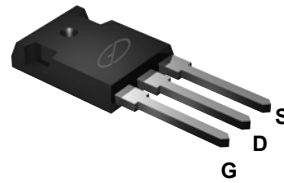
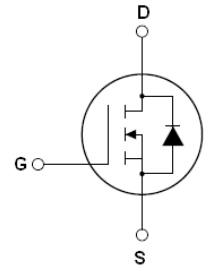


Main Product Characteristics

V_{DS}	650V
$R_{DS(ON)MAX}$	160m Ω
I_D	21A



TO-247



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 GSJA6521 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 ($T_C=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Max.	Unit
Drain-Source Voltage ($V_{GS}=0V$)	V_{DS}	650	V
Gate-Source Voltage ($V_{DS}=0V$), AC ($f>1\text{ Hz}$)	V_{GS}	± 30	V
Drain Current-Continuous ($T_C=25^\circ\text{C}$)	I_D	21	A
Drain Current-Continuous ($T_C=100^\circ\text{C}$)		13.2	A
Drain Current-Pulsed ¹	I_{DM}	84	A
Power Dissipation ($T_C=25^\circ\text{C}$)	P_D	188	W
Power Dissipation-Derate Above 25°C		1.5	W/ $^\circ\text{C}$
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_{jmax} ¹	E_{AR}	0.7	mJ
Drain Source Voltage Slope, $V_{DS} \leq 480V$,	dv/dt	50	V/nS
Reverse Diode dv/dt , $V_{DS} \leq 480V$, $I_{SD} < I_D$	dv/dt	50	V/nS
Thermal Resistance, Junction-to-Case(Max.)	$R_{\theta JC}$	0.66	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Ambient(Max.)	$R_{\theta JA}$	62.5	$^\circ\text{C/W}$
Operating Junction Temperature Range	T_J	-55 To +150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55 To +150	$^\circ\text{C}$

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
On/Off Characteristics						
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}	$V_{DS}=650V, V_{GS}=0V$	-	0.1	2	μA
Zero Gate Voltage Drain Current ($T_C=125^\circ\text{C}$)		$V_{DS}=650V, V_{GS}=0V$	-	-	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	$R_{DS(ON)}$	$V_{GS}=10V, I_D=10.5A$	-	160	199	m Ω
Dynamic Characteristics						
Forward Transconductance	g_{FS}	$V_{DS}=20V, I_D=10.5A$	-	16	-	S
Input Capacitance	C_{ISS}	$V_{DS}=50V, V_{GS}=0V, F=1.0MHz$	-	2250	-	pF
Output Capacitance	C_{OSS}		-	83	-	
Reverse Transfer Capacitance	C_{RSS}		-	1.6	-	
Total Gate Charge	Q_g	$V_{DS}=480V, I_D=21A, V_{GS}=10V$	-	36	-	nC
Gate-Source Charge	Q_{gs}		-	14	-	
Gate-Drain Charge	Q_{gd}		-	8.5	-	
Switching Characteristics						
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=380V, I_D=11A, V_{GS}=10V, R_G=4\Omega$	-	11	-	nS
Turn-On Rise Time	t_r		-	6	-	
Turn-Off Delay Time	$t_{d(off)}$		-	61	-	
Turn-Off Fall Time	t_f		-	4.5	-	
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}	$T_J=25^\circ\text{C}, I_F=21A, di/dt=100A/\mu s$	-	160	-	nS
Reverse Recovery Charge	Q_{rr}		-	1.4	-	nC
Peak Reverse Recovery Current	I_{rrm}		-	17	-	A

