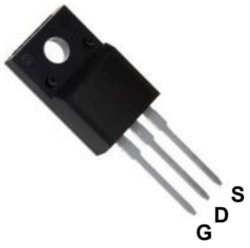
GSFU6504

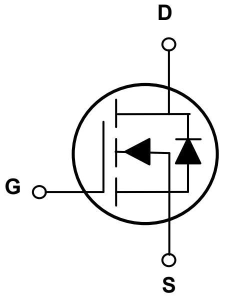
650V N-Channel MOSFET

Main Product Characteristics

$V_{(BR)DSS}$	650V
$R_{DS(ON)}$	2.3Ω (Typ.)
I_D	4A



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 GSFU6504 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_{DSS}	650	V
Gate-Source Voltage		V_{GSS}	±30	V
Continuous Drain Current	T_C=25°C	I_D	4	A
	T_C=100°C		2.5	A
Pulsed Drain Current[1]		I_{DM}	16	A
Single Pulsed Avalanche Energy[2]		E_{AS}	215	mJ
Power Dissipation	T_C=25°C	P_D	77	W
Thermal Resistance, Junction to Case		$R_{\theta JC}$	1.62	°C/W
Thermal Resistance, Junction to Ambient		$R_{\theta JA}$	110	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Electrical Characteristics (T_C=25°C unless otherwise specified)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=250μA	650	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=650V, V_{GS}=0V, T_J=25°C	-	-	1	μA
Gate to Body Leakage Current	I_{GSS}	V_{GS}=±30V	-	-	±100	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	2	-	4	V
Static Drain-Source On-Resistance[3]	$R_{DS(on)}$	V_{GS}=10V, I_D=2A	-	2.3	2.7	Ω
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS}=25V, V_{GS}=0V, f=1.0MHz	-	430	-	pF
Output Capacitance	C_{oss}		-	55	-	pF
Reverse Transfer Capacitance	C_{rss}		-	4.1	-	pF
Total Gate Charge	Q_g	V_{DD}=520V, I_D=4A, V_{GS}=10V	-	12.5	-	nC
Gate-Source Charge	Q_{gs}		-	2.74	-	nC
Gate-Drain ("Miller") Charge	Q_{gd}		-	6.31	-	nC
Switching Characteristics						
Turn-On Delay Time	$t_{d(on)}$	V_{DD}=325V, I_D=4A, R_G=25Ω, V_{GS}=10V	-	9.93	-	nS
Turn-On Rise Time	t_r		-	25.6	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	27.6	-	nS
Turn-Off Fall Time	t_f		-	25.6	-	nS
Drain-Source Diode Characteristics and Maximum Ratings						
Maximum Continuous Drain to Source Diode Forward Current	I_S	-	-	-	4	A
Maximum Pulsed Drain to Source Diode Forward Current	I_{SM}		-	-	16	A
Drain to Source Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_{SD}=4A, T_J= 25°C	-	-	1.4	V
Reverse Recovery Time	t_{rr}	V_{GS}=0V, I_S=4A, di/dt=100A/μS	-	450	-	nS
Reverse Recovery Charge	Q_{rr}		-	1.87	-	μC

