

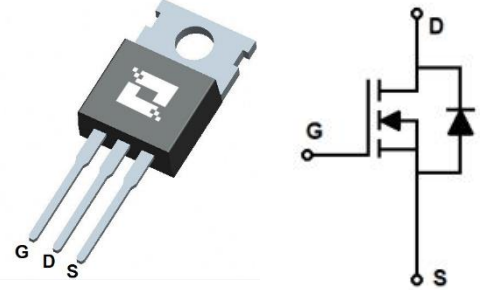
**Features**

- N-Channel, *Low  $R_{DS(on)}$  @  $V_{GS}=10V$*
- *10V Logic Level Control*
- *100% UIS Tested*
- *Green Device Available*

$V_{(BR)DSS}$	$R_{DS(ON)}$ Typ	$I_D$ Max
200V	8.3m $\Omega$ @ 10V	110A

**Applications**

- Quick Charger
- Load Switch
- LED backlighting
- Telecom
- Industrial power supplies


**Order Information**

Product	Package	Marking	Packing
DWP9R820H	TO-220	9R820H	50PCS/Tube

**TO-220**
**Absolute Maximum Ratings**

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

Symbol	Parameter	Rating	Unit
<b>Common Ratings (<math>T_j=25^\circ\text{C}</math> Unless Otherwise Noted)</b>			
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	200	V
$T_{J, STG}$	Junction and Storage Temperature Range	-50 to 175	$^\circ\text{C}$
<b>Mounted on Large Heat Sink</b>			
$I_{DM}$	Pulse Drain Current Tested <sup>①</sup>	$T_C=25^\circ\text{C}$	350 A
$I_S$	Diode continuous forward current	$T_C=25^\circ\text{C}$	110 A
$I_D$	Continuous Drain Current	$T_C=25^\circ\text{C}$	110 A
		$T_C=70^\circ\text{C}$	88 A
$P_D$	Maximum Power Dissipation	$T_C=25^\circ\text{C}$	750 W
EAS	Avalanche energy, single pulsed <sup>②</sup>		1135.35 mJ
$R_{\theta JC}$	Thermal Resistance-Junction to Case		0.188 $^\circ\text{C/W}$

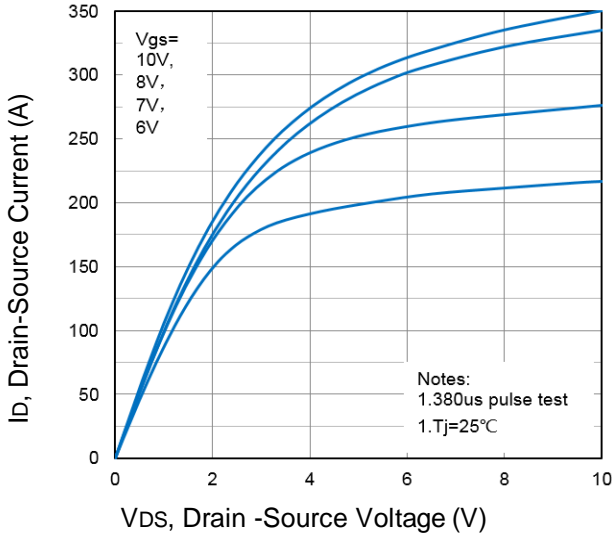
Symbol	Parameter	Condition	Min	Typ	Max	Unit
<b>Static Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise stated)</b>						
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V I <sub>D</sub> =250μA	200	–	–	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current(T <sub>C</sub> =25°C)	V <sub>DS</sub> =200V, V <sub>GS</sub> =0V	–	–	1	μA
	Zero Gate Voltage Drain Current(T <sub>C</sub> =125°C)	V <sub>DS</sub> =160V, V <sub>GS</sub> =0V	–	–	100	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	2.0	3.0	4.0	V
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance <sup>③</sup>	V <sub>GS</sub> =10V, I <sub>D</sub> =30A	–	8.3	10	mΩ
<b>Dynamic Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise stated)</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =100V, V <sub>GS</sub> =0V , f=1MHz	–	5014	–	pF
C <sub>oss</sub>	Output Capacitance		–	416	–	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		–	12	–	pF
R <sub>g</sub>	Gate Resistance	f=1MHz	–	3.5	–	Ω
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =10V I <sub>D</sub> =50, V <sub>GS</sub> =10V	–	76.9	–	nC
Q <sub>gs</sub>	Gate Source Charge		–	25.7	–	nC
Q <sub>gd</sub>	Gate Drain Charge		–	19.1	–	nC
<b>Switching Characteristics @ T<sub>J</sub> = 25°C (unless otherwise stated)</b>						
t <sub>d(on)</sub>	Turn on Delay Time	V <sub>DD</sub> =10V, I <sub>D</sub> =1A, R <sub>G</sub> =6Ω, V <sub>GS</sub> =10V	–	22	–	ns
t <sub>r</sub>	Turn on Rise Time		–	25	–	ns
t <sub>d(off)</sub>	Turn Off Delay Time		–	35	–	ns
t <sub>f</sub>	Turn Off Fall Time		–	18	–	ns
<b>Source Drain Diode Characteristics @ T<sub>J</sub> = 25°C (unless otherwise stated)</b>						
V <sub>SD</sub>	Forward on voltage <sup>③</sup>	I <sub>SD</sub> =20A, V <sub>GS</sub> =0V	–	–	1.2	V