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

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

Typical Electrical and Thermal Characteristic Curves

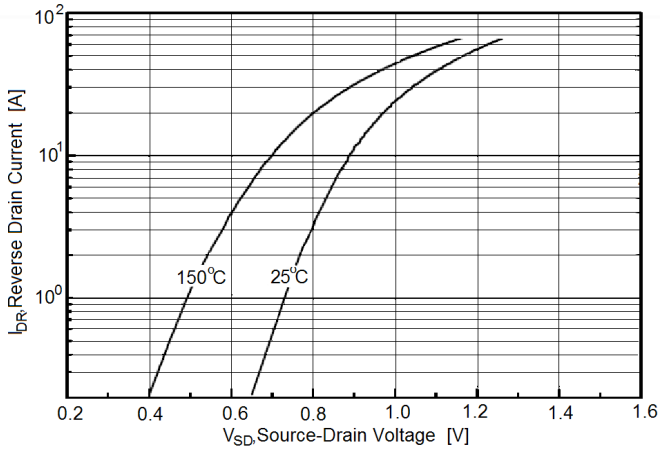


Figure 1. Source-Drain Diode Forward Voltage

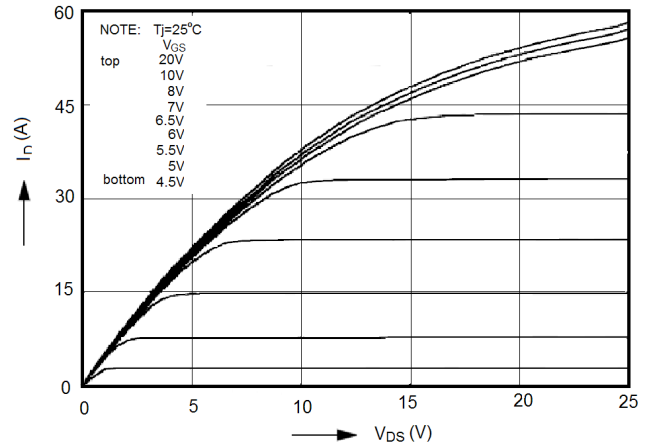


Figure 2. Output Characteristics

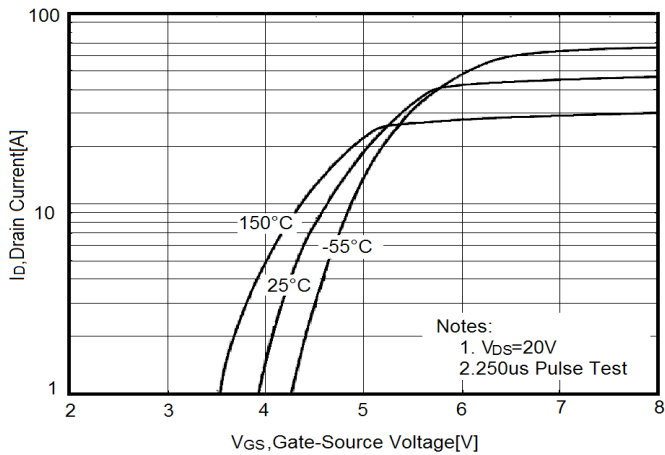


Figure 3. Transfer Characteristics

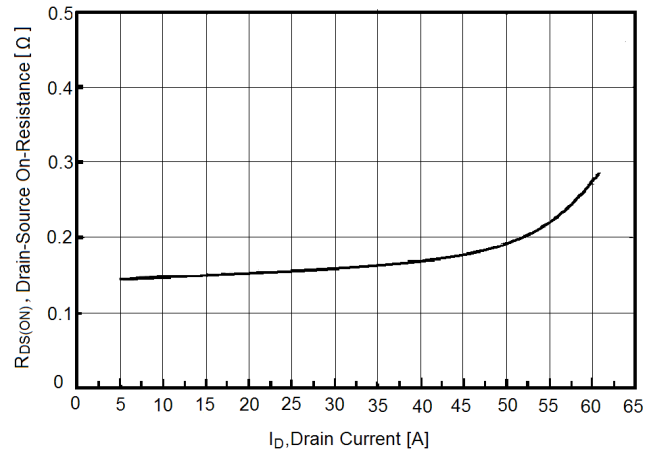


