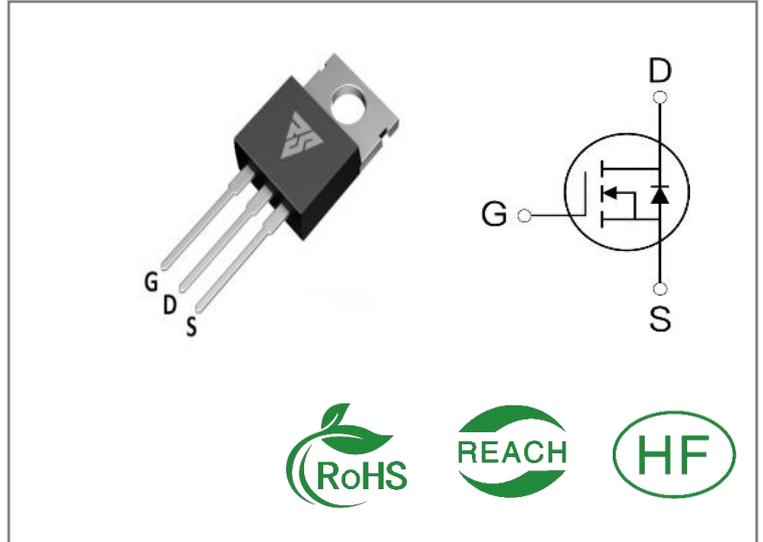


ID	R <sub>Ds(ON)</sub> (Typ)	VDSS
150A	3.0mΩ	40V


**Applications:**

- Load Switch
- PWM Applications
- Power Management

**Features:**

- Fast switching speed
- 100% avalanche tested
- Improved dv/dt capability

**Ordering Information**

Part Number	Package	Marking	Packing	Qty.
RS40N150T	TO-220	RS40N150T	Tube	50 PCS

**Absolute Maximum Ratings** T<sub>c</sub>= 25°C unless otherwise specified

Symbol	Parameter	RS40N150T	Units
VDSS	Drain-to-Source Voltage	40	V
ID	Continuous Drain Current TC=25°C	150	A
ID	Continuous Drain Current TC=100°C	98	
IDM	Pulsed Drain Current	600	
PD	Power Dissipation	180	W
VGS	Gate- to- Source Voltage	±20	V
EAS	Single Pulse Avalanche Energy L = 0.5mH, VDD = 15V, R <sub>G</sub> = 25Ω, T <sub>j</sub> = 25°C	255	mJ
TL TPKG	Maximum Temperature for Soldering	300 260	°C
	Leads at 0.063in(1.6mm)from Case for 10 seconds		
	Package Body for 10 seconds		
TJ and TSTG	Operating Junction and Storage Temperature Range	-55 to 175	

\* Drain Current Limited by Maximum Junction Temperature

Caution: Stresses greater than those listed in the“ Absolute Maximum Ratings” Table may cause permanent damage to the device.

**Thermal Resistance**

Symbol	Parameter	RS40N150T	Units	Test Conditions
R $\theta$ JC	Junction-to-Case	0.83	°C / W	Drain lead soldered to water cooled heatsink, PD adjusted for a peak junction temperature of + 1 5 0 °C
R $\theta$ JA	Junction-to-Ambient	35		1 cubic foot chamber, free air.

**OFF Characteristics** T<sub>J</sub>= 25°C unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
BVDSS	Drain- to- source Breakdown Voltage	40	--	--	V	VGS=0V, ID=250μA
IDSS	Drain- to- Source Leakage Current	--	--	1	μA	VDS=40V, VGS=0V
IGSS	Gate- to- Source Forward Leakage	--	--	100	nA	VGS=20V , VDS=0V
	Gate- to- Source Reverse Leakage	--	--	-100		VGS=-20V , VDS=0V

**ON Characteristics** T<sub>J</sub>=25°C unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
RDS(on)	Static Drain- to- Source On-Resistance	--	3.0	4.0	mΩ	VGS=10V, ID=30A
		--	4.5	5.6	mΩ	VGS=4.5V, ID=20A
VGS (TH)	Gate Threshold Voltage	2	2.8	4	V	VGS=VDS, ID=250μA

**Resistive Switching Characteristics** Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
td(ON)	Turn- on Delay Time	--	21	--	nS	VDS=20V ID=30A RG=3Ω VGS=10V
trise	Rise Time	--	32	--		
td(OFF)	Turn- OFF Delay Time	--	71	--		
tfall	Fall Time	--	40	--		

