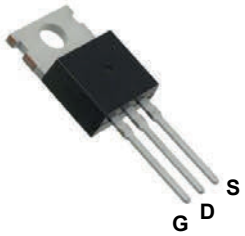
GOOD-ARK SEMICONDUCTOR

GSGH6R515

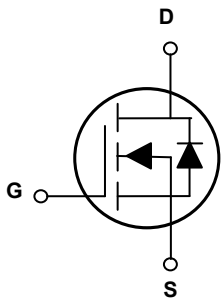
150V N-Channel MOSFET

Main Product Characteristics

$V_{(BR)DSS}$	150V
$R_{DS(ON)}$	6.5mΩ (Max.)
I_D	135A



TO-220



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

RoHS Compliant

Description

The GSGH6R515 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_{DS}	150	V
Gate-to-Source Voltage	V_{GS}	±20	V
Continuous Drain Current, @ Steady-State (T_C=25°C)[1]	I_D	135	A
Continuous Drain Current, @ Steady-State (T_C=100°C)		95	A
Pulsed Drain Current[2]	I_{DM}	540	A
Power Dissipation (T_C=25°C)	P_D	300	W
Linear Derating Factor (T_C=25°C)		2.0	W/°C
Single Pulse Avalanche Energy[3]	E_{AS}	1166	mJ
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.5	°C/W
Thermal Resistance, Junction-to-Ambient (PCB Mounted, Steady-State)[4]	$R_{\theta JA}$	62.5	°C/W
Operating Junction and Storage Temperature Range	T_J/T_{STG}	-55 to +175	°C

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
On / Off Characteristics						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=250μA	150	-	-	V
Drain-to-Source Leakage Current	I_{DSS}	V_{DS}=150V, V_{GS}=0V	-	-	1	μA
		V_{DS}=150V, V_{GS}=0V, T_J=125°C	-	-	100	
Gate-to-Source Forward Leakage	I_{GSS}	V_{GS}=20V	-	-	100	nA
		V_{GS}=-20V	-	-	-100	
Static Drain-to-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=50A	-	5.4	6.5	mΩ
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	2.4	3.5	4.6	V
Dynamic and Switching Characteristics						
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=75V, f=1MHz	-	4176	-	pF
Output Capacitance	C_{oss}		-	514	-	
Reverse Transfer Capacitance	C_{rss}		-	15.4	-	
Total Gate Charge	Q_g	I_D=20A, V_{DS}=75V, V_{GS}=10V	-	62	-	nC
Gate-to-Source Charge	Q_{gs}		-	19.2	-	
Gate-to-Drain ("Miller") Charge	Q_{gd}		-	15.6	-	
Gate Plateau Voltage	$V_{plateau}$		-	4.8	-	V
Turn-on Delay Time	$t_{d(on)}$	V_{GS}=10V, V_{DS}=75V, I_D=20A, R_{GEN}=3Ω	-	6.5	-	nS
Rise Time	t_r		-	29	-	
Turn-Off Delay Time	$t_{d(off)}$		-	37	-	
Fall Time	t_f		-	20.5	-	
Gate Resistance	R_g	f=1MHz	-	1.9	-	Ω
Source-Drain Ratings and Characteristics						
Continuous Source Current (Body Diode)	I_S	MOSFET symbol showing the integral reverse p-n junction diode.	-	-	135	A
Pulsed Source Current (Body Diode)	I_{SM}		-	-	540	A
Diode Forward Voltage	V_{SD}	I_S=10A, V_{GS}=0V	-	1	1.2	V
Reverse Recovery Time	t_{rr}	T_J=25°C, I_F=20A, di/dt=100A/μs	-	92	-	nS
Reverse Recovery Charge	Q_{rr}		-	0.34	-	uC

Notes:

1. Pulse test: Pulse width ≤300us, duty cycle ≤2%.
2. Repetitive rating; pulse width limited by max. junction temperature.
3. L=0.3mH, R_G=25Ω, V_{DD}=50V, I_{AS}=60A, T_J=25°C.
4. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch.

