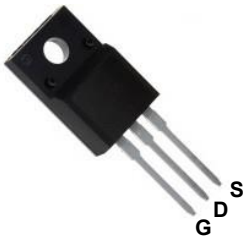
GOOD-ARK SEMICONDUCTOR

GSJU6520

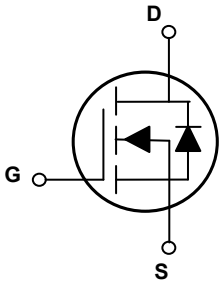
650V N-Channel MOSFET

Main Product Characteristics

$V_{(BR)DSS}$	650V
$R_{DS(ON)}$	0.22Ω (max.)
I_D	20A



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 GSJU6520 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_J=25°C unless otherwise specified)

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	V_{DS}	650	V
Gate-Source Voltage	V_{GS}	±30	V
Drain Current-Continuous, at Steady-State, (T_C=25°C)	I_D	20	A
Drain Current-Continuous, at Steady-State, (T_C=100°C)		12	
Drain Current-Pulsed	I_{DM}	80	A
Single Pulse Avalanche Energy[1]	E_{AS}	657	mJ
Power Dissipation (T_C=25°C)	P_D	40	W
Power Dissipation – Derate above 25°C		0.32	W/°C
Body Diode Reverse Voltage Slope[2]	dv/dt	15	V/ns
MOS dv/dt Ruggedness[3]	dv/dt	100	V/ns
Junction-to-Ambient (PCB Mounted, Steady-State)	$R_{\theta JA}$	62.5	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	3.1	°C/W
Operating Junction Temperature Range	T_J	-55 To +150	°C
Storage Temperature Range	T_{STG}	-55 To +150	°C

Electrical Characteristics (T_J=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=250uA	650	-	-	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=650V, V_{GS}=0V	-	-	1	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±30V, V_{DS}=0V	-	-	±100	nA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=10A	-	0.19	0.22	Ω
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS}, I_D=250uA	2.0	-	4.0	V
Dynamic and Switching Characteristics						
Total Gate Charge[4,5]	Q_g	V_{DD}=520V, I_D=20A, V_{GS}=10V	-	48	-	nC
Gate-Source Charge[4,5]	Q_{gs}		-	20	-	
Gate-Drain ("Miller") Charge[4,5]	Q_{gd}		-	19	-	
Turn-On Delay Time[4,5]	$t_{d(on)}$	V_{DD}=325V, R_G=25Ω, V_{GS}=10V, I_D=20A	-	32	-	nS
Rise Time[4,5]	t_r		-	96	-	
Turn-Off Delay Time[4,5]	$t_{d(off)}$		-	105	-	
Fall Time[4,5]	t_f		-	75	-	
Input Capacitance	C_{lss}	V_{DS}=100V, V_{GS}=0V, F=1MHz	-	1718	-	pF
Output Capacitance	C_{oss}		-	66	-	
Reverse Transfer Capacitance	C_{rss}		-	1.7	-	
Gate Resistance	R_g	F=1MHz	-	1.3	-	Ω
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current (Body Diode)	I_S	T_C=25°C, MOSFET symbol showing the integral reverse p-n junction diode.	-	-	20	A
Source Pulse Current	I_{SM}		-	-	80	A
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=20A	-	1.1	1.4	V
Reverse Recovery Time[2]	t_{rr}	V_{GS}=0V, I_F=20A, dI_F/dt=100A/μs	-	330	-	nS
Reverse Recovery Charge[2]	Q_{rr}		-	5.7	-	uC

Note:

1. L=79mH, I_{AS}=3.8A, V_{DD}=100V, R_g=25Ω, starting temperature T_J=25°C.
2. V_{DS}=0-400V, I_{SD}≤I_S, T_J=25°C.
3. V_{DS}=0-480V.
4. Pulse test: pulse width ≤ 300us, duty cycle ≤ 2%.
5. Essentially independent of operating temperature.

