

**TS6N65**

**6.0Amps, 650V N-Channel Power Mosfet**

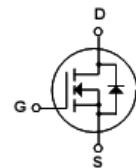
DRAWING

**Features**

- \* 6.0A,650V, $R_{DS(ON)}=1.23\Omega@V_{GS}=10V$
- \* Low gate charge(typical 19nc)
- \* Low crss (typical 26pF)
- \* Fast switching
- \* 100%avalanche tested
- \* Improved dv/dt capability



G D S



**General Description**

- \* Package:ITO-220AB DG
- \* 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 switch mode power supply.

**Absolute Maximum Ratings**

Symbol	Parameter	Spec	Units
$V_{DSS}$	Drain-Source Voltage	650	V
$I_D$	Drain Current -Continuous( $T_c=25^\circ C$ )	6.0	A
	-Continuous( $T_c=100^\circ C$ )	3.6	A
$I_{DM}$	Drain Current -Pulsed	24	A
$V_{GSS}$	Gate-Source Voltage	$\pm 30$	V
$E_{AS}$	Single Pulsed Avalanche Energy	135	mJ
$I_{AR}$	Avalanche Current	6.0	A
$E_{AR}$	Repetitive Avalanche Energy	5.4	mJ
dv/dt	Peak Diode Recovery dv/dt	4.5	V/ns
$P_D$	Power Dissipation ( $TC=25^\circ C$ )	54	W
	-Derate above $25^\circ C$	0.3	W/ $^\circ C$
$T_j, T_{STG}$	Operating and Storage Temperature Range	-55 to +150	$^\circ C$
$T_L$	Maximum lead temperature for solderin purpose 1/8" from case for 5 seconds	300	$^\circ C$

**Notes:**

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2.  $I_{AS}=7A, V_{DD}=50V, L=7mH, V_G=10V$ , Starting  $T_J=25^\circ C$
3.  $I_{SD} \leq 7A, di/dt \leq 200A/\mu s, V_{DD} \leq B_{VDSS}$ , Starting  $T_J=25^\circ C$

**Thermal Characteristics**

Symbol	Parameter	Typ	Max	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	-	2.3	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	-	62.5	$^\circ C/W$

**Electrical Characteristics**(Tc=25°C unless otherwise noted)

**Off Characteristics**

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	650	—	—	V
BV <sub>DSS</sub> /T <sub>J</sub>	Breakdown Voltage Temperature Coeffocoent	I <sub>D</sub> =250uA, Referenced to 25°C	—	0.63	—	V/°C
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =650V, V <sub>GS</sub> =0V	—	—	1	uA
		V <sub>DS</sub> =540V, Tc=125°C	—	—	10	uA
I <sub>GSSF</sub>	Gate-Body Leakage Current, Forward	V <sub>GS</sub> =30V, V <sub>DS</sub> =0V	—	—	100	nA
I <sub>GSSR</sub>	Gate-Body Leakage Current, Reverse	V <sub>GS</sub> =-30V, V <sub>DS</sub> =0V	—	—	-100	nA

**On Characteristics**

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
V <sub>GSTH</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA	2.0	—	4.0	V
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =3.0A	—	1.23	1.5	Ω
G <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =50, I <sub>D</sub> =3.0A	1	—	100	S

**Dynamic Characteristics**

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
C <sub>JSS</sub>	Input Capacitance	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1.0MHz	—	1350	—	pF
C <sub>OSS</sub>	Output Capacitance		—	120	—	pF
C <sub>RSS</sub>	Reverse Transfer Capacitance		—	26	—	pF

**Switching Characteristics**

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
t <sub>don</sub>	Turn-On Delay Time	V <sub>DD</sub> =325V I <sub>D</sub> =6.0A R <sub>G</sub> =25Ω	—	12	—	ns
t <sub>r</sub>	Turn-On Rise Time		—	13	—	ns
t <sub>doff</sub>	Turn-Off Delay Time		—	25	—	ns
t <sub>f</sub>	Turn-Off Fall Time		—	13	—	ns
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =520V	—	1.9	—	nc
Q <sub>gs</sub>	Gate-Source Charge	I <sub>D</sub> =6.0A	—	5.1	—	nc
Q <sub>gd</sub>	Gate-Drain Charge	V <sub>GS</sub> =10V	—	6.9	—	nc