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

2. I_{AS}=3.6A, L=30mH, V_{DD}=100V, R_G=25Ω, starting T_J=25°C.

3. Pulse Test: pulse width ≤ 300μS, duty Cycle ≤ 1%

Typical Electrical and Thermal Characteristic Curves

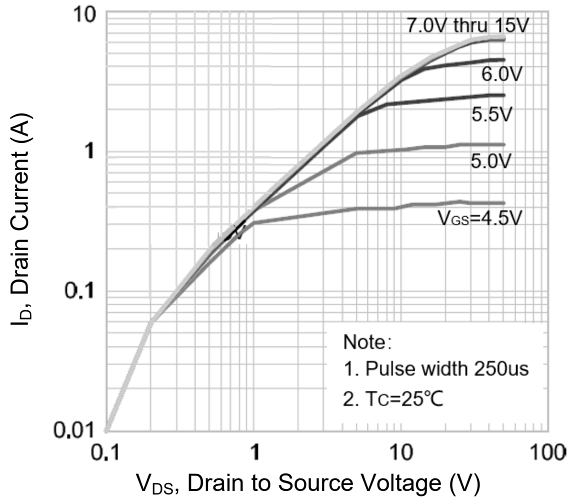


Figure 1. Output Characteristics

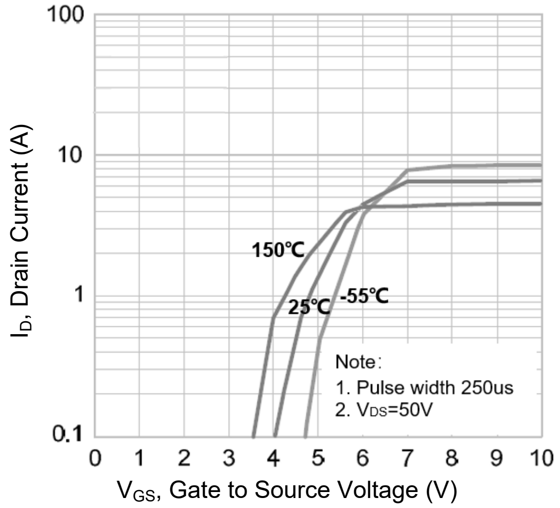


Figure 2. Transfer Characteristics

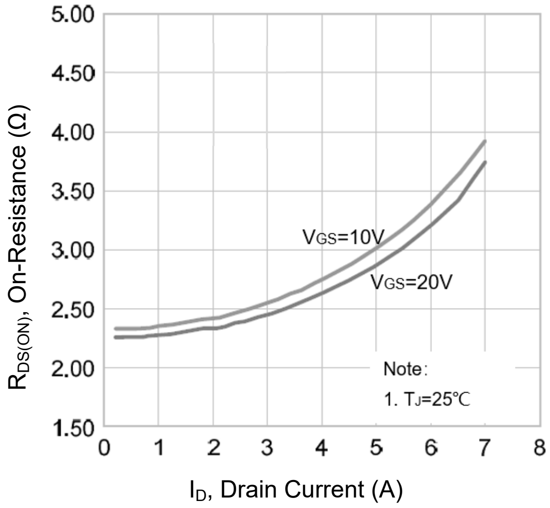


