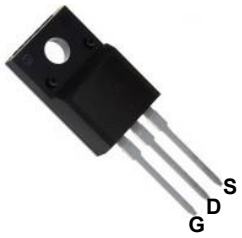
GOOD-ARK SEMICONDUCTOR

GSJU6514

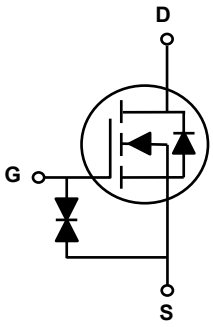
650V N-Channel MOSFET

Main Product Characteristics

V_{DS}	650V
$R_{DS(ON)}$	260mΩ (Max.)
I_D	14.5A



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 GSJU6514 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 supplies and a wide variety of other applications.

Absolute Maximum Ratings (T_C=25°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>1Hz)	V_{GS}	±30	V
Gate-Source Voltage (V_{DS}=0V) DC	V_{GS}	±20	V
Drain Current-Continuous (T_C=25°C)	$I_{D\ (DC)}$	14.5	A
Drain Current-Continuous (T_C=100°C)		10.15	A
Drain Current-Pulsed[1]	$I_{DM\ (pulse)}$	43.5	A
Maximum Power Dissipation (T_C=25°C)	P_D	33.1	W
Maximum Power Dissipation-Derate Above 25°C		0.22	W/°C
Avalanche Current[2]	I_{AS}	3.5	A
Drain Source Voltage Slope, V_{DS} ≤ 480V	dv/dt	50	V/ns
Reverse Diode dv/dt, V_{DS} ≤ 480V, I_{SD} < I_D		15	V/ns
Thermal Resistance, Junction-to-Ambient (Max.)	$R_{\theta JA}$	62	°C/W
Thermal Resistance, Junction-to-Case (Max.)	$R_{\theta JC}$	4.53	°C/W
Storage Temperature Range	T_{STG}	-55 To +175	°C
Operating Junction Temperature Range	T_J	-55 To +175	°C

Electrical Characteristics (T_A=25°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=250μA	650	-	-	V
Zero Gate Voltage Drain Current (T_C=25°C)	I_{DSS}	V_{DS}=650V, V_{GS}=0V	-	-	1	μA
Zero Gate Voltage Drain Current (T_C=125°C)		V_{DS}=650V, V_{GS}=0V	-	-	100	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V	-	-	±200	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	3	3.5	4	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=7A	-	230	260	mΩ
Dynamic Characteristics						
Input Capacitance	C_{lss}	V_{DS}=50V, V_{GS}=0V, F=1MHz	-	1104	-	pF
Output Capacitance	C_{oss}		-	40	-	
Reverse Transfer Capacitance	C_{rss}		-	3	-	
Total Gate Charge	Q_g	V_{DS}=480V, I_D=7A, V_{GS}=10V	-	22	-	nC
Gate-Source Charge	Q_{gs}		-	7	-	
Gate-Drain Charge	Q_{gd}		-	5.5	-	
Gate Plateau Voltage	V_{gp}		-	5.5	-	V
Intrinsic Gate Resistance	R_G	F=1 MHz, Open Drain	-	18	-	Ω
Switching Times						
Turn-On Delay Time	$t_{d(on)}$	V_{DD}=480V, R_G=1.7Ω V_{GS}=10V, I_D=7A	-	11	-	nS
Turn-On Rise Time	t_r		-	9	-	
Turn-Off Delay Time	$t_{d(off)}$		-	57	-	
Turn-Off Fall Time	t_f		-	10	-	
Source-Drain Diode Characteristics						
Source-Drain Current (Body Diode)	I_{SD}	T_C=25°C	-	-	14.5	A
Pulsed Source-Drain Current (Body Diode)	I_{SDM}		-	-	43.5	A
Forward On Voltage	V_{SD}	T_J=25°C, V_{GS}=0V, I_{SD}=14.5A	-	0.9	1.2	V
Reverse Recovery Time	t_{rr}	T_J=25°C, I_F=7A, di/dt=100A/μs	-	240	-	nS
Reverse Recovery Charge	Q_{rr}		-	2.0	-	uC
Peak Reverse Recovery Current	I_{rrm}		-	17	-	A

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. T_J=25°C, V_{DD}=50V, V_G=10V, R_G=25Ω.

