

## General Description

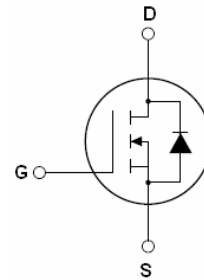
The 18N10w combines advanced trench MOSFET technology with a low resistance package to provide extremely low  $R_{DS(ON)}$ . This device is ideal for power switching application.

## Features

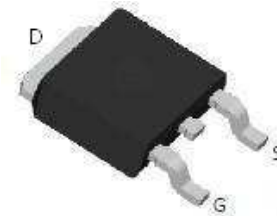
VDSS	RDS(ON) @10V (typ)	RDS(ON) @4.5V (typ)	ID
100V	33mΩ	37mΩ	18A

## Application

- Power switching application
- LED backlighting



Schematic Diagram



To-252

Table 1. Absolute Maximum Ratings (TA=25°C)

Symbol	Parameter	Value	Unit
$V_{DS}$	Drain-Source Voltage ( $V_{GS}=0V$ )	100	V
$V_{GS}$	Gate-Source Voltage ( $V_{DS}=0V$ )	±20	V
$I_{D(DC)}$	Drain Current (DC) at $T_c=25^\circ C$	18	A
$I_{D(DC)}$	Drain Current (DC) at $T_c=100^\circ C$	12.6	A
$I_{DM(pulse)}$	Drain Current-Continuous@ Current-Pulsed <b>(Note 1)</b>	72	A
$P_D$	Maximum Power Dissipation( $T_c=25^\circ C$ )	47	W
$E_{AS}$	Single Pulse Avalanche Energy <b>(Note 2)</b>	20	mJ
$T_J, T_{STG}$	Operating Junction and Storage Temperature Range	-55 To 175	°C

Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature

2. $E_{AS}$  condition: $T_J=25^\circ C, V_{DD}=50V, V_G=10V, R_G=25\Omega$

**Table 2. Thermal Characteristic**

Symbol	Parameter	Value	Max	Unit
R <sub>θJC</sub>	Thermal Resistance, Junction-to-Case	---	3.2	°C/W

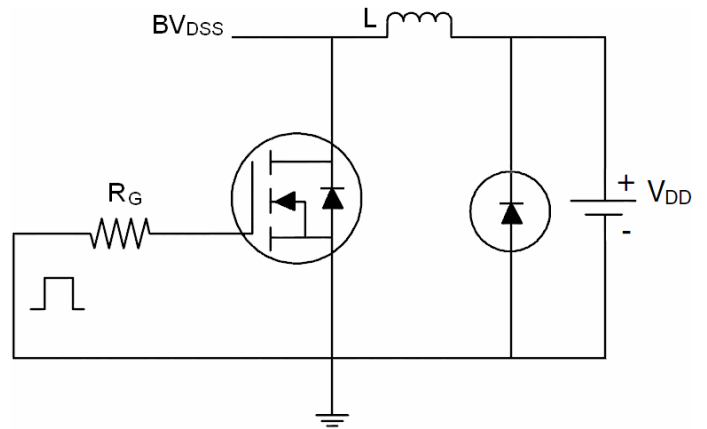
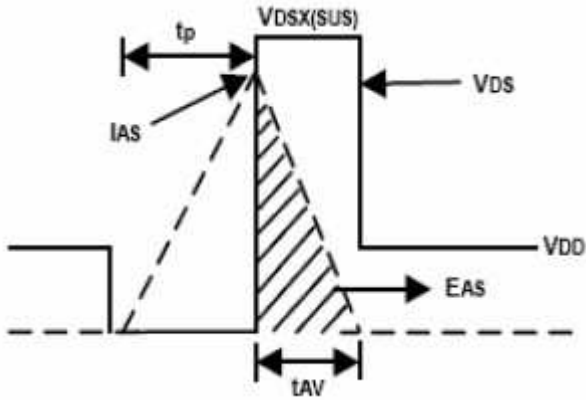
**Table 3. Electrical Characteristics (TA=25°C unless otherwise noted)**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>On/Off States</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	100			V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current(Tc=25°C)	V <sub>DS</sub> =100V, V <sub>GS</sub> =0V			1	μA
I <sub>DSS</sub>	Zero Gate Voltage Drain Current(Tc=100°C)	V <sub>DS</sub> =100V, V <sub>GS</sub> =0V			5	μA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V			±100	nA
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1.2	2.2	2.9	V
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =5A		33	50	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =3A		37	55	
<b>Dynamic Characteristics</b>						
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =5V, I <sub>D</sub> =4.5A	5			S
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =50V, V <sub>GS</sub> =0V f=1.0MHz		1380		PF
C <sub>oss</sub>	Output Capacitance			88		PF
C <sub>rss</sub>	Reverse Transfer Capacitance			60		PF
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =50V, I <sub>D</sub> =4.5A V <sub>GS</sub> =10V		26.8		nC
Q <sub>gs</sub>	Gate-Source Charge			6.4		nC
Q <sub>gd</sub>	Gate-Drain Charge			12.4		nC
<b>Switching Times</b>						
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DS</sub> =50V, R <sub>L</sub> =8.6Ω V <sub>GS</sub> =10V, R <sub>G</sub> =3Ω		7		nS
t <sub>r</sub>	Turn-on Rise Time			12		nS
t <sub>d(off)</sub>	Turn-Off Delay Time			24		nS
t <sub>f</sub>	Turn-Off Fall Time			11		nS
<b>Source-Drain Diode Characteristics</b>						
I <sub>SD</sub>	Source-Drain Current(Body Diode)			18		A
I <sub>SDM</sub>	Pulsed Source-Drain Current(Body Diode)			72		A
V <sub>SD</sub>	Forward On Voltage <sup>(Note 1)</sup>	T <sub>J</sub> =25°C, I <sub>SD</sub> =7A, V <sub>GS</sub> =0V		0.8	1	V
t <sub>rr</sub>	Reverse Recovery Time <sup>(Note 1)</sup>	T <sub>J</sub> =25°C, I <sub>F</sub> =4.5A di/dt=500A/μs		22		nS
Q <sub>rr</sub>	Reverse Recovery Charge <sup>(Note 1)</sup>				28	
t <sub>on</sub>	Forward Turn-on Time	Intrinsic turn-on time is negligible(turn-on is dominated by L <sub>S</sub> +L <sub>D</sub> )				

