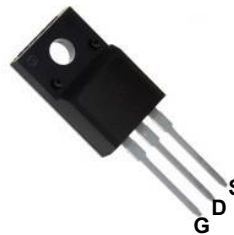
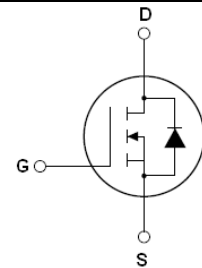


Main Product Characteristics

V_{DS}	650V
$R_{DS(ON)max}$	180m Ω
I_D	21A



TO-220F



Schematic Diagram

Features and Benefits

- Advanced MOSFET process technology
- Ideal for high efficiency switched mode power supplies
- Low on-resistance with low gate charge
- Fast switching and reverse body recovery



Description

The GSJU6521 utilizes the latest techniques to achieve high cell density and low on-resistance. These features make this device extremely efficient and reliable for use in high efficiency switch mode power supply and a wide variety of other applications.

Absolute Maximum Ratings ($T_C=25^{\circ}C$ unless otherwise specified)

Parameter	Symbol	Max.	Unit
Drain-Source Voltage ($V_{GS}=0V$)	V_{DS}	650	V
Gate-Source Voltage ($V_{DS}=0V$), AC ($f>1$ Hz)	V_{GS}	± 30	V
Continuous Drain Current ³ at $T_C=25^{\circ}C$	$I_{D(DC)}$	21	A
Continuous Drain Current ³ at $T_C=100^{\circ}C$	$I_{D(DC)}$	13.2	A
Pulsed Drain Current ^{1, 3}	$I_{DM(pluse)}$	84	A
Maximum Power Dissipation ($T_C=25^{\circ}C$)	P_D	33.8	W
Derate Above 25 $^{\circ}C$		0.27	W/ $^{\circ}C$
Single Pulse Avalanche Energy ²	E_{AS}	441	mJ
Avalanche Current ¹	I_{AR}	10.5	A
Repetitive Avalanche Energy, t_{AR} Limited by T_{Jmax1}	E_{AR}	0.7	mJ
Drain Source Voltage Slope, $V_{DS} \leq 480V$,	d_v/d_t	50	V/ns
Reverse Diode d_v/d_t , $V_{DS} \leq 480V$, $I_{SD} < I_D$	d_v/d_t	15	V/ns
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-50 to +150	$^{\circ}C$
Thermal Resistance, Junction-to-Case (Maximum)	R_{thJC}	3.69	$^{\circ}C/W$
Thermal Resistance, Junction-to-Ambient (Maximum)	R_{thJA}	80	$^{\circ}C/W$

Electrical Characteristics ($T_A=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	650	-	-	V
Zero Gate Voltage Drain Current($T_C=25^\circ\text{C}$)	I_{DSS}	$V_{DS}=650V, V_{GS}=0V$	-	0.05	1	μA
Zero Gate Voltage Drain Current($T_C=125^\circ\text{C}$)	I_{DSS}	$V_{DS}=650V, V_{GS}=0V$	-	-	100	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	3	3.5	4	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=10.5A$	-	150	180	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=20V, I_D=10.5A$	-	16	-	S
Input Capacitance	C_{iss}	$V_{DS}=50V, V_{GS}=0V, F=1.0\text{MHz}$	-	2250	-	PF
Output Capacitance	C_{oss}		-	83	-	PF
Reverse Transfer Capacitance	C_{rss}		-	1.6	-	PF
Total Gate Charge	Q_g	$V_{DS}=480V, I_D=21A, V_{GS}=10V$	-	36	-	nC
Gate-Source Charge	Q_{gs}		-	14	-	nC
Gate-Drain Charge	Q_{gd}		-	8.5	-	nC
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=380V, I_D=11A, R_G=4\Omega, V_{GS}=10V$	-	11	-	nS
Turn-On Rise Time	t_r		-	6	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	61	-	nS
Turn-Off Fall Time	t_f		-	4.5	-	nS
Source- Drain Diode Characteristics						
Source-Drain Current(Body Diode)	I_{SD}	$T_C=25^\circ\text{C}$	-	-	21	A
Pulsed Source-Drain Current(Body Diode)	I_{SDM}		-	-	84	A
Forward On Voltage	V_{SD}	$T_j=25^\circ\text{C}, I_{SD}=21A, V_{GS}=0V$	-	0.9	1.3	V
Reverse Recovery Time	t_{rr}	$T_j=25^\circ\text{C}, I_F=21A, d_i/d_t=100A/\mu s$	-	310	-	nS
Reverse Recovery Charge	Q_{rr}		-	5	-	μC
Peak Reverse Recovery Current	I_{rrm}		-	28	-	A

