Time Waveform

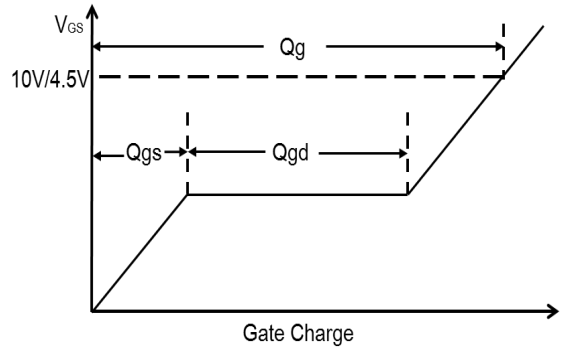
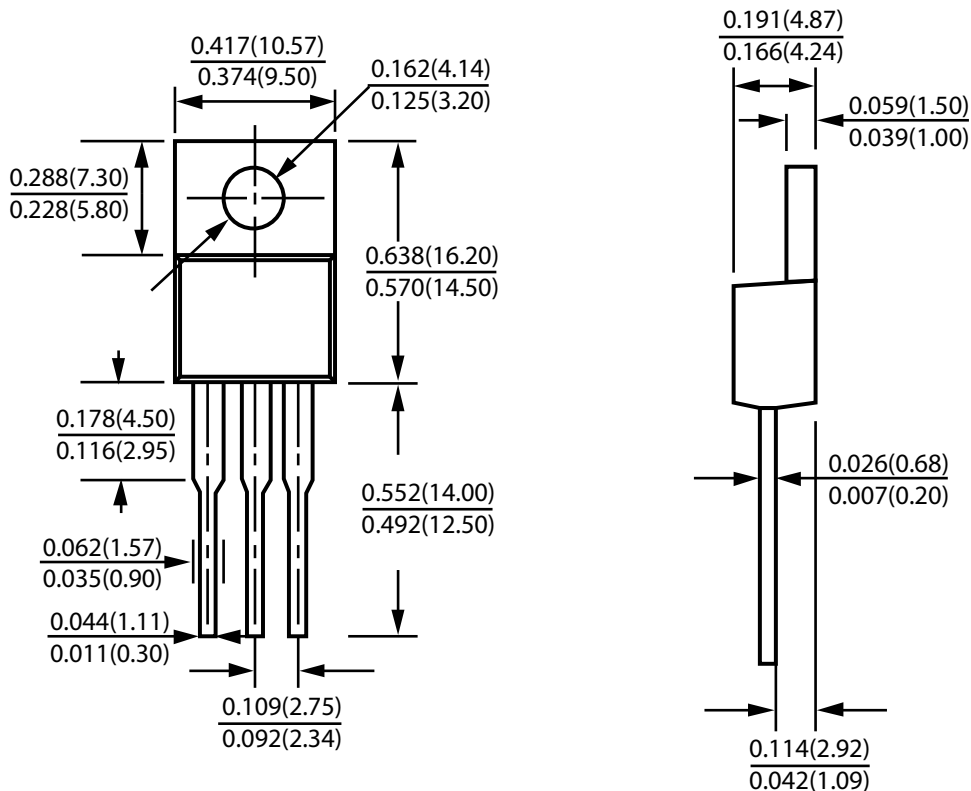


Fig.8 Gate Charge Waveform

Package Outline Dimensions



TO-220

Dimensions in inches and (millimeters)



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