**Dynamic Characteristics** Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
Ciss	Input Capacitance	--	4890	--	pF	VGS= 0V VDS=20V f=1.0MHz
Coss	Output Capacitance	--	525	--		
Crss	Reverse Transfer Capacitance	--	318	--		
Qg	Total Gate Charge	--	80	--	nC	VDS= 20V ID=20A VGS=10V
Qgs	Gate- to- Source Charge	--	17	--		
Qgd	Gate-to-Drain(" Miller") Charge	--	21	--		

**Source- Drain Diode Characteristics**

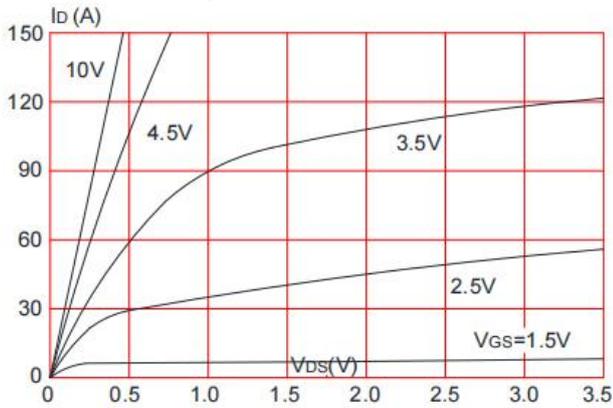
Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
IS	Continuous Source Current	--	--	150	A	Integral pn- diode in MOSFET
ISM	Maximum Pulsed Current	--	--	600	A	
VSD	Diode Forward Voltage	--	--	1.2	V	IS=30A,VGS=0V
trr	Reverse Recovery Time	--	27	--	nS	VGS=0V IS=30A di/dt=100A/μs
Qrr	Reverse Recovery Charge	--	46	--	nC	

**Notes:**

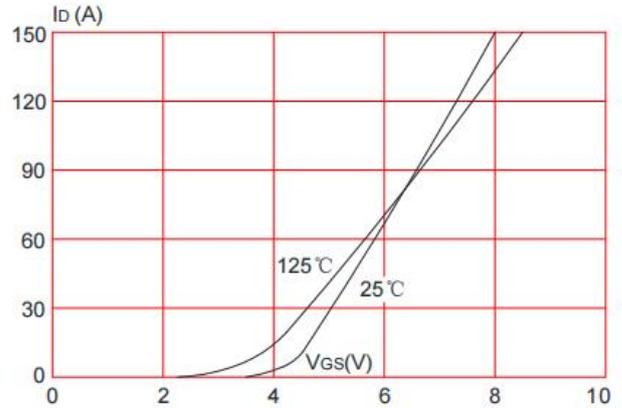
- \* 1. Repetitive rating, pulse width limited by maximum junction temperature.
- \* 2. Pulse Test: Pulse width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 1\%$

**Typical Feature Curve**

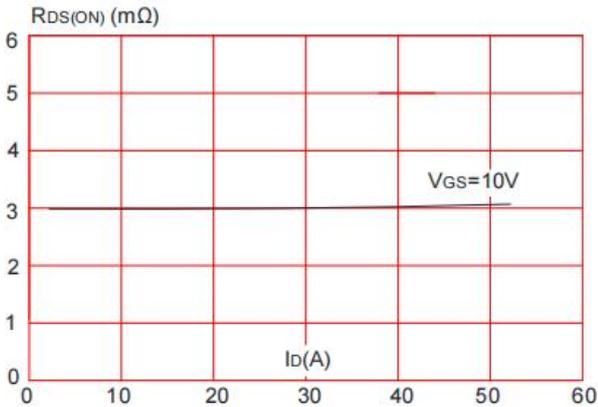
**Figure 1: Output Characteristics**



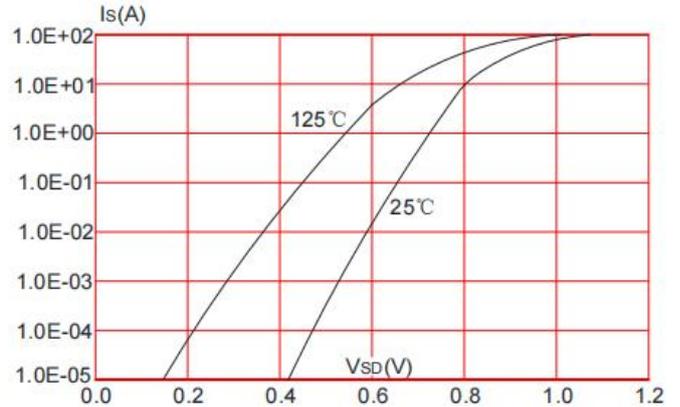
**Figure 2: Typical Transfer Characteristics**