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

2. $T_j=25^\circ\text{C}, V_{DD}=50V, V_G=10V, R_G=25\Omega$.

3. Limited by maximum junction temperature.

Typical Electrical and Thermal Characteristic Curves

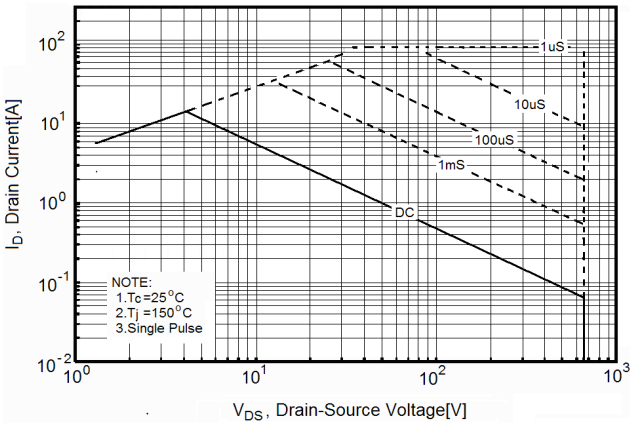


Figure 1. Safe Operating Area For TO-220F

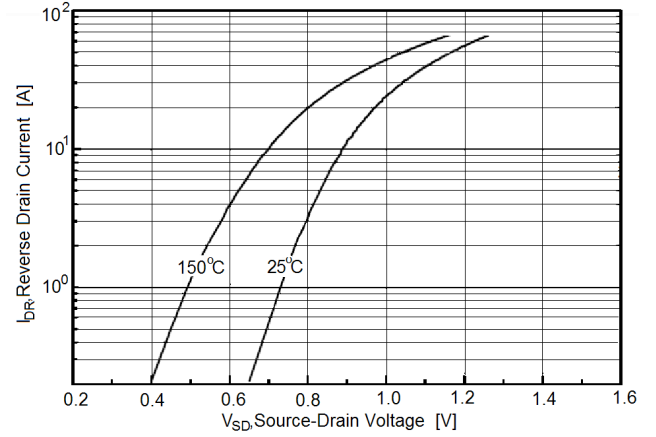