Figure 4. Static Drain-Source On Resistance

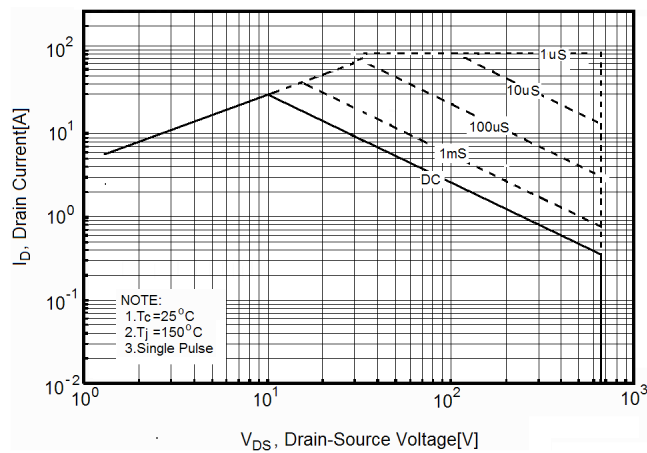


Figure 5. Safe Operating Area

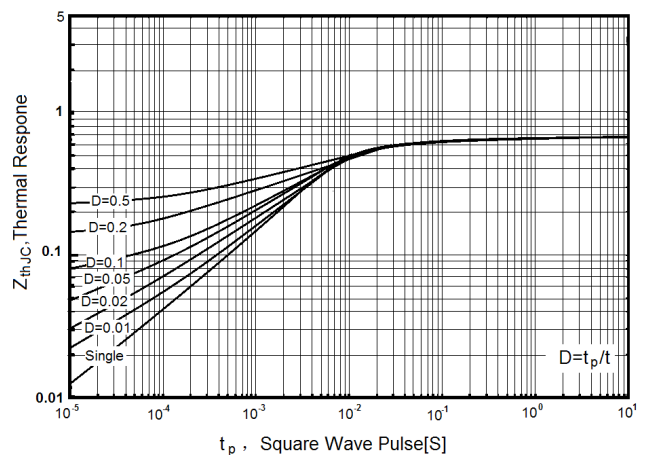


Figure 6. Transient Thermal Impedance

Typical Electrical and Thermal Characteristic Curves

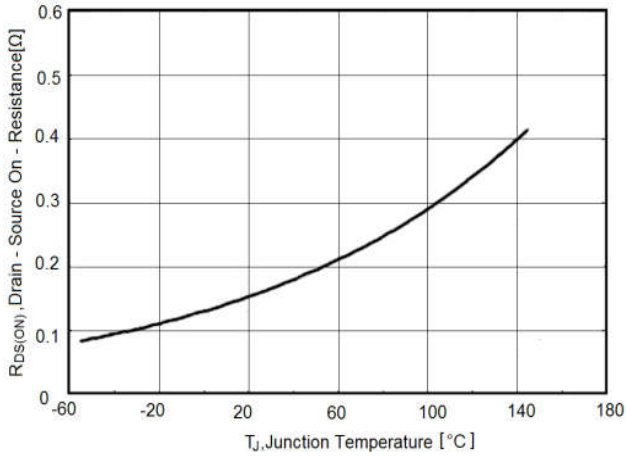


Figure 7. R_{DS(ON)} vs Junction Temperature

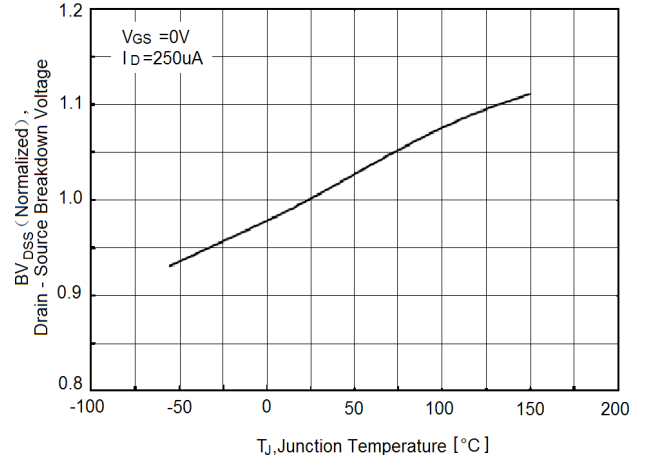


Figure 8. BV_{DSS} vs Junction Temperature