Figure 3. $R_{DS(ON)}$ vs. Drain Current

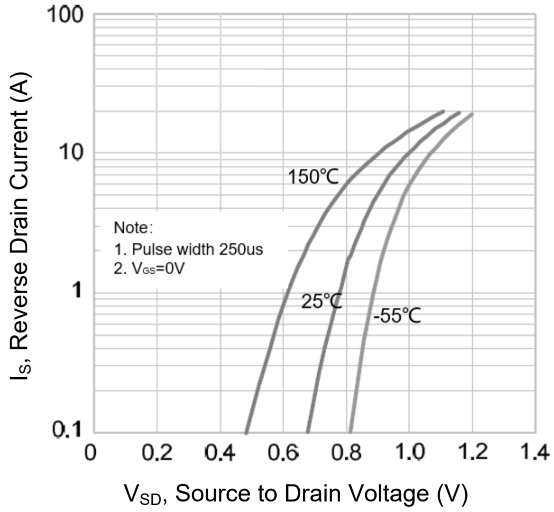


Figure 4. Body Diode Characteristics

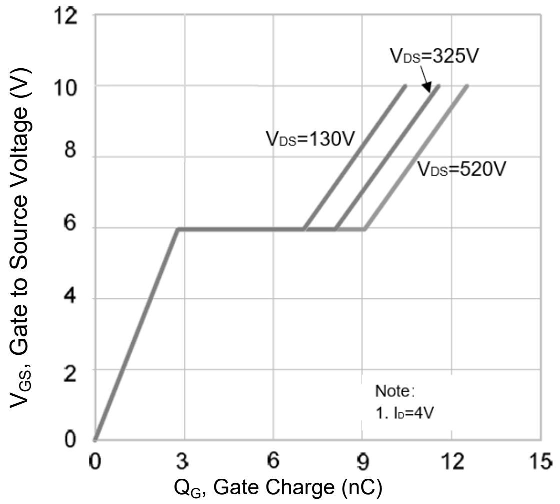


Figure 5. Gate Charge

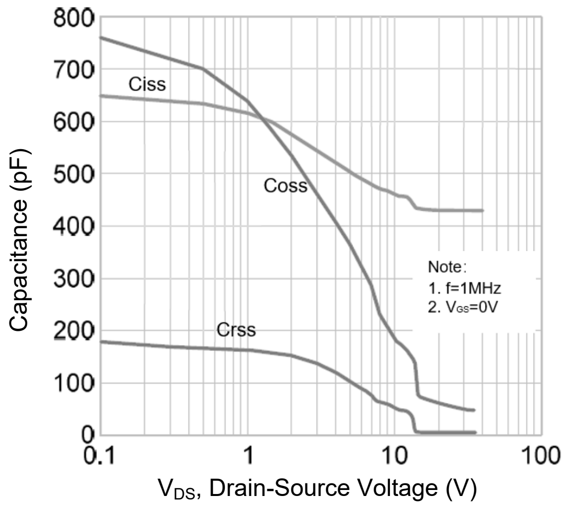


Figure 6. Capacitance Characteristics

Typical Electrical and Thermal Characteristic Curves

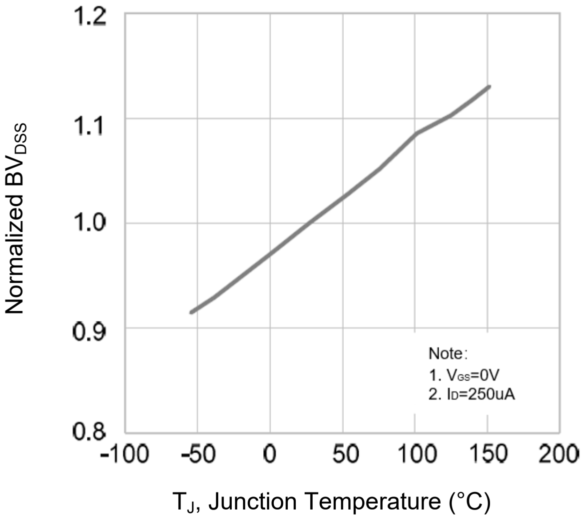


Figure 7. Normalized BV$_{DSS}$ vs. Junction Temperature