Figure 2. Source-Drain Diode Forward Voltage

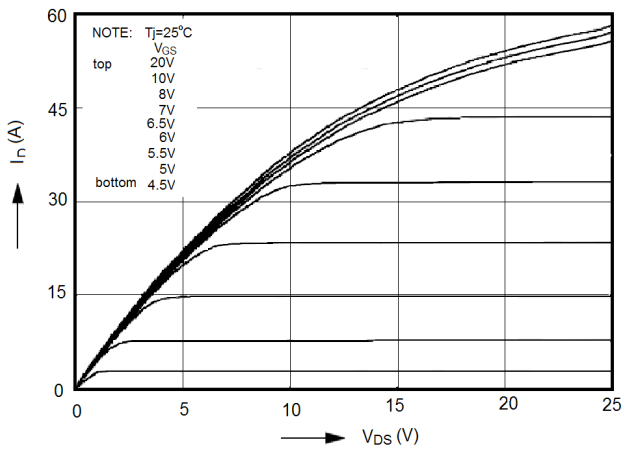


Figure 3. Output Characteristics

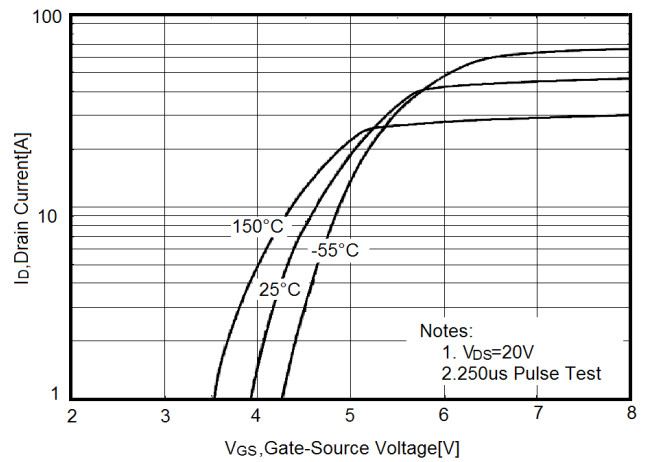


Figure 4. Transfer Characteristics

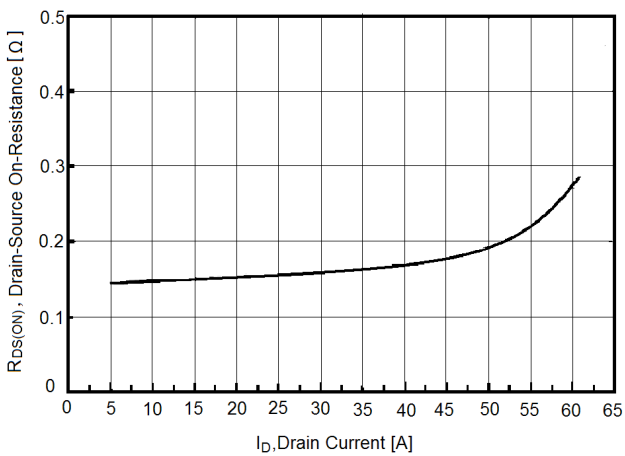


Figure 5. Static Drain-Source on Resistance

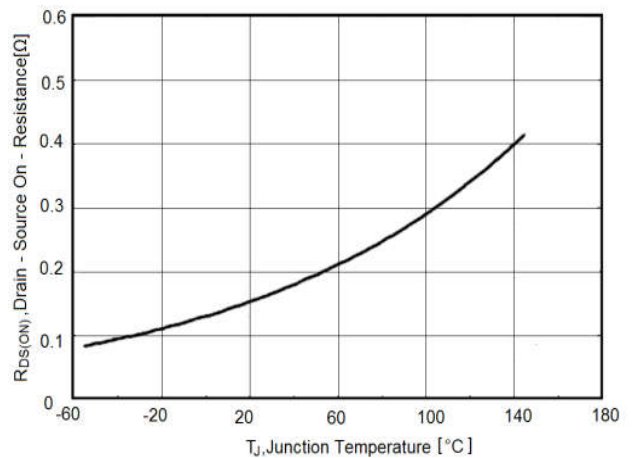