Typical Electrical and Thermal Characteristic Curves

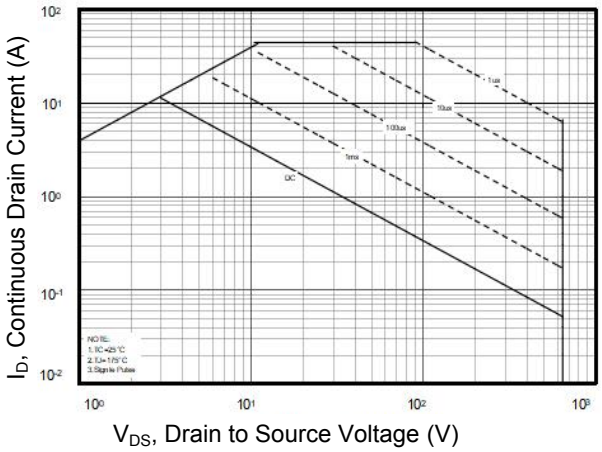


Figure 1. Safe Operation Area

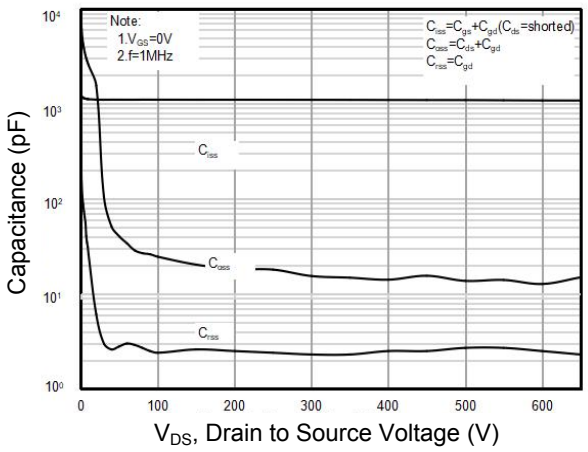


Figure 2. Capacitance

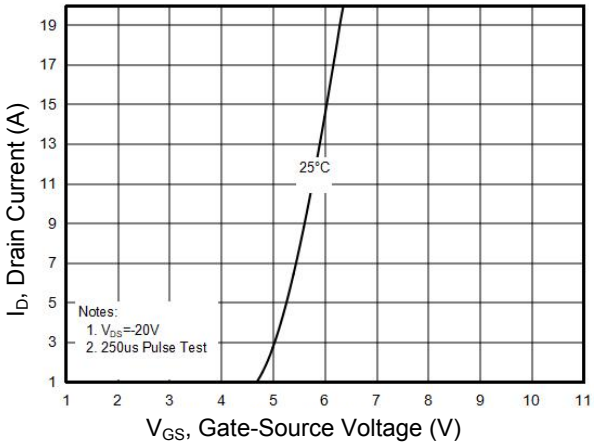


Figure 3. Source-Drain Diode Forward Voltage

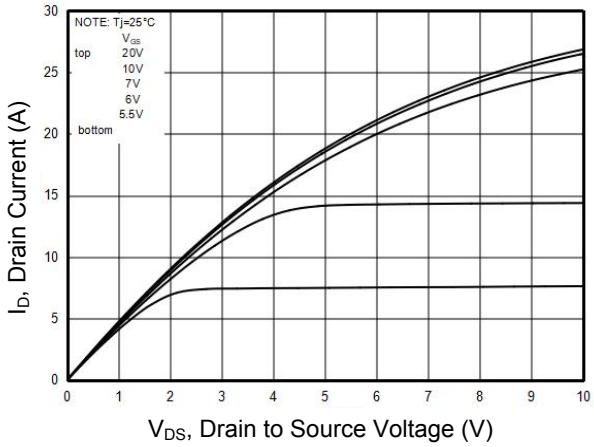


Figure 4. Output Characteristics

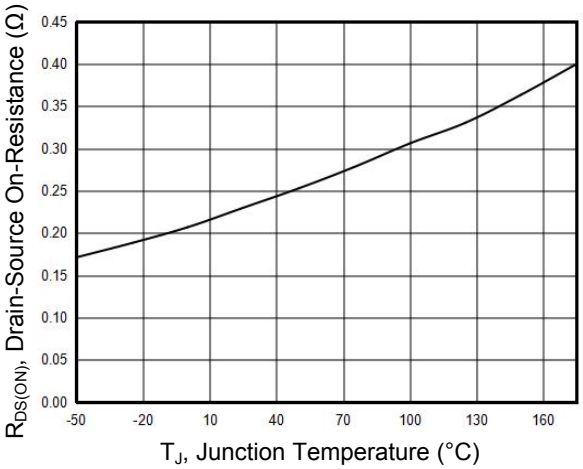


Figure 5. $R_{DS(ON)}$ vs. Junction Temperature

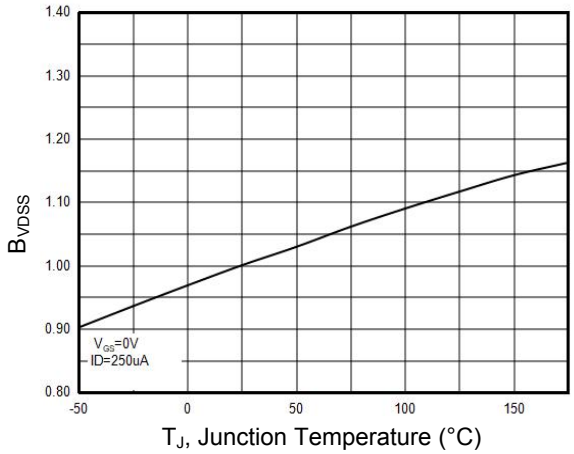