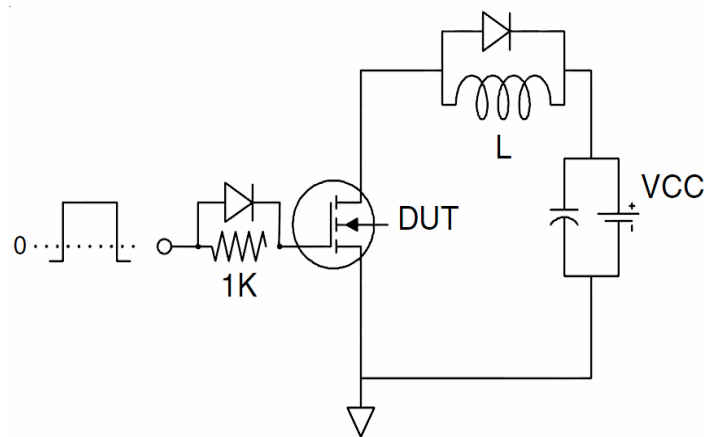
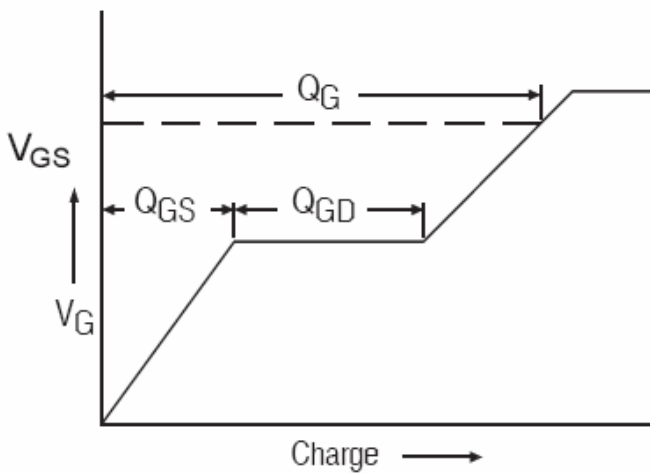
Notes 1. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 1.5%, Starting T<sub>J</sub>=25°C