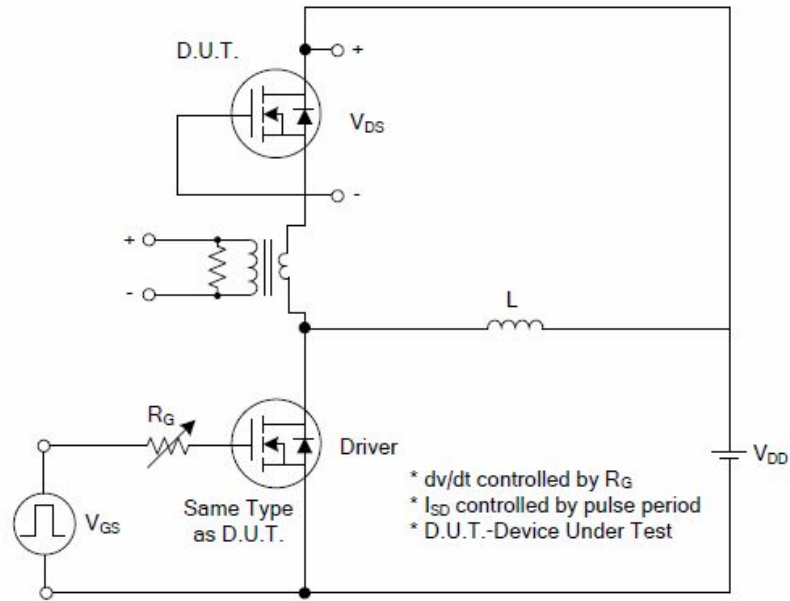
**Drain-Source Diode Characteristics and Maximum Ratings**

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
I <sub>s</sub>	Maximum Continuous Drain-source diode forward current		—	—	6.0	A
I <sub>sm</sub>	Maxmum pulsed drain-source diode diode forward current		—	—	24	A
V <sub>sd</sub>	Drain-source diode forward Voltage	V <sub>GS</sub> =0V, I <sub>s</sub> =6.0A	—	—	1.5	V
T <sub>rr</sub>	Rrverse Recovery Time	V <sub>GS</sub> =0V, I <sub>s</sub> =6.0A	—	330	—	ns
Q <sub>rr</sub>	Rrverse Recovery charge	di/dt=100A/us	—	2.8	—	uc

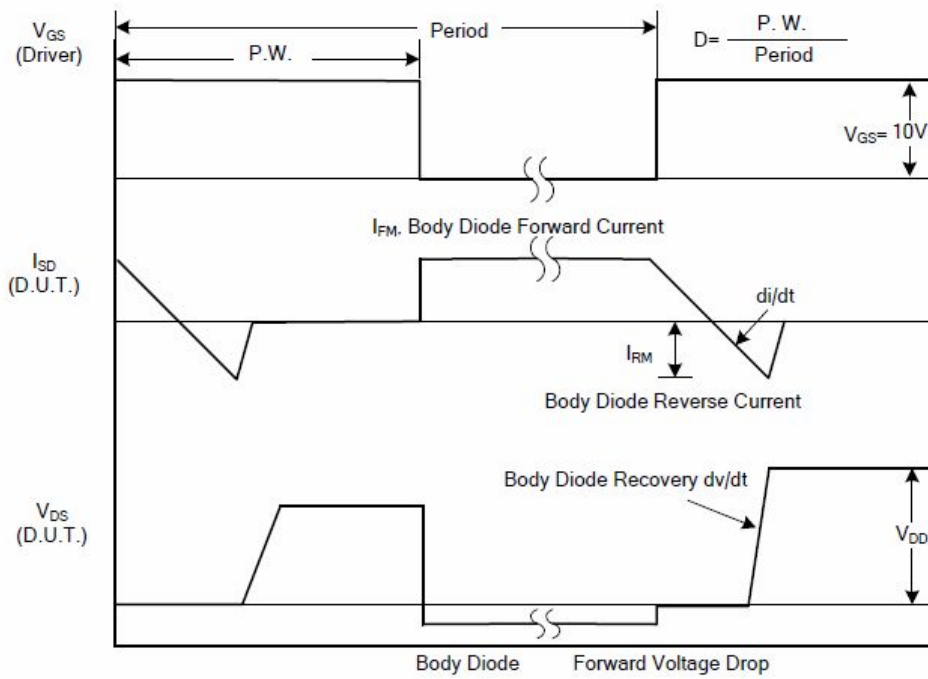
**Notes:**

1. Pulse Test: Pulse Width ≅ 300μs, Duty Cycle ≅ 2%

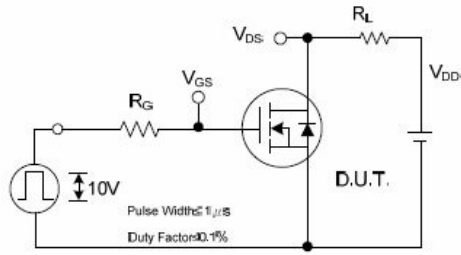
Test circuits and waveforms



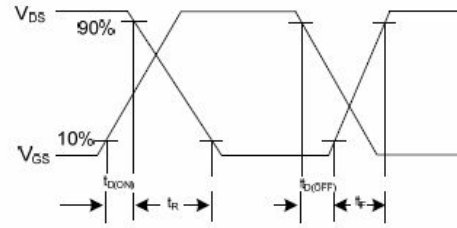
Peak Diode Recovery  $dv/dt$  Test Circuit



