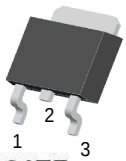
40N10 N-Channel Power MOSFET

$V_{(BR)DSS}$	$R_{DS(on)}$MAX	I_D
100V	17mΩ@10V	40A

TO-252



1. GATE
2. DRAIN
3. SOURCE

DESCRIPTION

This advanced high voltage MOSFET is designed to stand high energy in the avalanche mode and switch efficiently. This new high energy device also offers a drain-to-source diode fast recovery time. Desighed for high voltage, high speed switching applications such as power supplies, converters, power motor controls and bridge circuits.

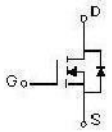
FEATURES

- High density cell design for ultra low $R_{DS(on)}$
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Special process technology for high ESD capability
- Excellent package for good heat dissipation

APPLICATIONS

- Hard switched and high frequency circuits
- Uninterruptible power supply
- Power switching application

EQUIVALENT CIRCUIT



MAXIMUM RATINGS (T_a=25℃ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current	I_D	40	A
Pulsed Drain Current	I_{DM}	160	A
Single Pulsed Avalanche Energy	E_{AS}(1)	320	mJ
Power Dissipation	P_D	1.25	W
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	100	℃/W
Junction Temperature	T_J	150	℃
Storage Temperature Range	T_{stg}	-55 ~+150	℃
Lead Temperature for Soldering Purposes(1/8'' from case for 10s)	T_L	260	℃

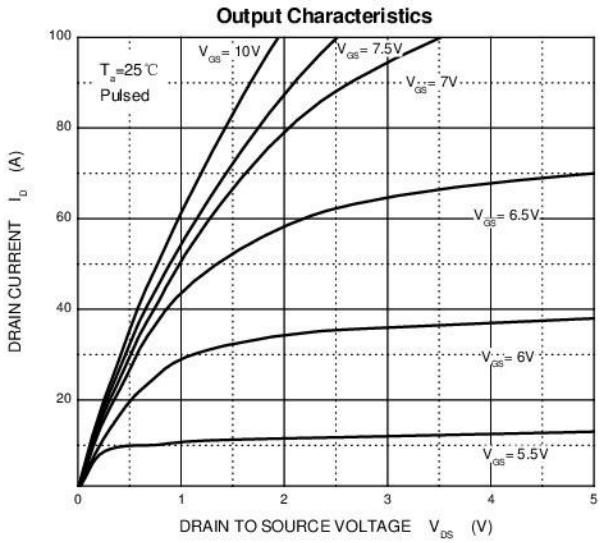
(1).E_{AS} condition: V_{DD}=50V,L=0.5mH, R_G=25Ω, Starting T_J = 25°C

