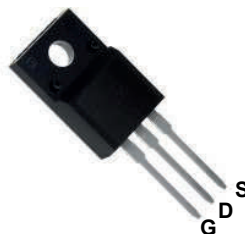
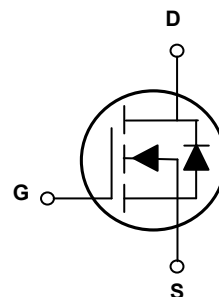


Main Product Characteristics

$V_{(BR)DSS}$	650V
$R_{DS(ON)}$	0.79Ω (Max.)
I_D	12A



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 GSFU6513 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 ($T_A=25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	V_{DS}	650	V
Gate-Source Voltage	V_{GS}	±30	V
Continuous Drain Current, @ Steady-State ($T_A=25^{\circ}\text{C}$) ¹	I_D	12	A
Continuous Drain Current, @ Steady-State ($T_A=100^{\circ}\text{C}$) ¹		9	A
Pulsed Drain Current ²	I_{DM}	50	A
Single Pulsed Avalanche Energy ³	E_{AS}	789	mJ
Power Dissipation ($T_A=25^{\circ}\text{C}$)	P_D	51	W
Thermal Resistance, Junction to Case	$R_{\theta JC}$	2.44	$^{\circ}\text{C/W}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	62.5	$^{\circ}\text{C/W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^{\circ}\text{C}$

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

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
On / Off Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	650	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=650V, V_{GS}=0V, T_J=25^{\circ}C$	-	-	1	μA
		$V_{DS}=520V, V_{GS}=0V, T_J=125^{\circ}C$	-	-	50	
Gate to Body Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 30V$	-	-	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2	-	4	V
Static Drain-Source on-Resistance ²	$R_{DS(ON)}$	$V_{GS}=10V, I_D=6.0A$	-	0.65	0.79	Ω
Dynamic and Switching Characteristics						
Input Capacitance	C_{iss}	$V_{DS}=25V, V_{GS}=0V, F=1.0MHz$	-	1746	-	pF
Output Capacitance	C_{oss}		-	152	-	
Reverse Transfer Capacitance	C_{rss}		-	4.5	-	
Total Gate Charge	Q_g	$V_{DS}=520V, I_D=13A$	-	24.2	-	nC
Gate-Source Charge	Q_{gs}		-	7.9	-	
Gate-Drain (“Miller”) Charge	Q_{gd}		-	7.5	-	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=325V, I_D=12A, R_G=25\Omega$	-	38	-	nS
Turn-on Rise Time	t_r		-	62	-	
Turn-off Delay Time	$t_{d(off)}$		-	80.5	-	
Turn-off Fall Time	t_f		-	46.7	-	
Source-Drain Ratings and Characteristics						
Maximum Continuous Drain to Source Diode Forward Current	I_S	MOSFET symbol showing the integral reverse p-n junction diode.	-	-	13	A
Maximum Pulsed Drain to Source Diode Forward Current	I_{SM}		-	-	50	A
Drain to Source Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_{SD}=12A$	-	-	1.4	V
Reverse Recovery Time	T_{rr}	$V_{GS}=0V, I_S=12A, di/dt=100A/\mu s$	-	590	-	ns
Reverse Recovery Charge	Q_{rr}		-	5.62	-	μC

Notes

1. Pulse test: Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
2. Repetitive rating; pulse width limited by max. junction temperature.
3. $L=30\text{mH}$, $I_{AS}=6.6A$, $V_{DD}=140V$, $T_J=25^\circ\text{C}$.