Notes: ① Pulse width limited by maximum allowable junction temperature

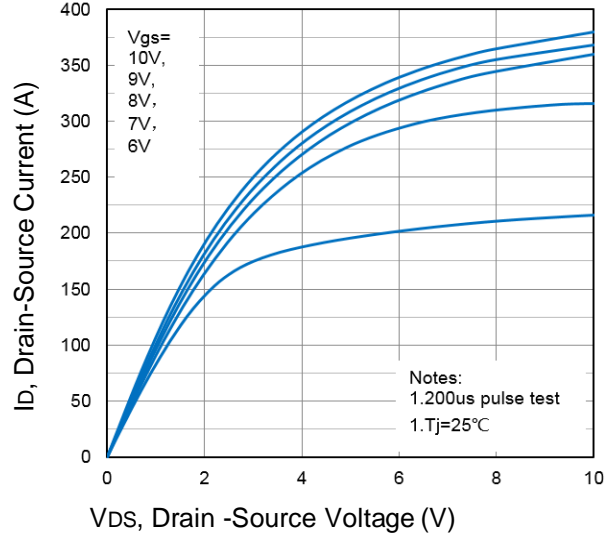
② Limited by T<sub>Jmax</sub>, starting T<sub>J</sub> = 25°C, L = 0.3mH, R<sub>G</sub> = 25Ω, I<sub>AS</sub> = 87A, V<sub>GS</sub> = 10V. Part not recommended for use above this value

③ Pulse width ≤ 300μs; duty cycle ≤ 2%.