Figure 6. $R_{DS(ON)}$ vs. Junction Temperature

Typical Electrical and Thermal Characteristic Curves

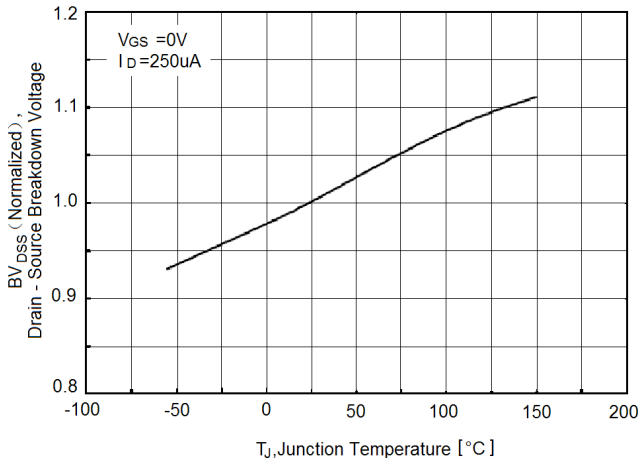


Figure 7. BV_{DSS} vs. Junction Temperature

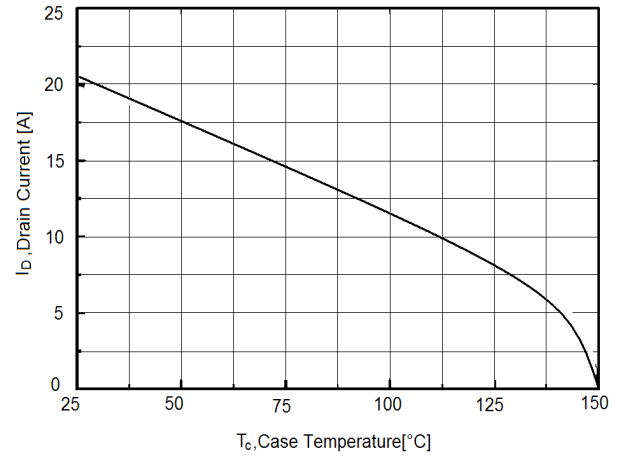


Figure 8. Maximum I_D vs. Junction Temperature

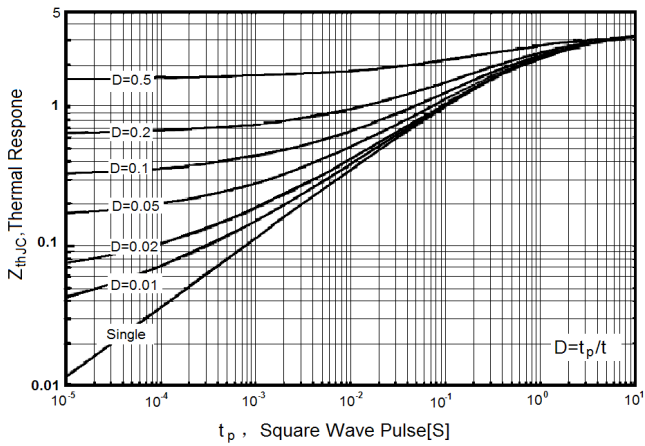


Figure 9. Transient Thermal Impedance for TO-220F