## Test Circuit

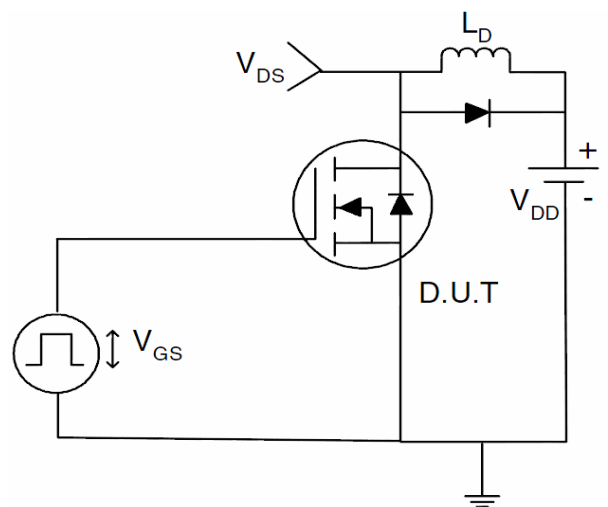
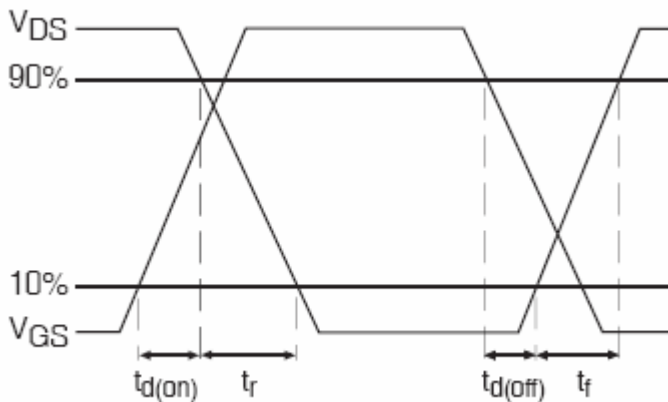
### 1) $E_{AS}$ Test Circuits



### 2) Gate Charge Test Circuit:



### 3) Switch Time Test Circuit:



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS (Curves)