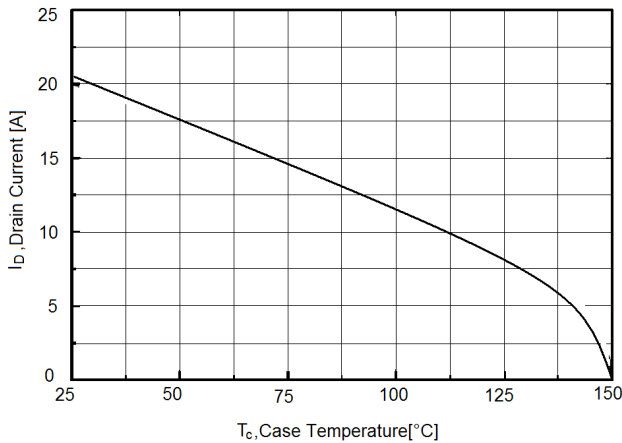


Figure 9. Maximum I_D vs Junction Temperature

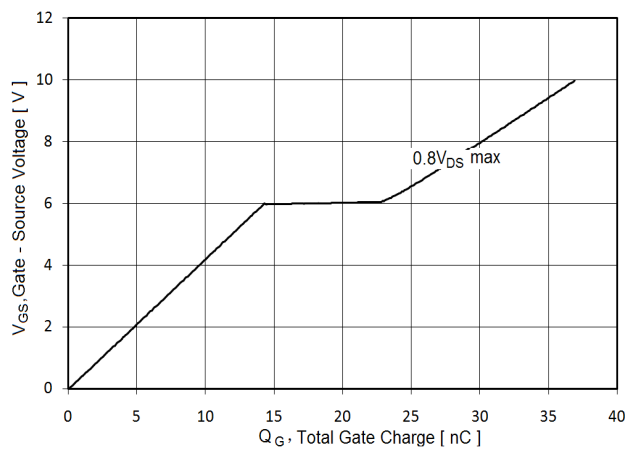


Figure 10. Gate Charge Waveforms

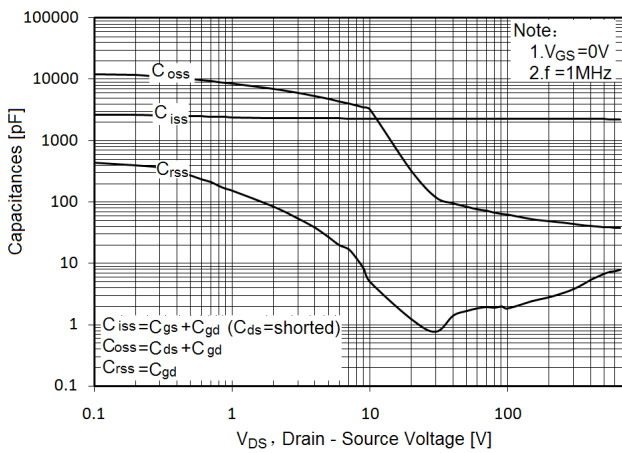


Figure 11. Capacitance

Test Circuit

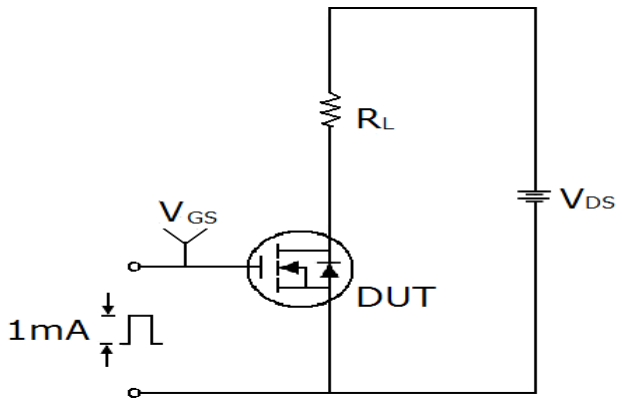


Figure 11. Gate Charge Test Circuit & Waveform

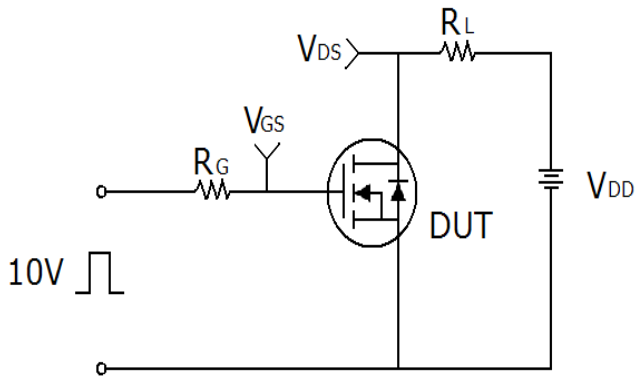
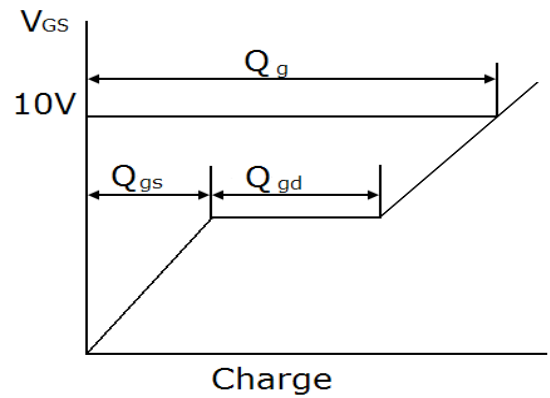