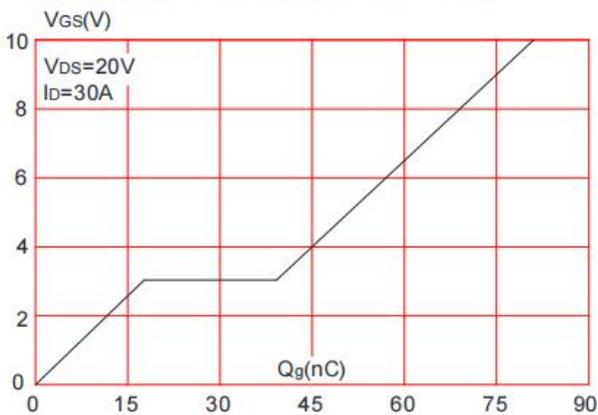
**Figure 3: On-resistance vs. Drain Current**



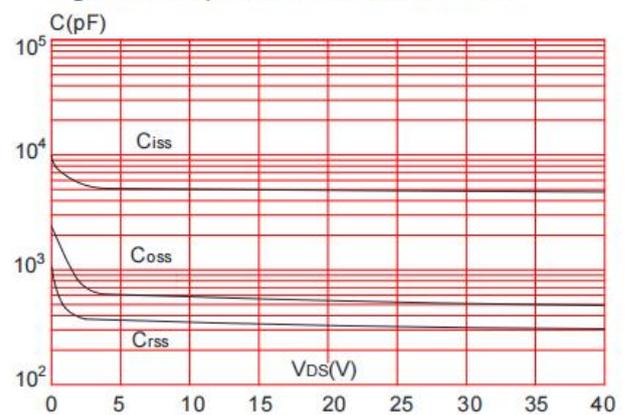
**Figure 4: Body Diode Characteristics**



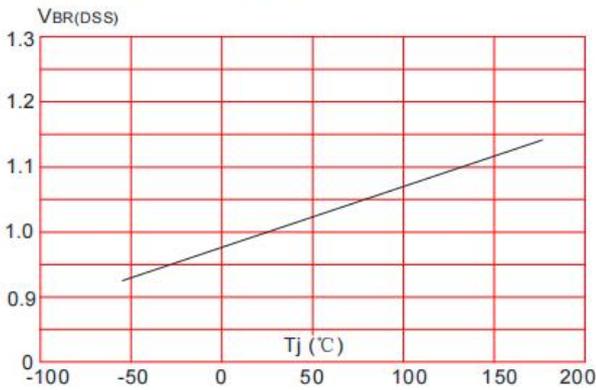
**Figure 5: Gate Charge Characteristics**



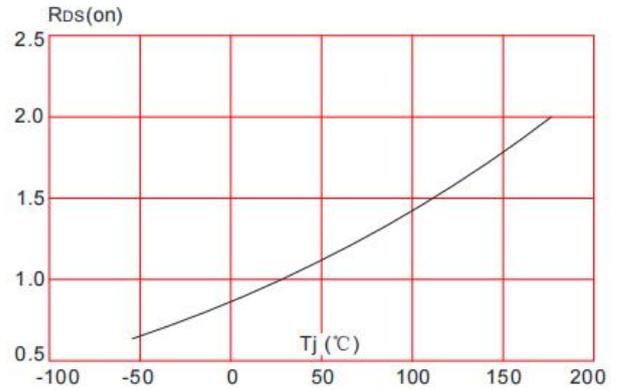
**Figure 6: Capacitance Characteristics**



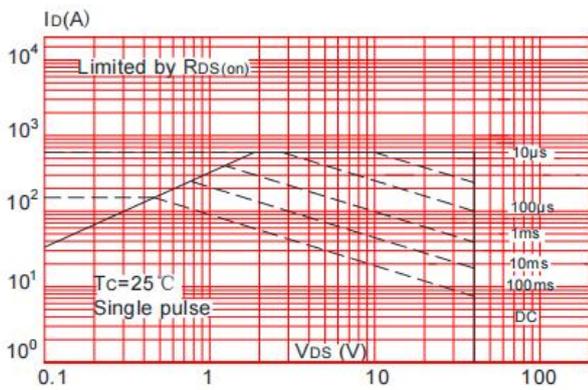
**Figure 7: Normalized Breakdown Voltage vs. Junction Temperature**