Figure1. On-Region Characteristics

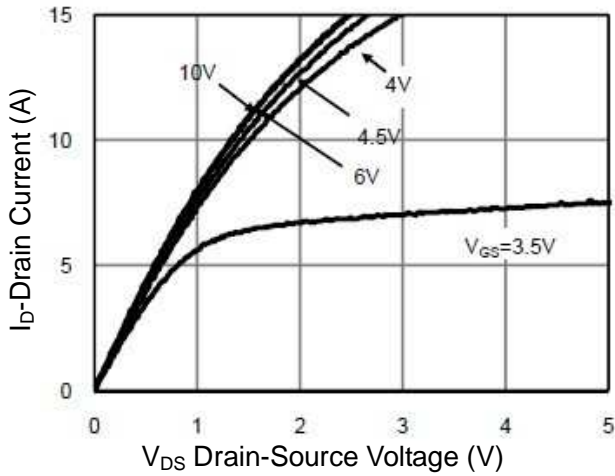


Figure 2: Transfer Characteristics

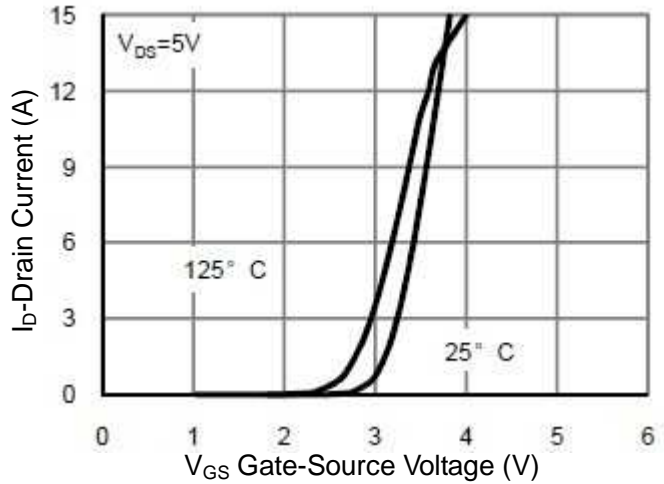


Figure3. ID vs Junction Temperature

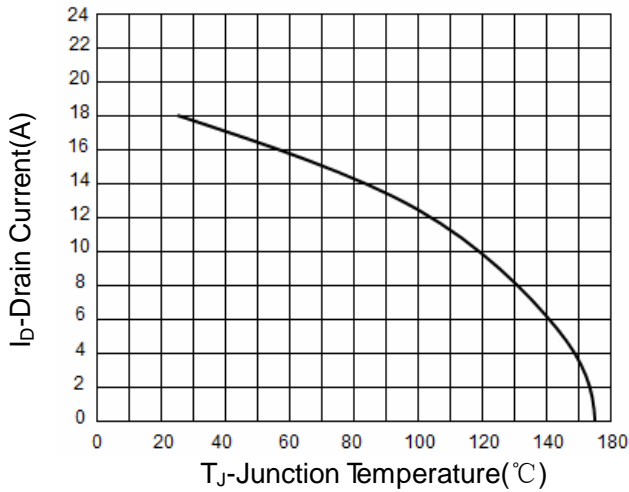


Figure4. On-Resistance vs. Junction Temperature

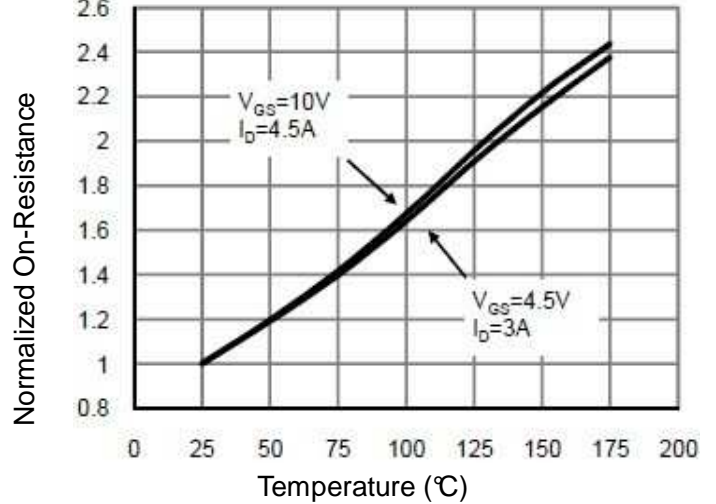


Figure5. On-Resistance vs. Gate-Source Voltage

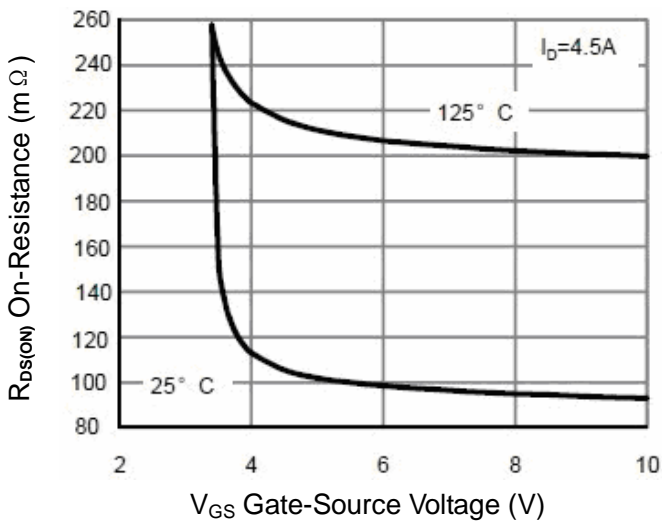
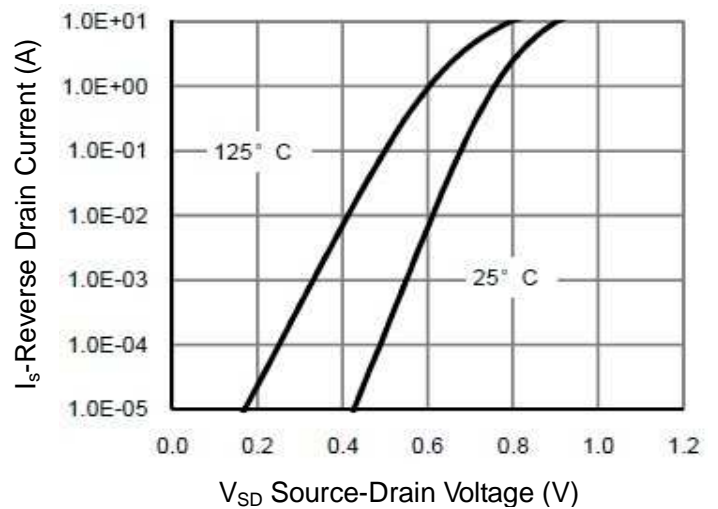
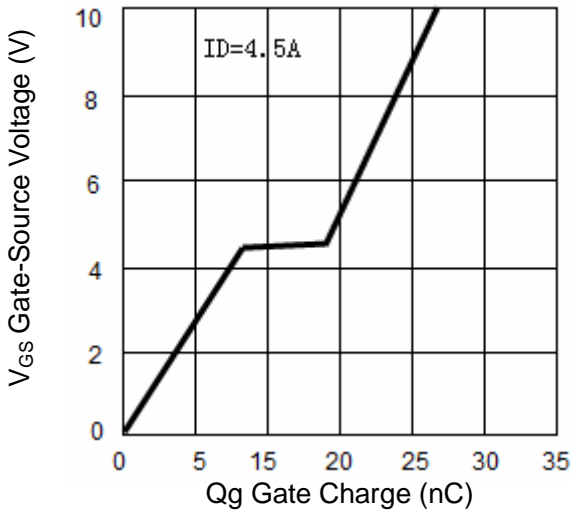