Figure 12. Switch Time Test Circuit

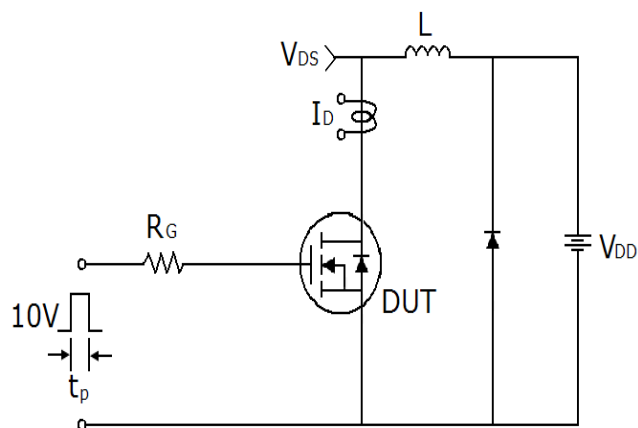
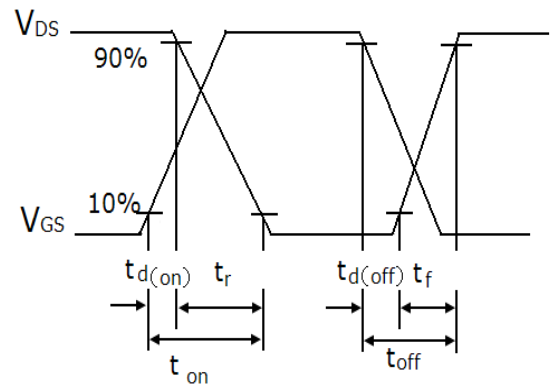
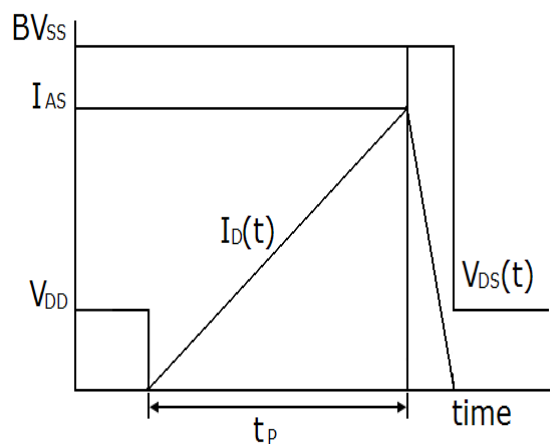
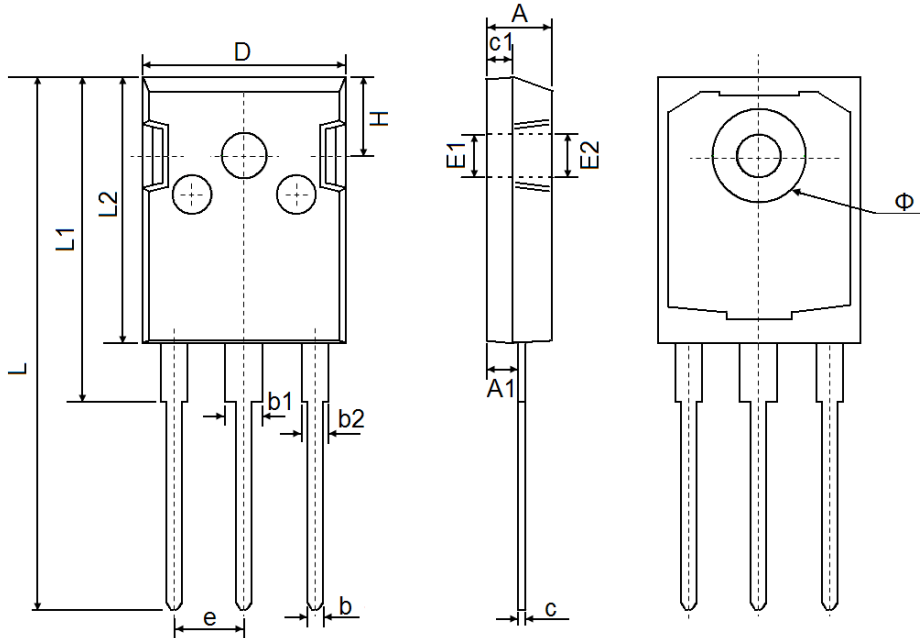


Figure 13. Unclamped Inductive Switching Test Circuit & Waveforms



Package Outline Dimensions (TO-247)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.850	5.150	0.191	0.200
A1	2.200	2.600	0.087	0.102
b	1.000	1.400	0.039	0.055
b1	2.800	3.200	0.110	0.126
b2	1.800	2.200	0.071	0.087
c	0.500	0.700	0.020	0.028
c1	1.900	2.100	0.075	0.083
D	15.450	15.750	0.608	0.620
E1	3.500 REF		0.138 REF	
E2	3.600 REF		0.142 REF	
L	40.900	41.300	1.610	1.626
L1	24.800	25.100	0.976	0.988
L2	20.300	20.600	0.799	0.811
Φ	7.100	7.300	0.280	0.287
e	5.450 TYP		0.215 TYP	
H	5.980 REF		0.235 REF	