Figure 6. BV_{DSS} vs. Junction Temperature

Typical Electrical and Thermal Characteristic Curves

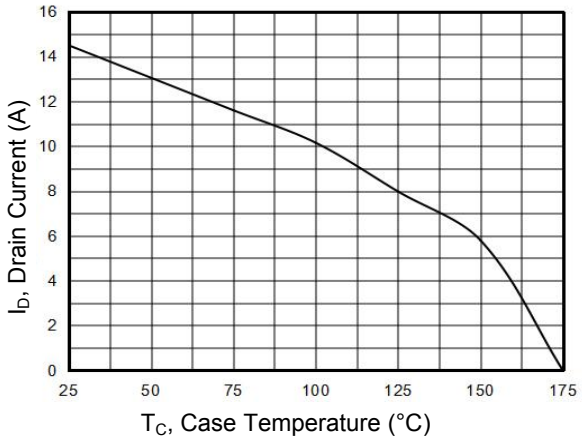


Figure 7. Drain Current vs. T_C

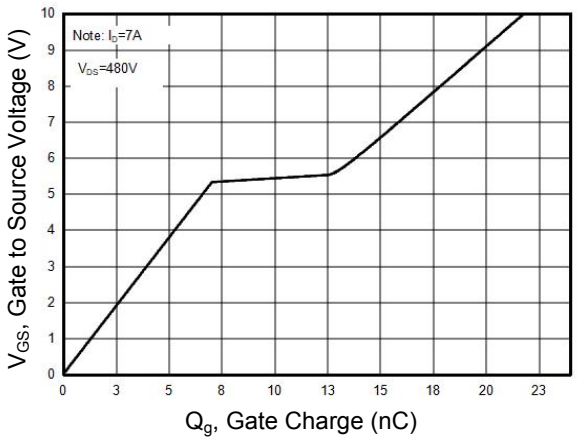


Figure 8. Gate Charge Waveform

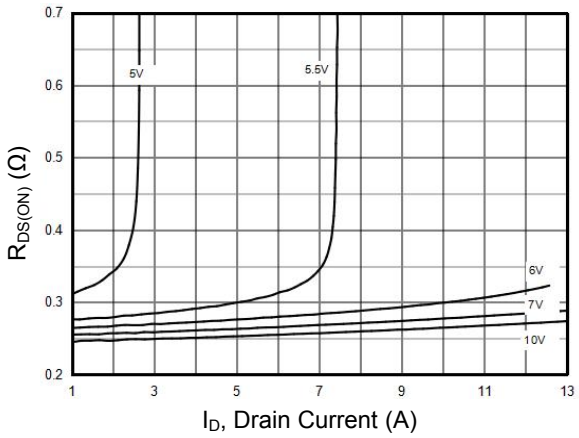


Figure 9. Static Drain-Source On Resistance

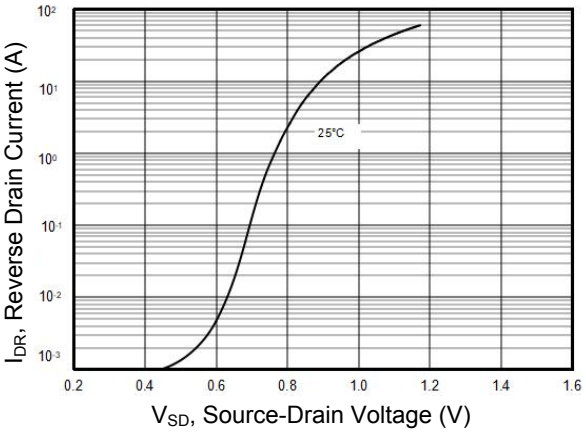
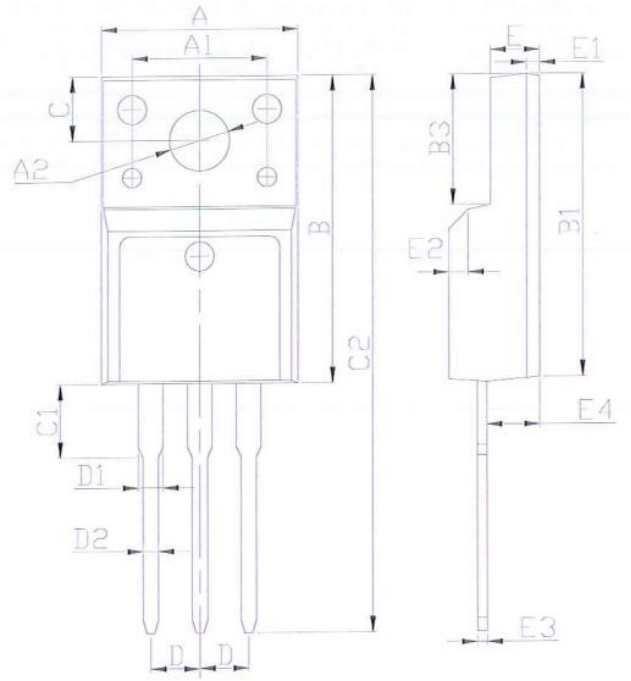


Figure 10. Source-Drain Diode Forward Voltage

Package Outline Dimensions (TO-220F)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	9.860	10.460	0.388	0.412
A1	6.800	7.200	0.268	0.283
A2	2.920	3.320	0.115	0.131
A3	9.400	10.000	0.370	0.394
B	15.400	16.400	0.606	0.646
B1	15.100	16.100	0.594	0.634
B2	4.400	5.000	0.173	0.197
B3	6.400	7.000	0.252	0.276
C	3.050	3.550	0.120	0.140
C1	2.950	3.550	0.116	0.140
C2	28.200	29.200	1.110	1.150
D	2.540 BSC		0.100 BSC	
D1	-	1.470	-	0.058
D2	0.600	1.000	0.024	0.039
E	2.300	2.800	0.091	0.110
E1	0.450	0.950	0.018	0.037
E2	45°		45°	
E3	0.300	0.700	0.012	0.028
E4	2.450	3.050	0.096	0.120