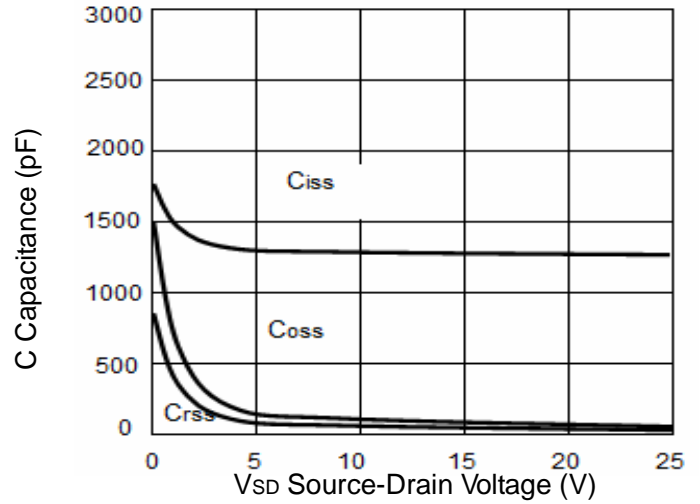
Figure6. Body-Diode Characteristics



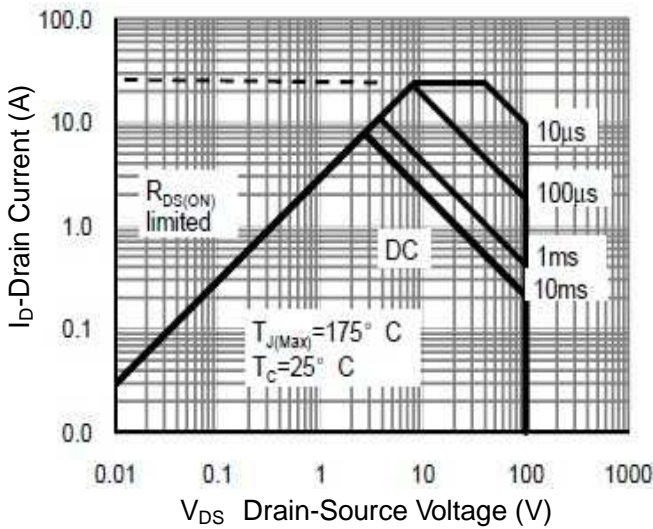
**Figure7. Gate-Charge Characteristics**



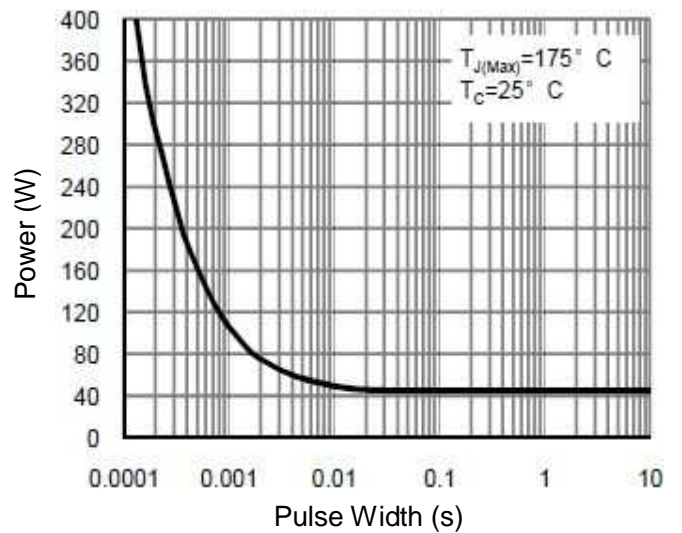
**Figure 8. Capacitance Characteristics**



**Figure 9. Maximum Forward Biased Safe Operating Area**



**Figure10. Single Pulse Power Rating Junction-to-Case**



**Figure11. Normalized Maximum Transient Thermal Impedance**