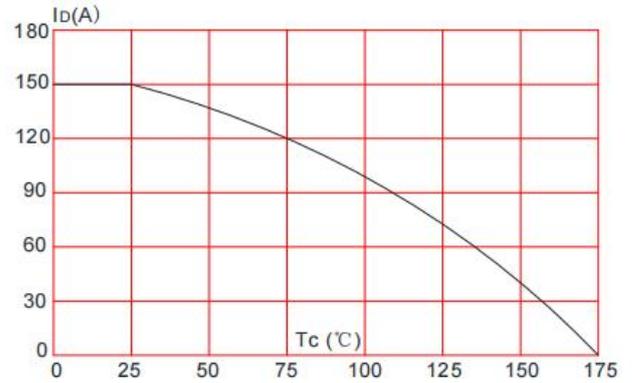
**Figure 8: Normalized on Resistance vs. Junction Temperature**



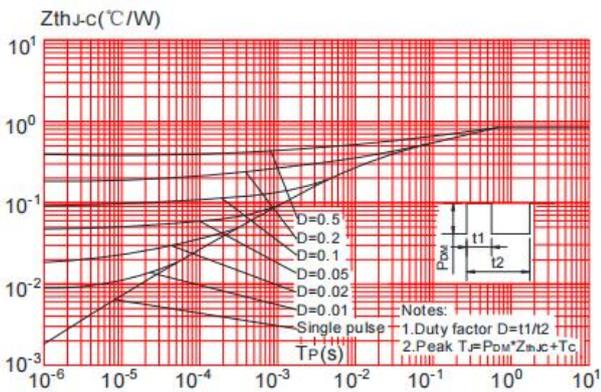
**Figure 9: Maximum Safe Operating Area**



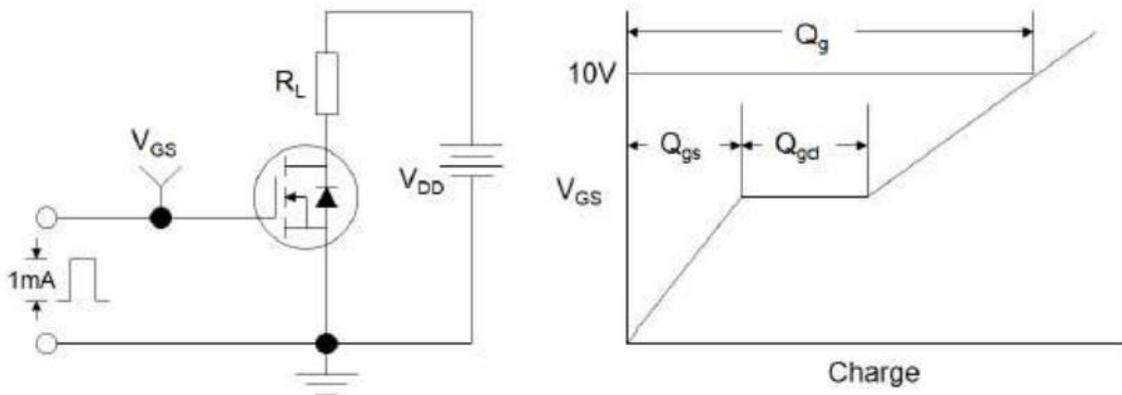
**Figure 10: Maximum Continuous Drain Current vs. Case Temperature**



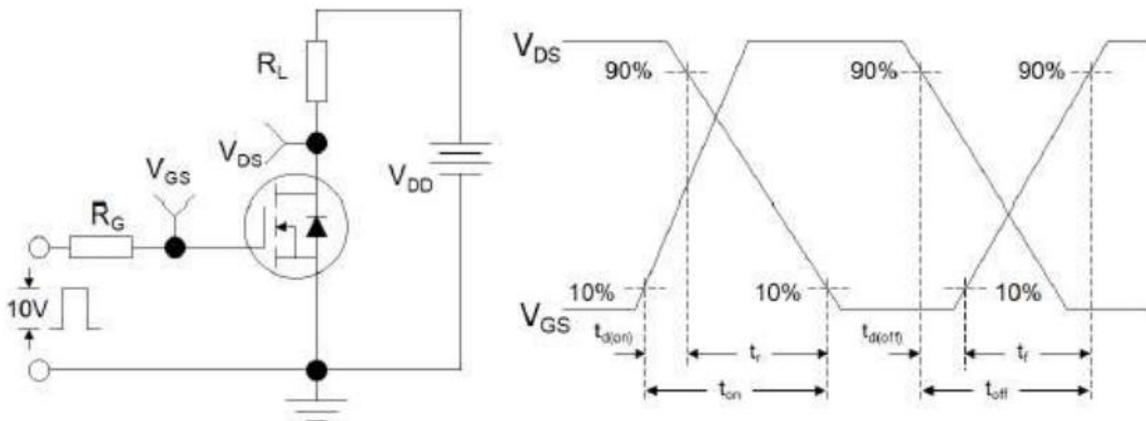
**Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case**