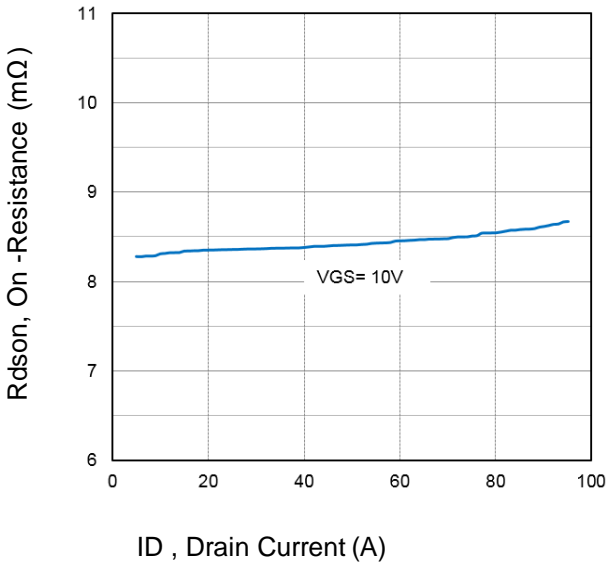
**Typical Characteristics**



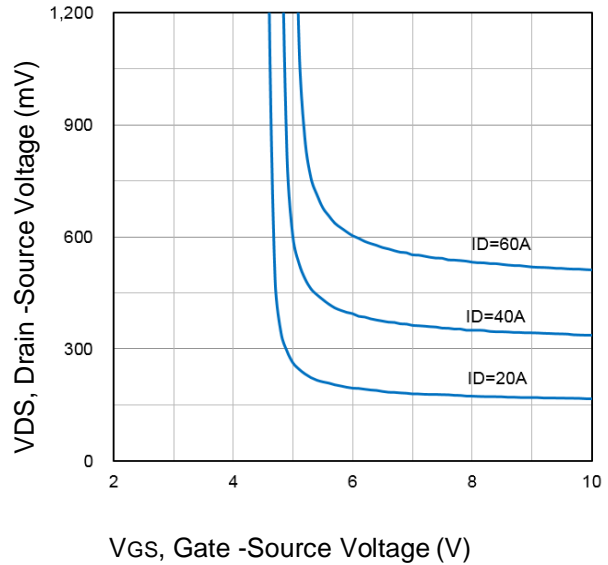
**Fig1.** Typical Output Characteristics



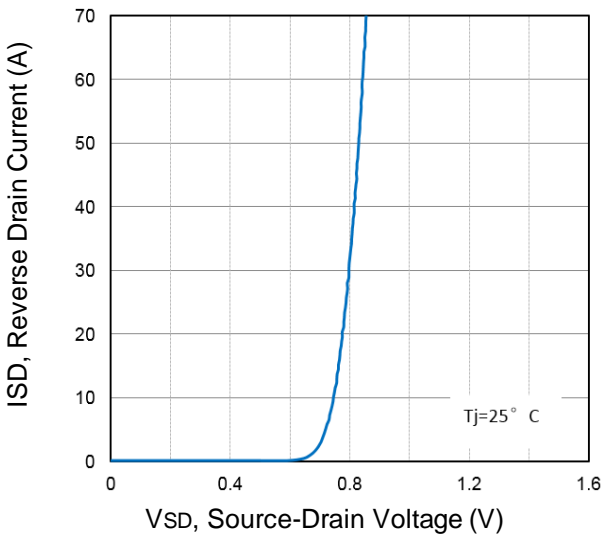
**Fig2.** Typical Output Characteristics



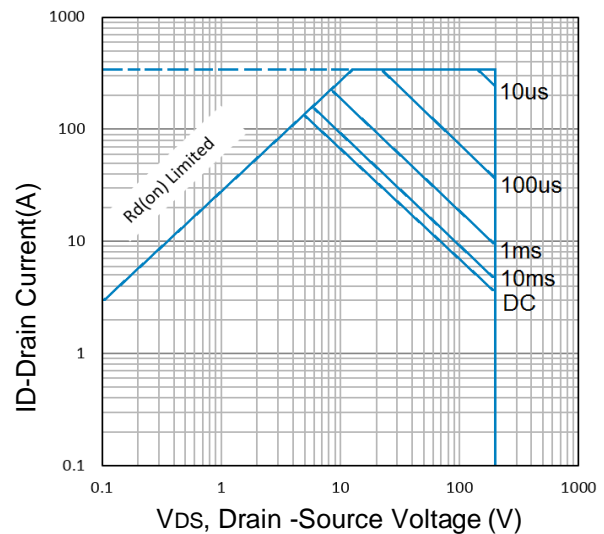
**Fig3.** On-Resistance vs. Drain Current