Typical Electrical and Thermal Characteristic Curves

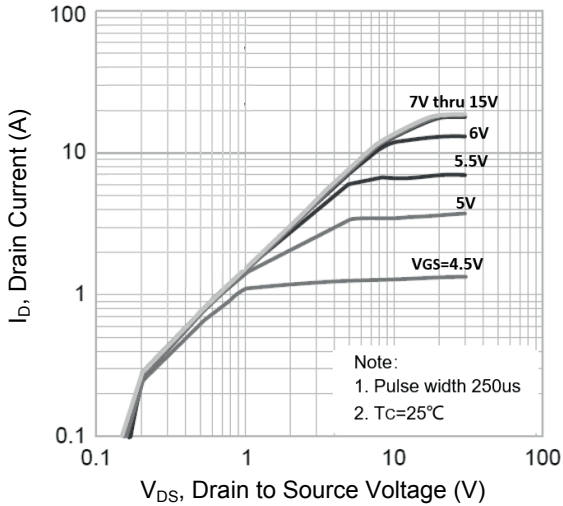


Figure 1. Output Characteristics

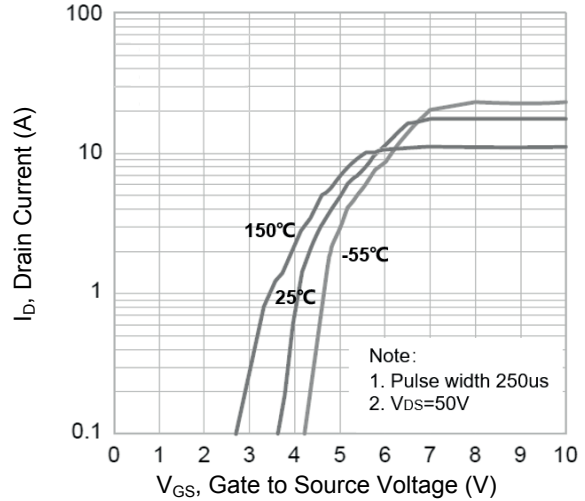


Figure 2. Transfer Characteristics

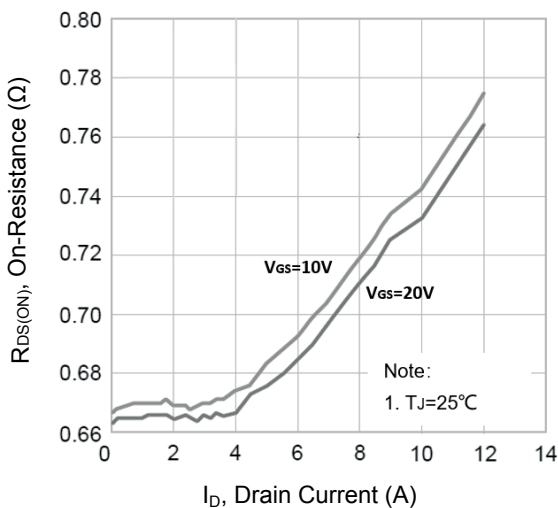


Figure 3. $R_{DS(ON)}$ vs. Drain Current

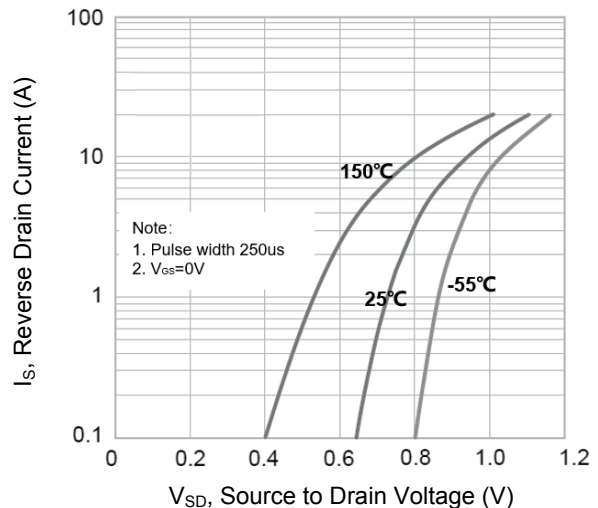


Figure 4. Body Diode Characteristics

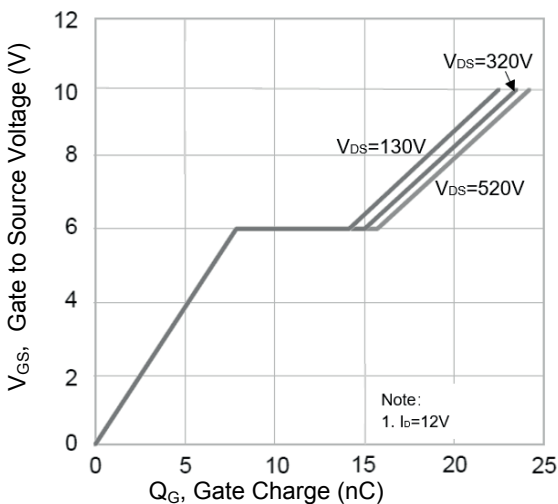


Figure 5. Gate Charge

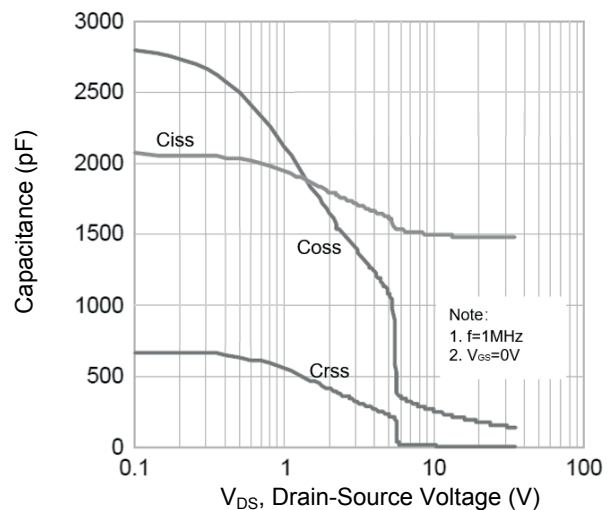


Figure 6. Capacitance Characteristics