Typical Electrical and Thermal Characteristic Curves

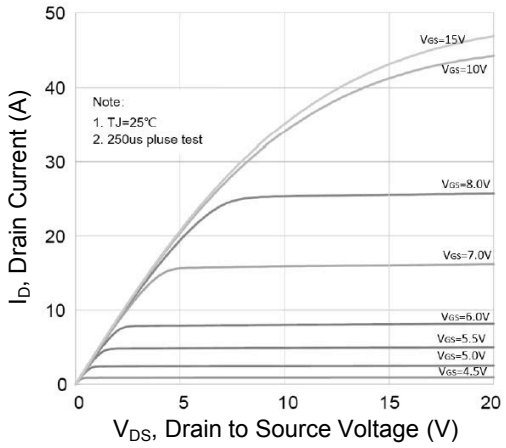


Figure 1. Typical Output Characteristics

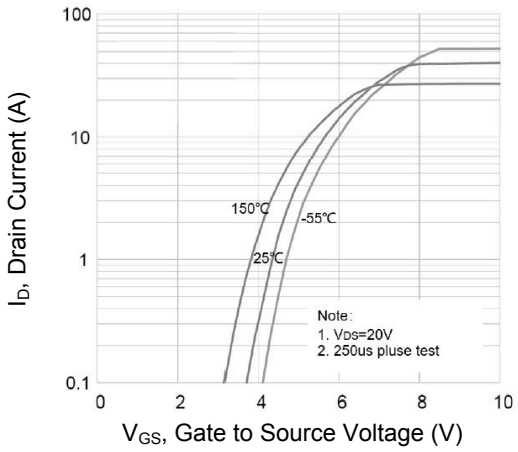


Figure 2. Transfer Characteristics

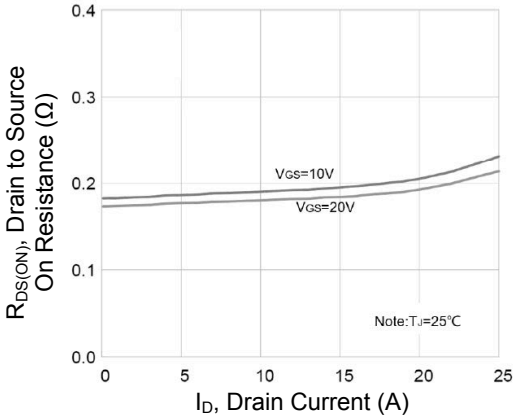


Figure 3. $R_{DS(ON)}$ vs. Drain Current

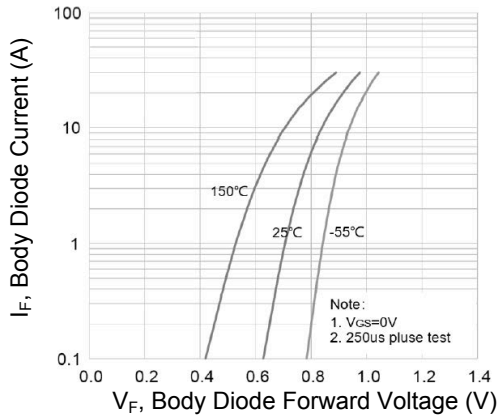


Figure 4. Body Diode Characteristics

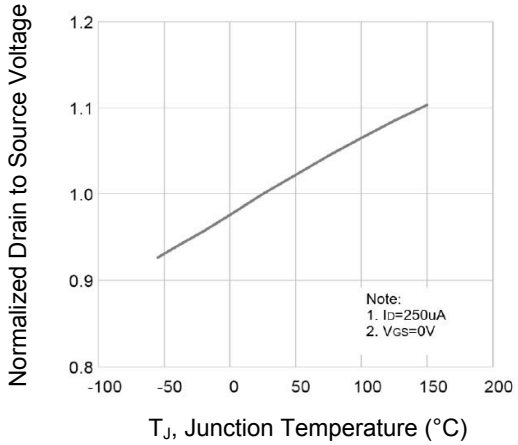


Figure 5. Normalized BV_{DSS} vs. Junction Temperature

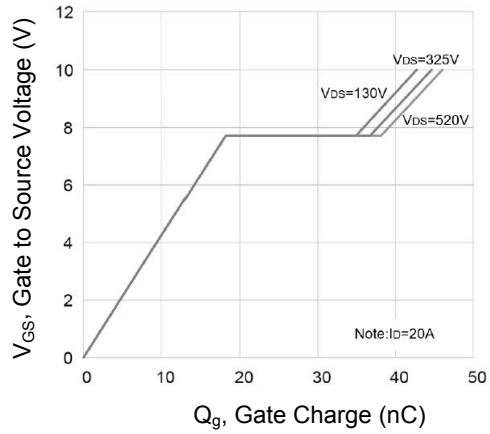


Figure 6. Gate Charge Characteristics

Typical Electrical and Thermal Characteristic Curves

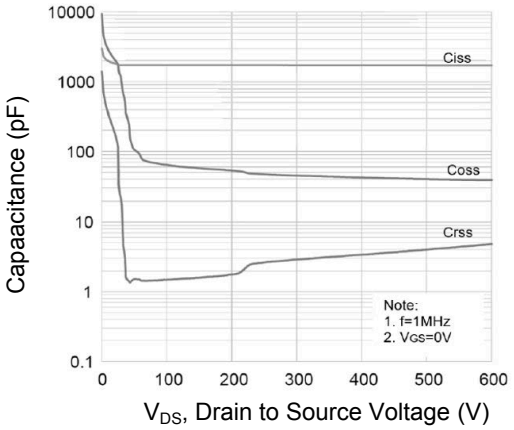


Figure 7. Capacitance Characteristics