**Fig4.** Drain-Source Voltage vs Gate-Source Voltage

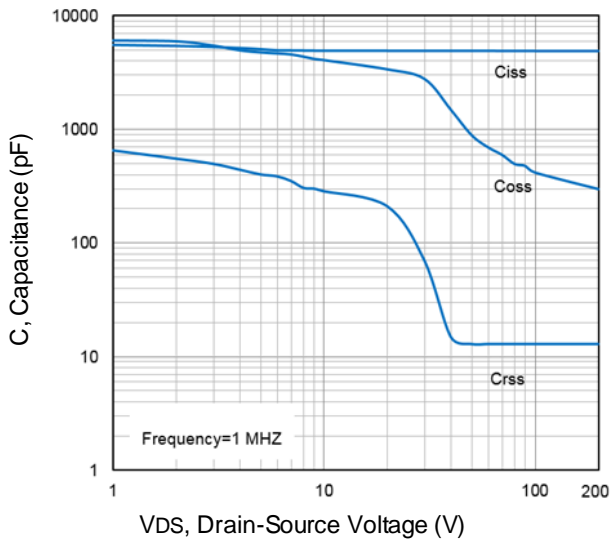


**Fig5.** Typical Source-Drain Diode Forward Voltage

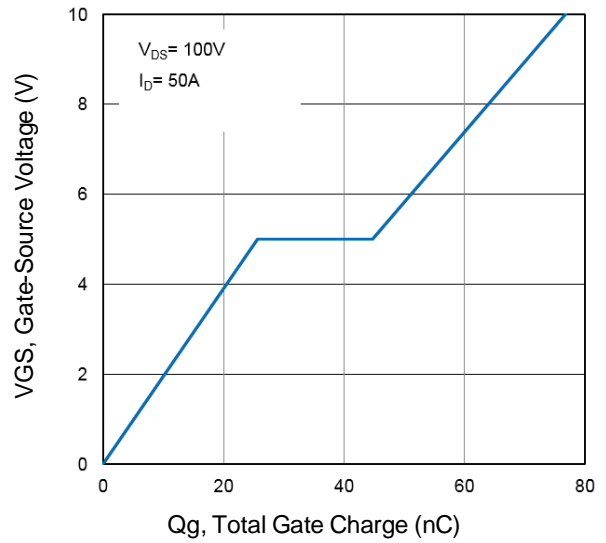


**Fig6.** Maximum Safe Operating Area

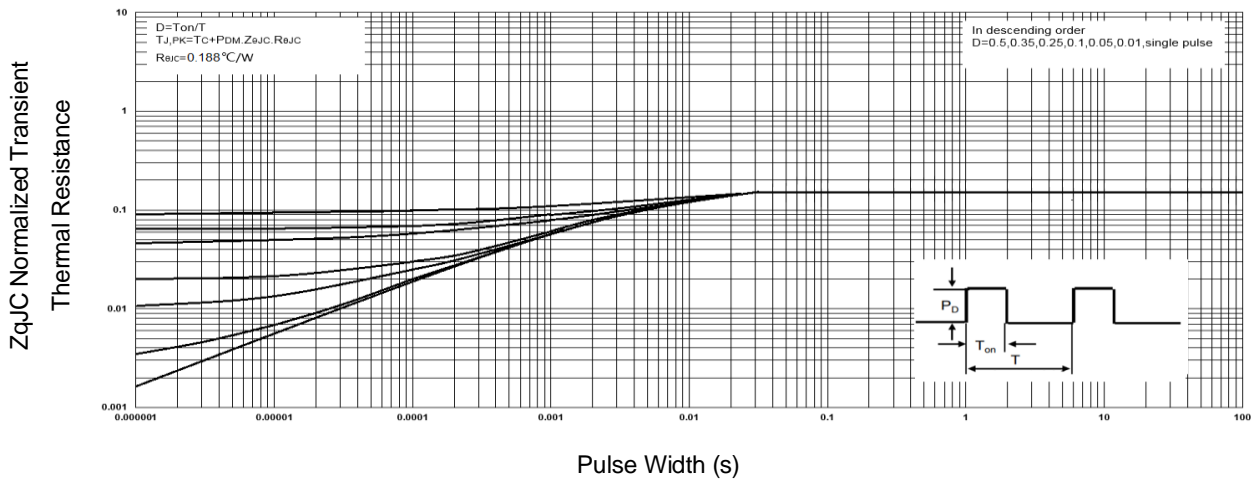
**Typical Characteristics**



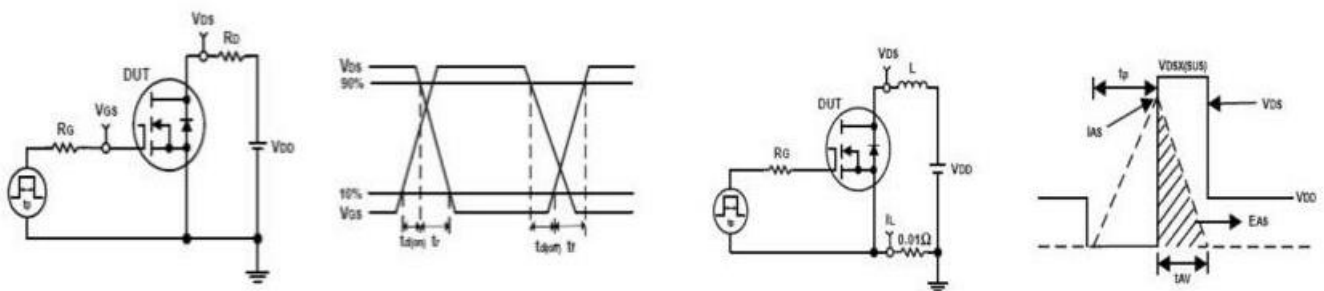
**Fig7.** Typical Capacitance Vs. Drain-Source Voltage