Typical Electrical and Thermal Characteristic Curves

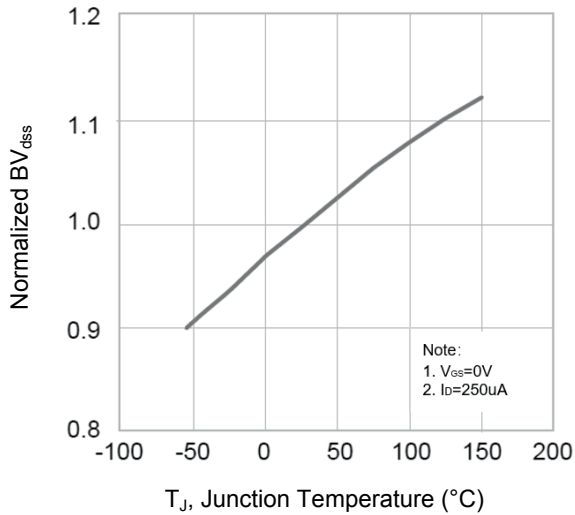


Figure 7. Normalized BV_{dss} vs. Junction Temperature

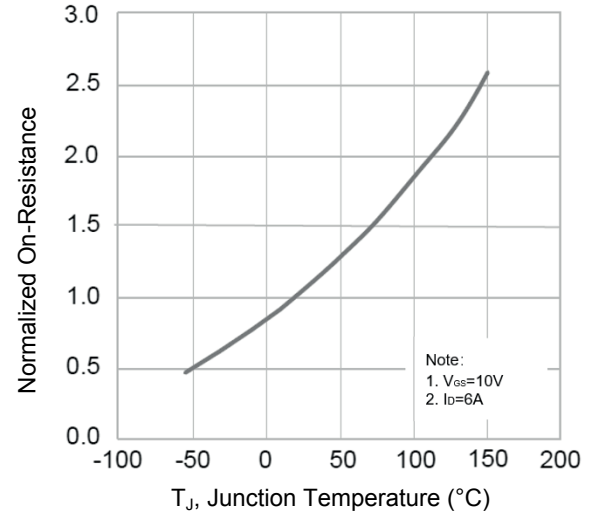


Figure 8. Normalized $R_{DS(ON)}$ vs. Junction Temperature

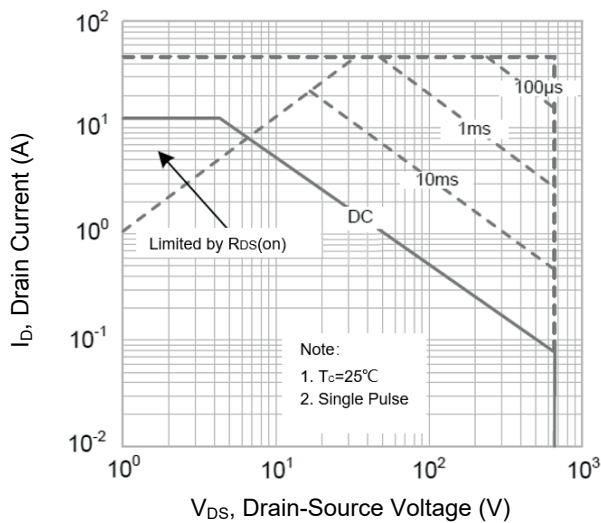
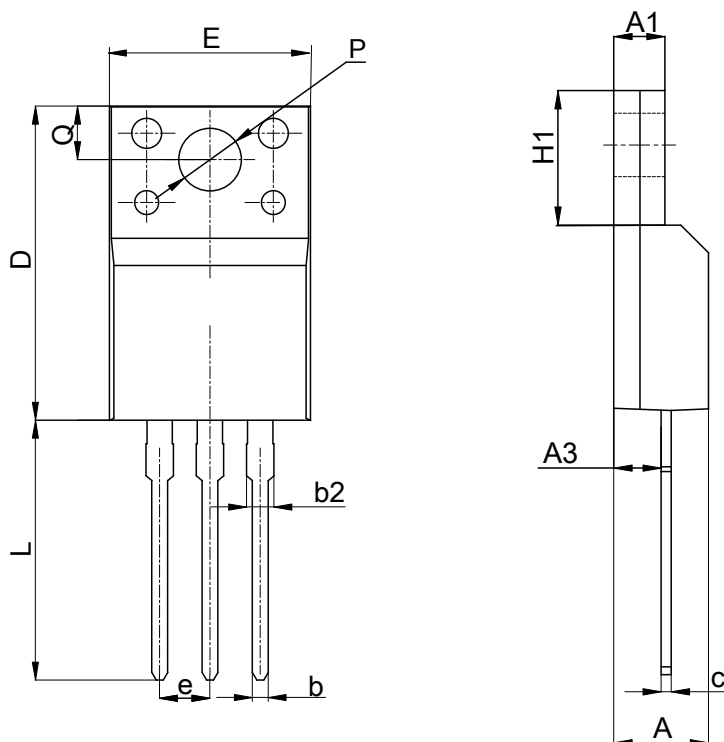


Figure 9. Safe Operation Area

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
GSFU6513	TO-220F	FU6513	Tube	50 pcs / Tube

For more information, please contact us at: inquiry@goodarksemi.com