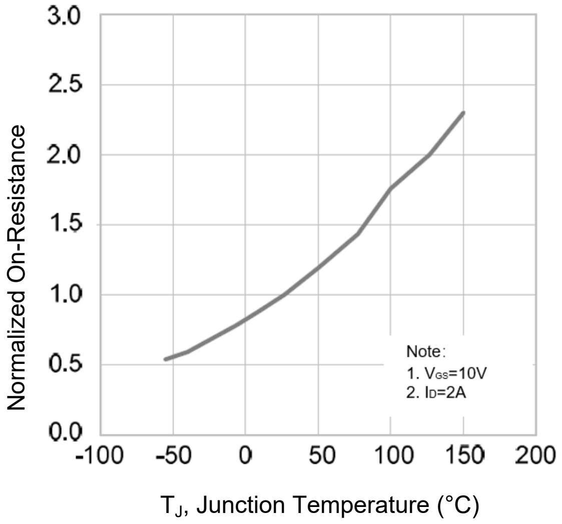


Figure 8. Normalized R$_{DS(ON)}$ vs. Junction Temperature

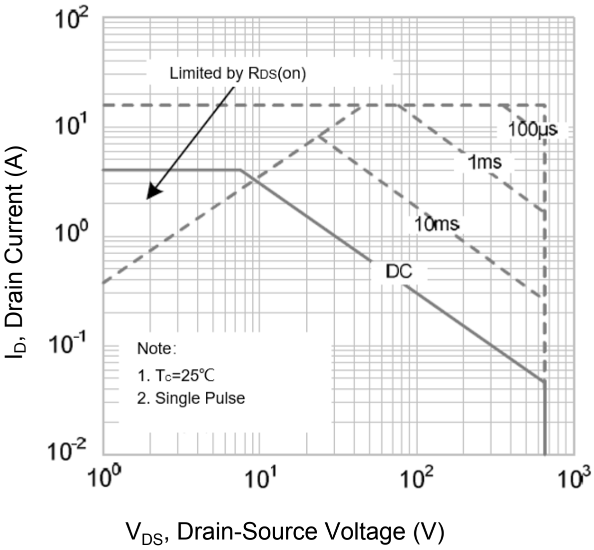


Figure 9. Safe Operation Area

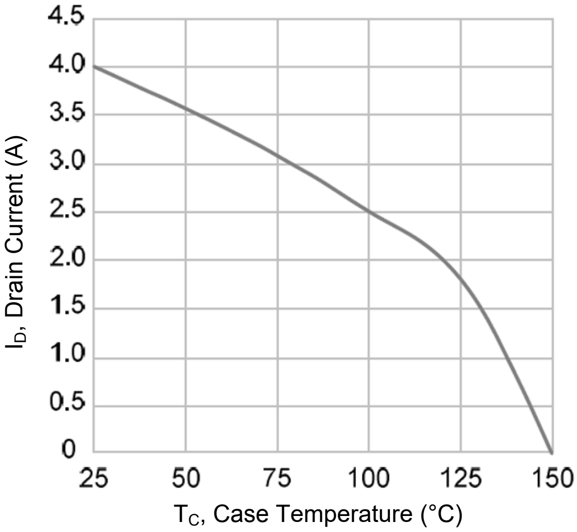
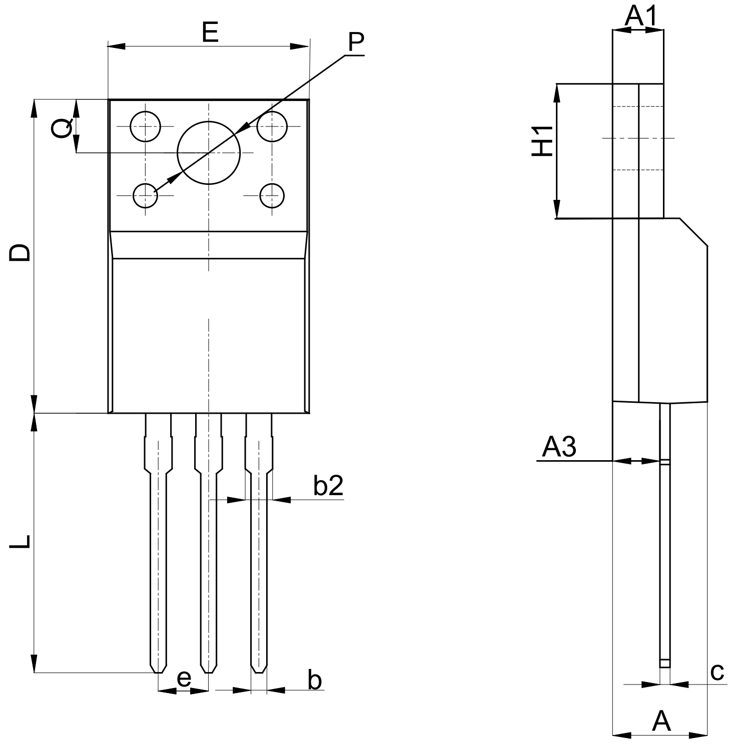


Figure 10. Drain Current vs. Case Temperature

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
GSFU6504	TO-220F	U4N65	Tube	50 pcs / Tube

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