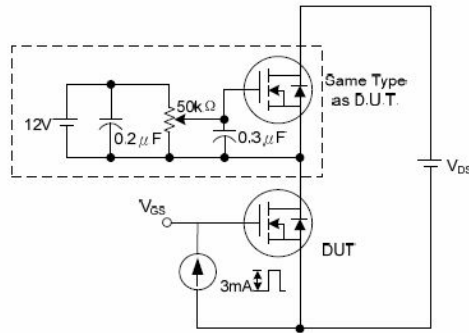
Peak Diode Recovery  $dv/dt$  Waveforms



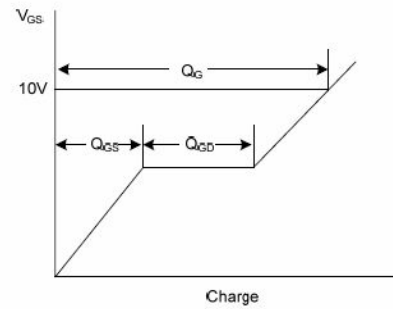
Switching Test Circuit



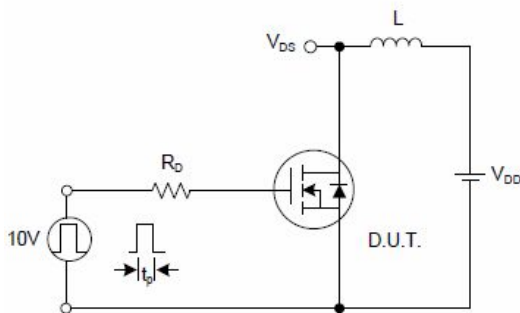
Switching Waveforms



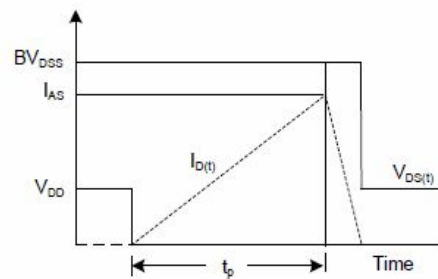
Gate Charge Test Circuit



Gate Charge Waveform

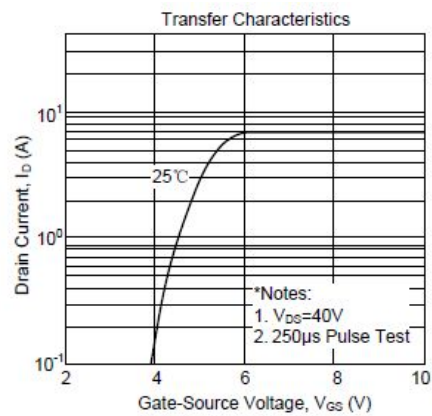
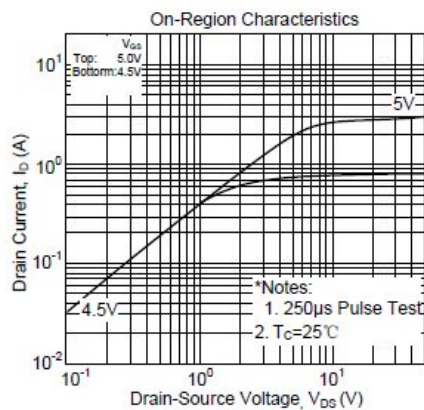


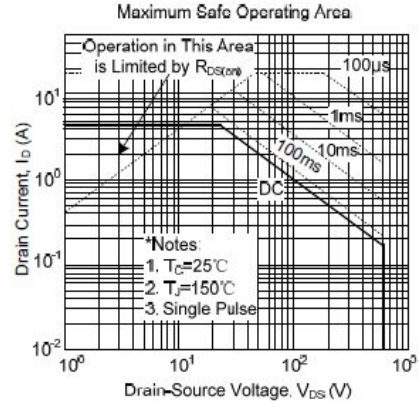
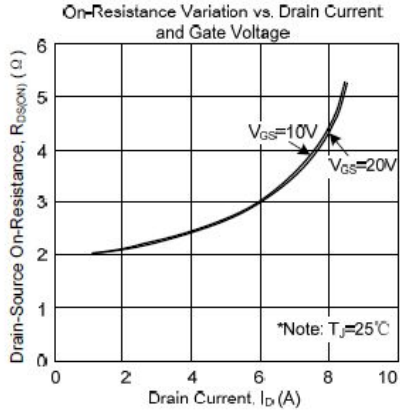
Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

Typical Characteristics





Mechanical Dimensions