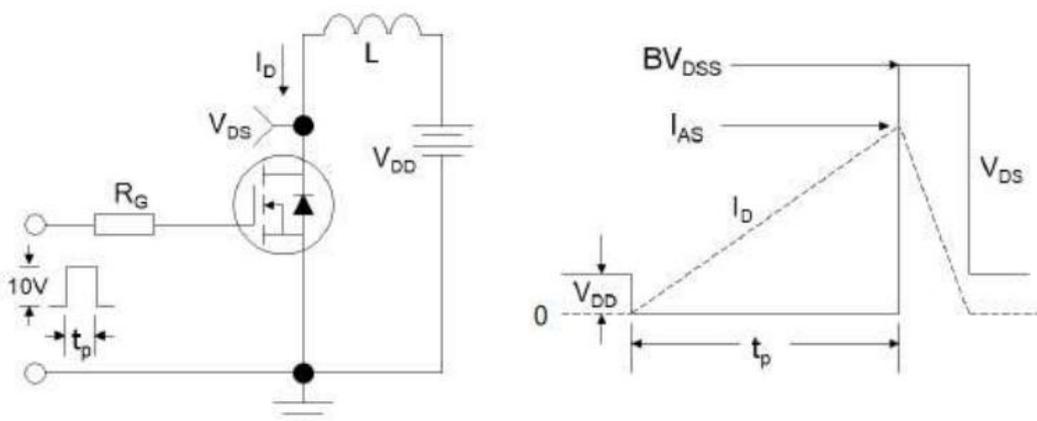
**Test ircuits and Waveforms**



**Figure1:Gate Charge Test Circuit & Waveform**

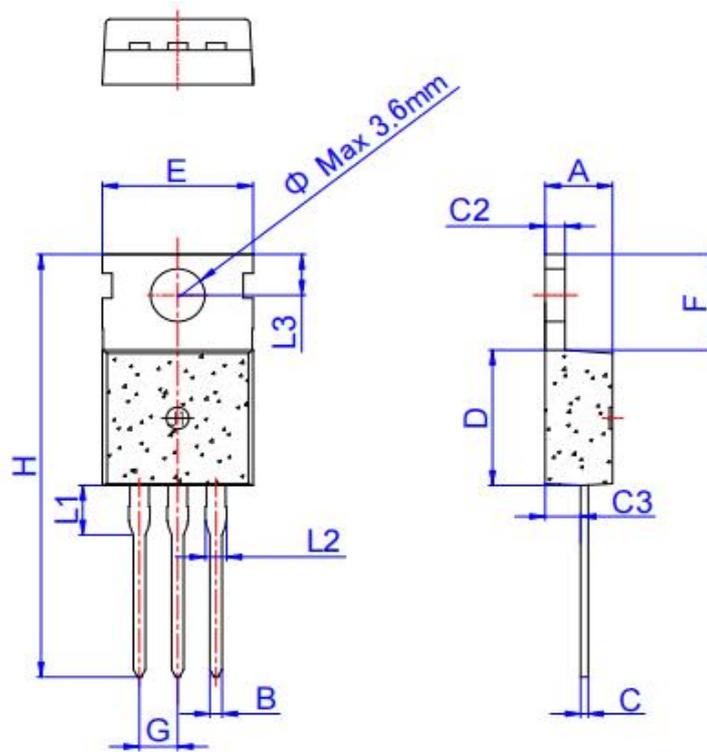


**Figure 2: Resistive Switching Test Circuit & Waveforms**



**Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms**

**Package outline drawing(TO-220 Unit: mm )**



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.40		4.60	0.173		0.181
B	0.70		0.90	0.028		0.035
C	0.45		0.60	0.018		0.024
C2	1.23		1.32	0.048		0.052
C3	2.20		2.60	0.087		0.102
D	8.90		9.90	0.350		0.390
E	9.90		10.3	0.390		0.406
F	6.30		6.90	0.248		0.272
G		2.54			0.1	
H	28.0		29.8	1.102		1.173
L1		3.39			0.133	
L2	1.14		1.70	0.045		0.067
L3	2.65		2.95	0.104		0.116
Φ		3.6			0.142	

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