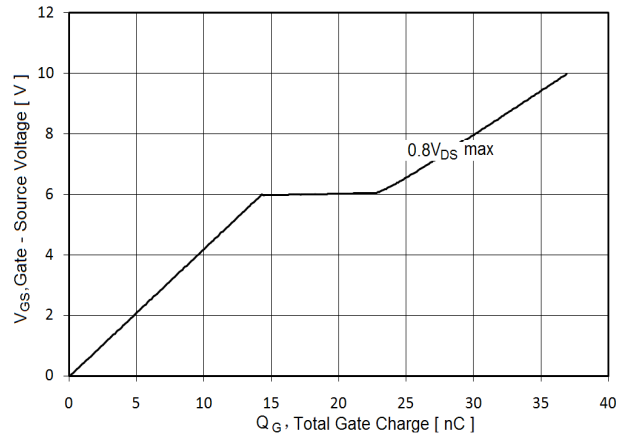


Figure 10. Gate Charge Waveforms

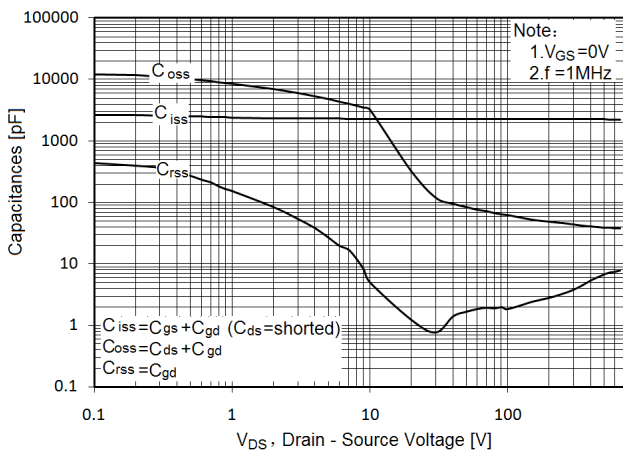


Figure 11. Capacitance

Test Circuit

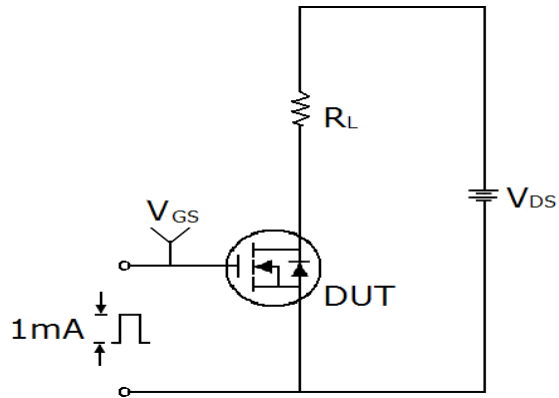


Figure 12. Gate Charge Test Circuit & Waveform

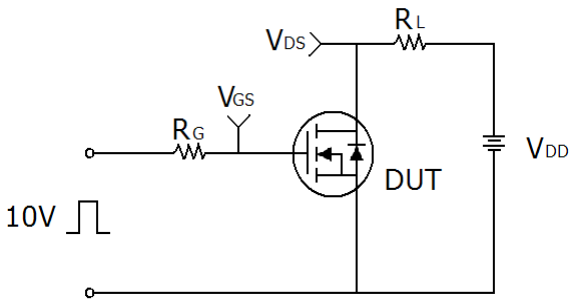
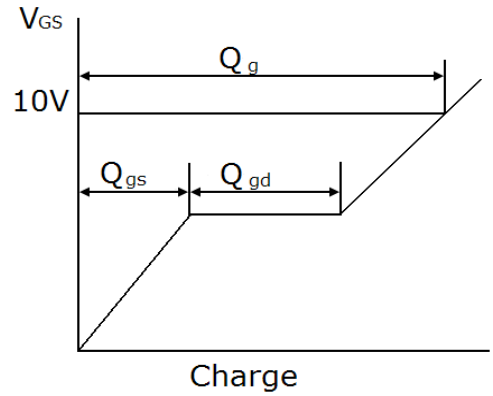