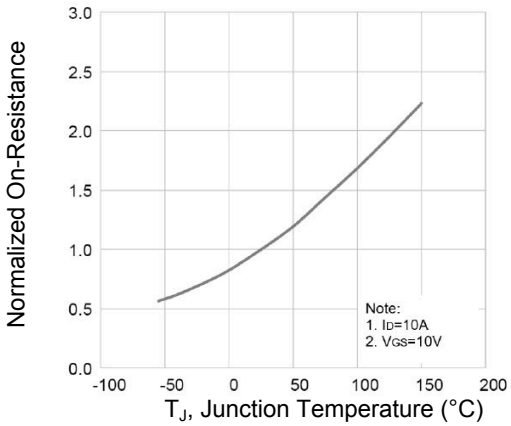


Figure 8. Normalized $R_{DS(ON)}$ vs. T_J

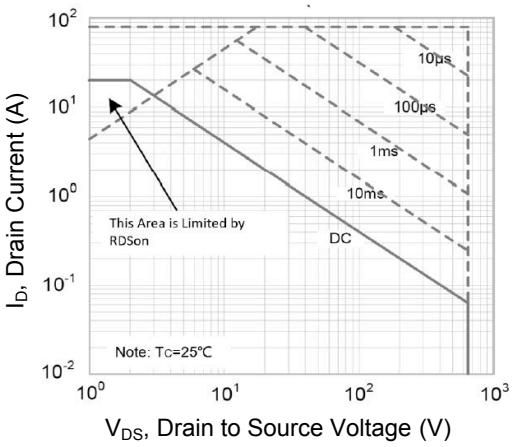
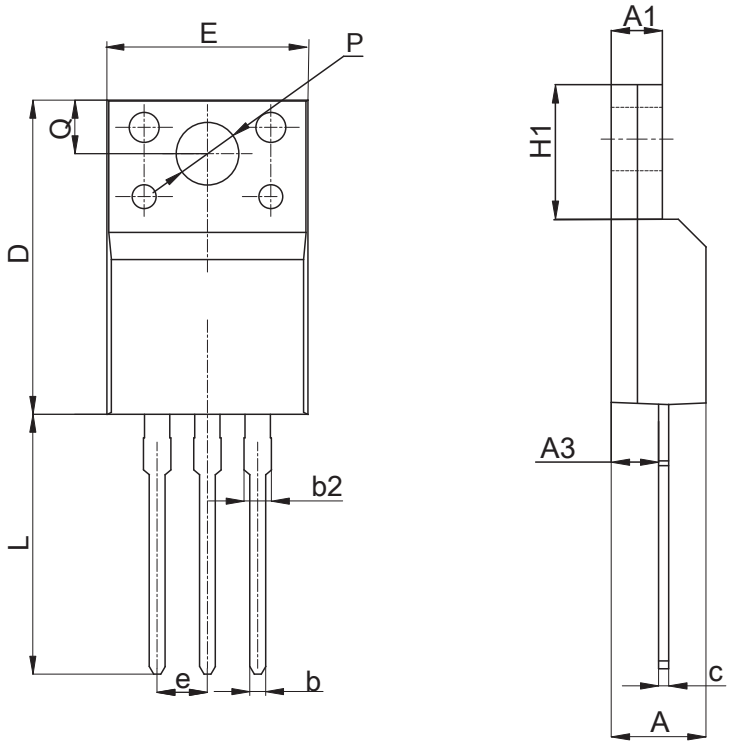


Figure 9. Safe Operation Area

Package Outline Dimensions (TO-220F)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.42	5.02	0.174	0.198
A1	2.30	2.83	0.091	0.111
A3	2.15	3.10	0.085	0.122
b	0.55	0.85	0.022	0.033
b2	0.96	1.46	0.038	0.057
c	0.35	0.65	0.014	0.026
D	15.25	16.25	0.600	0.640
E	9.73	10.50	0.383	0.413
e	2.50	2.60	0.098	0.102
H1	6.40	6.70	0.252	0.264
L	12.48	13.70	0.491	0.539
P	3.00	3.60	0.118	0.142
Q	3.05	3.60	0.120	0.142

Order Information

Device	Package	Marking	Carrier	Quantity
GSJU6520	TO-220F	U65R220	Tube	50 pcs / Tube