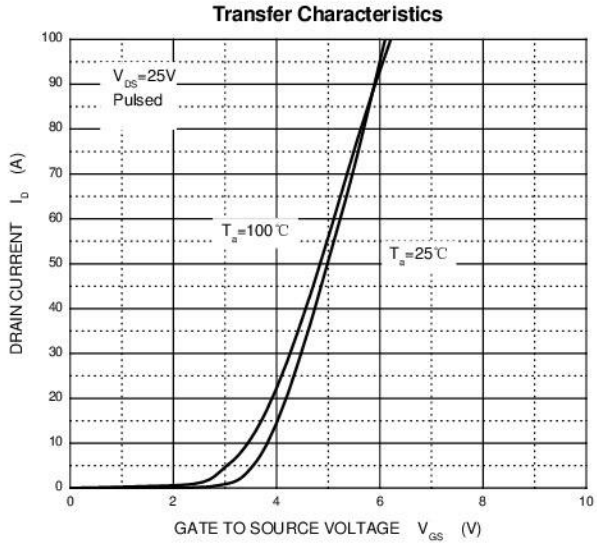
T_a=25 ℃ unless otherwise specified

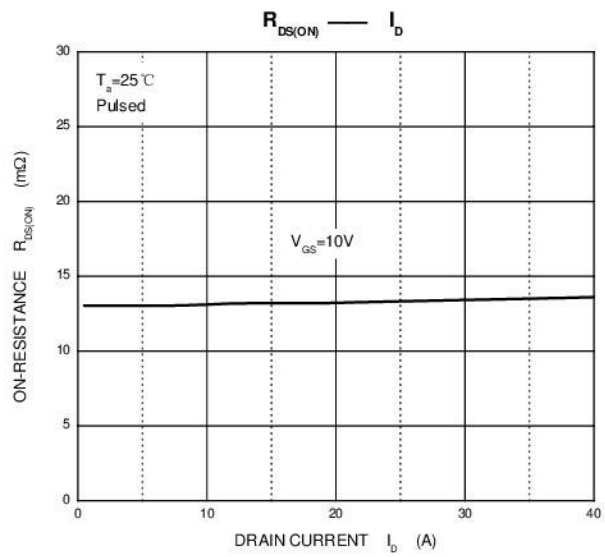
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Off characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D =250μA	100			V
Zero gate voltage drain current	I_{DSS}	V_{DS} =100V, V_{GS} =0V			1	μA
Gate-body leakage current	I_{GSS}	V_{DS} =0V, V_{GS} =±20V			±100	nA
On characteristics (note1)						
Gate-threshold voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =250μA	2	2.7	4	V
Static drain-source on-sate resistance	$R_{DS(on)}$	V_{GS} =10V, I_D =28A		14	17	mΩ
Forward transconductance	g_{FS}	V_{DS} =25V, I_D =28A	32			S
Dynamic characteristics (note 2)						
Input capacitance	C_{iss}	V_{DS} =30V,V_{GS} =0V, f =1MHz		3400		pF
Output capacitance	C_{oss}			290		
Reverse transfer capacitance	C_{rss}			221		
Switching characteristics (note 2)						
Total gate charge	Q_g	V_{DS}=30V, V_{GS}=10V, I_D=30A		94		nC
Gate-source charge	Q_{gs}			16		
Gate-drain charge	Q_{gd}			24		
Turn-on delay time	$t_{d(on)}$	V_{DD}=30V,V_{GS}=10V,R_G= 2.5Ω, I_D=2A, R_L=15Ω		15		ns
Turn-on rise time	t_r			11		
Turn-off delay time	$t_{d(off)}$			52		
Turn-off fall time	t_f			13		
Drain-Source Diode Characteristics						
Drain-source diode forward voltage(note1)	V_{SD}	V_{GS} =0V, I_S=28A			1.2	V
Continuous drain-source diode forward current	I_S				40	A
Pulsed drain-source diode forward current	I_{SM}				160	A

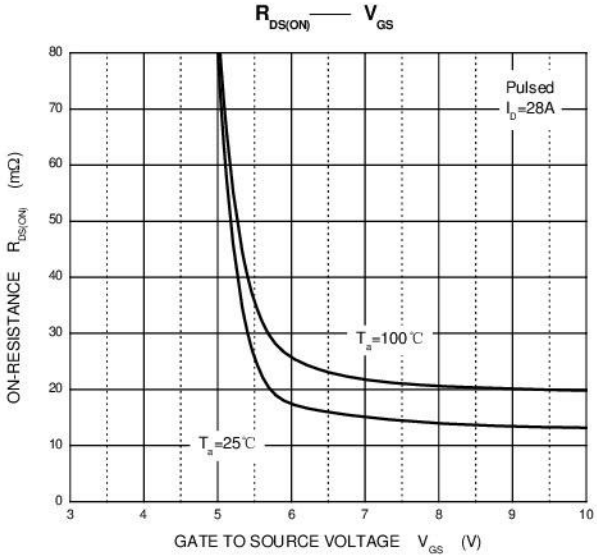
Notes:

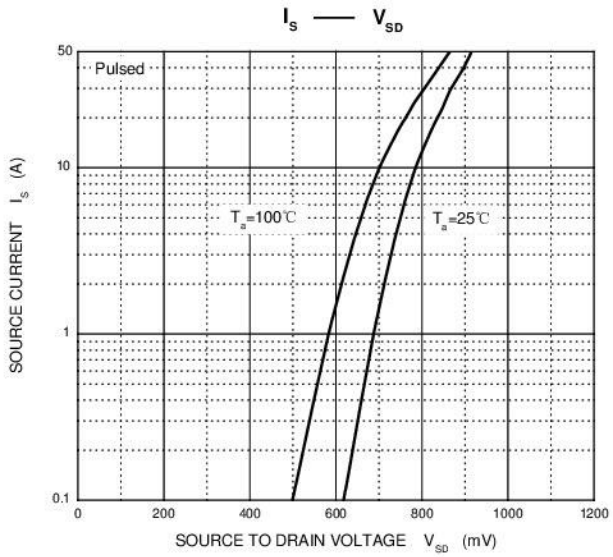
1. Pulse Test : Pulse Width≤300μs, duty cycle ≤2%.
2. Guaranteed by design, not subject to production.

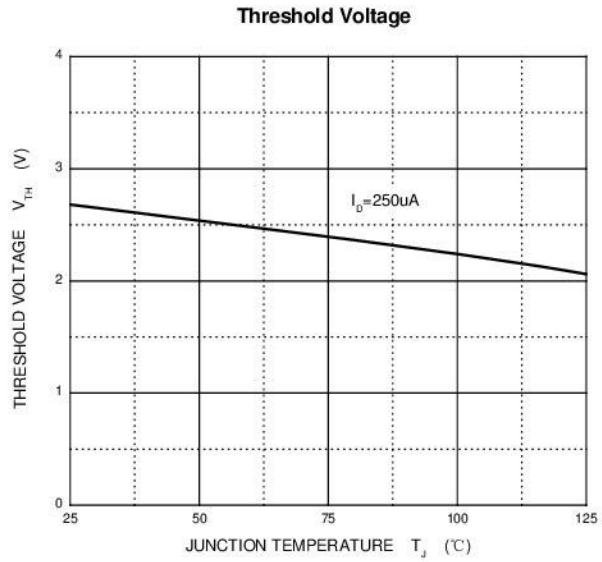

Output Characteristics
T_a=25℃
Pulsed
V_{GS}= 10V
V_{GS}= 7.5V
V_{GS}= 7V
V_{GS}= 6.5V
V_{GS}= 6V
V_{GS}= 5.5V
DRAIN CURRENT I_D (A)
DRAIN TO SOURCE VOLTAGE V_{DS} (V)


Transfer Characteristics
V_{DS}=25V
Pulsed
T_a=100℃
T_a=25℃
DRAIN CURRENT I_D (A)
GATE TO SOURCE VOLTAGE V_{GS} (V)


$R_{DS(ON)}$ —— I_D
T_a=25℃
Pulsed
V_{GS}=10V
ON-RESISTANCE $R_{DS(ON)}$ (mΩ)
DRAIN CURRENT I_D (A)


$R_{DS(ON)}$ —— V_{GS}
Pulsed
I_D=28A
T_a=100℃
T_a=25℃
ON-RESISTANCE $R_{DS(ON)}$ (mΩ)
GATE TO SOURCE VOLTAGE V_{GS} (V)


I_S —— V_{SD}
Pulsed
T_a=100℃
T_a=25℃
SOURCE CURRENT I_S (A)
SOURCE TO DRAIN VOLTAGE V_{SD} (mV)


Threshold Voltage
I_D=250uA
THRESHOLD VOLTAGE V_{TH} (V)
JUNCTION TEMPERATURE T_J (℃)