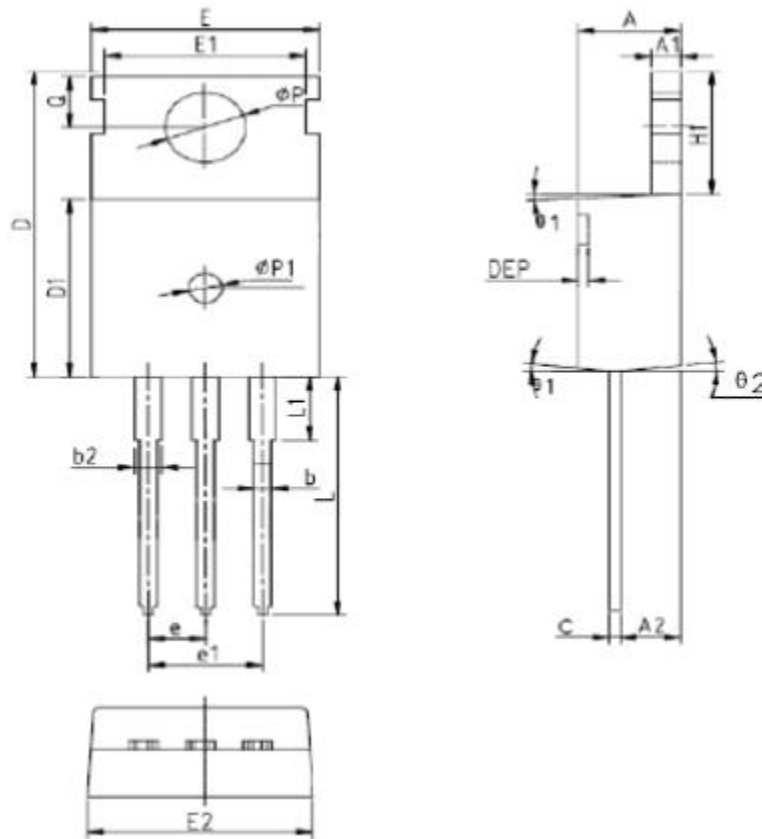


**Fig8.** Typical Gate Charge Vs. Gate-Source Voltage



**Fig9.** Normalized Maximum Transient Thermal Impedance



**TO-220 Mechanical Data**


SYMBOL	MM			INCH			SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX		MIN	NOM	MAX	MIN	NOM	MAX
A	4.40	4.57	4.70	0.173	0.180	0.185	$\phi p1$	1.40	1.50	1.60	0.055	0.059	0.063
A1	1.27	1.30	1.33	0.050	0.051	0.052	e	2.54BSC			0.1BSC		
A2	2.35	2.40	2.50	0.093	0.094	0.098	e1	5.08BSC			0.2BSC		
b	0.77	-	0.90	0.030	-	0.035	H1	6.40	6.50	6.60	0.252	0.256	0.260
b2	1.23	-	1.36	0.048	-	0.054	L	12.75	-	13.17	0.502	-	0.519
C	0.48	0.50	0.52	0.019	0.020	0.021	L1	-	-	3.95	-	-	0.156
D	15.40	15.60	15.80	0.606	0.614	0.622	L2	2.50REF			0.098REF.		
D1	9.00	9.10	9.20	0.354	0.358	0.362	$\phi p$	3.57	3.60	3.63	0.141	0.142	0.143
DEP	0.05	0.10	0.20	0.002	0.004	0.008	Q	2.73	2.80	2.87	0.107	0.110	0.113
E	9.70	9.90	10.10	0.382	0.389	0.398	$\theta 1$	5°	7°	9°	5°	7°	9°
E1	-	8.70	-	-	0.343	-	$\theta 2$	1°	3°	5°	1°	3°	5°
E2	9.80	10.00	10.20	0.386	0.394	0.401							

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