Figure 13. Switch Time Test Circuit

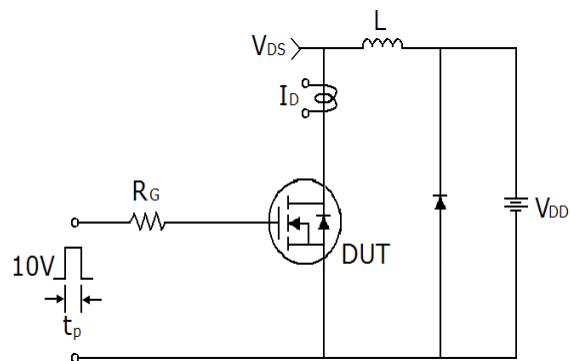
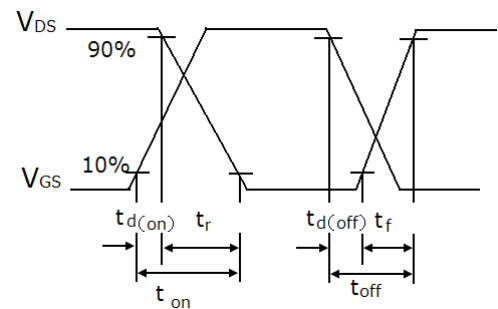
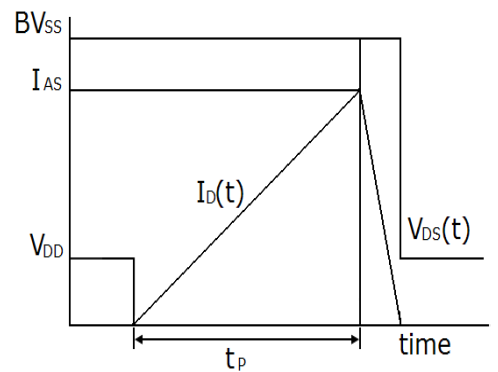
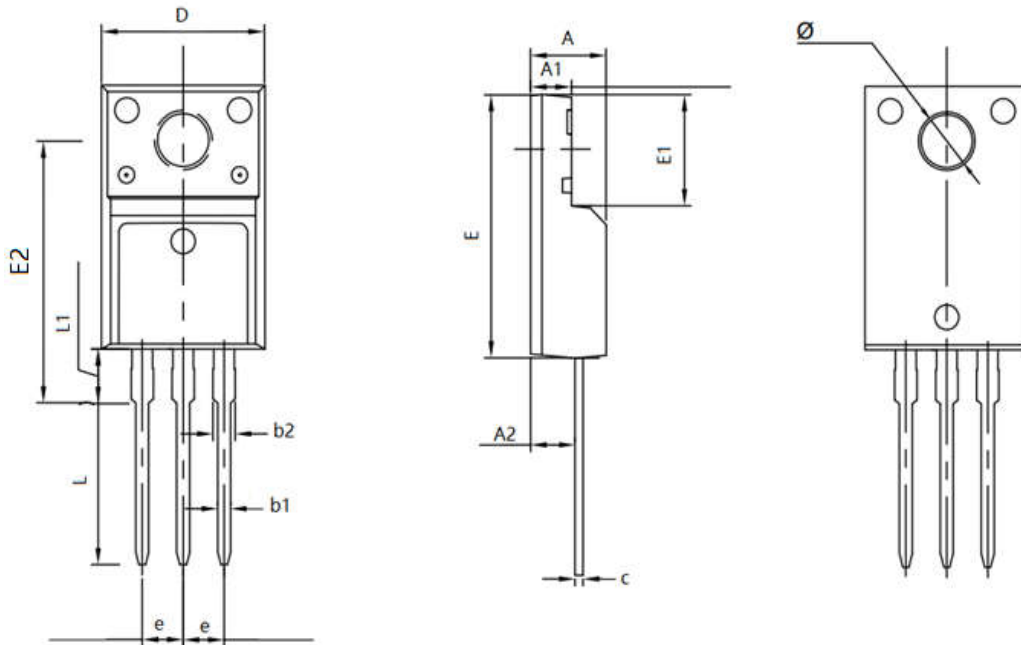


Figure 14. Unclamped Inductive Switching Test Circuit & Waveforms



Package Outline Dimensions (TO-220F)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.500	4.900	0.177	0.193
A1	2.340	2.740	0.092	0.108
A2	2.560	2.960	0.101	0.117
b1	0.700	0.900	0.028	0.035
b2	1.180	1.580	0.046	0.062
c	0.400	0.600	0.016	0.024
D	9.960	10.360	0.392	0.408
E	15.670	15.970	0.617	0.629
E1	6.500	6.900	0.256	0.272
E2	15.500	16.100	0.610	0.634
e	2.540 TYP		0.100 TYP	
Φ	3.080	3.280	0.121	0.129
L	12.640	13.240	0.498	0.521
L1	3.030	3.430	0.119	0.135