Typical Electrical and Thermal Characteristic Curves

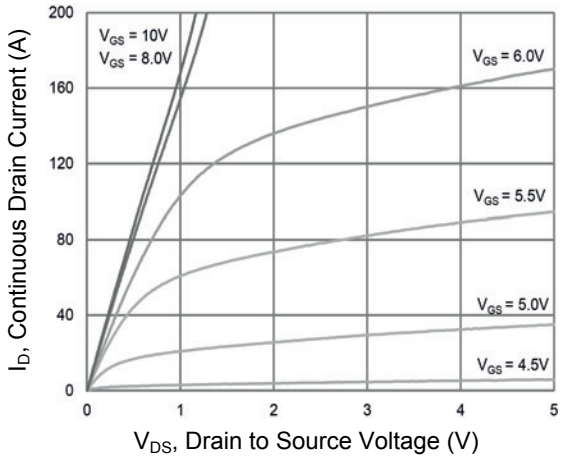


Figure 1. Typical Output Characteristics

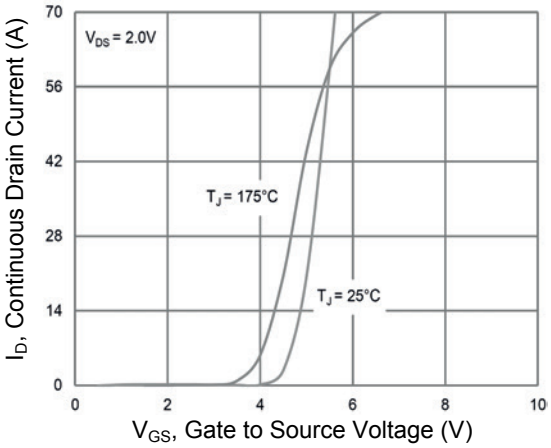


Figure 2. Typical Transfer Characteristics

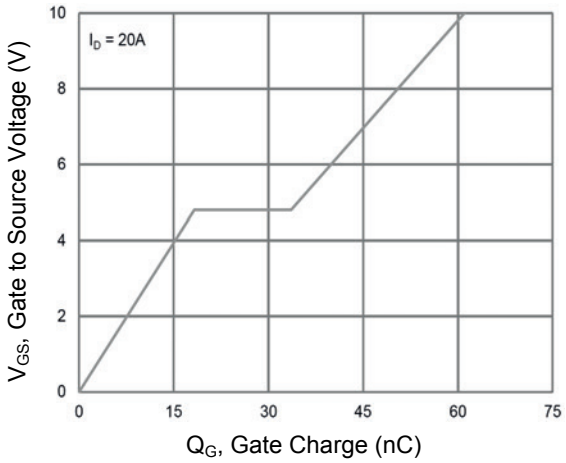


Figure 3. Gate Charge

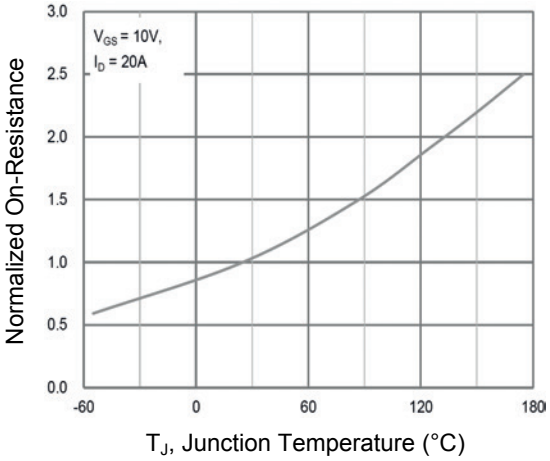


Figure 4. Normalized $R_{DS(ON)}$ vs. T_J

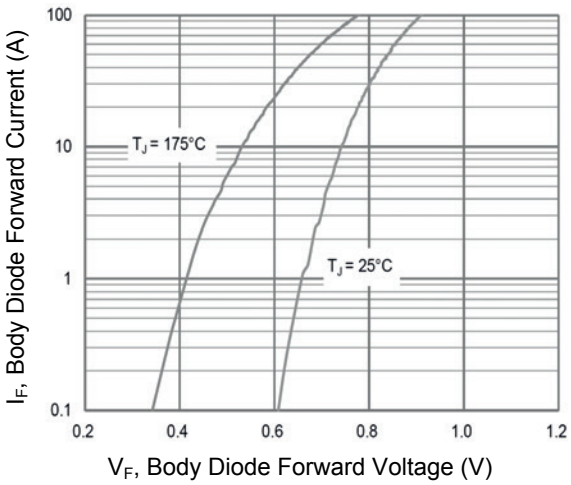


Figure 5. Body Diode Characteristics

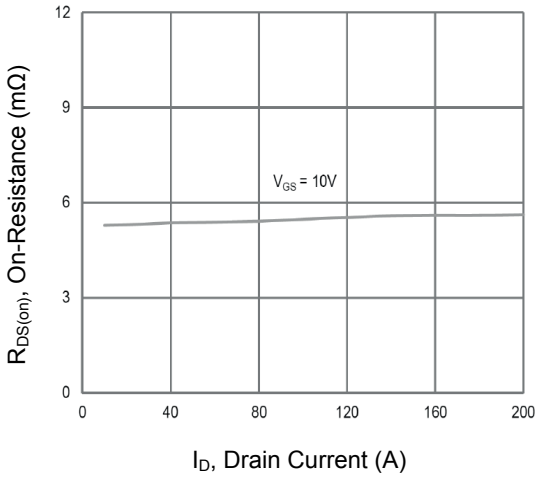


Figure 6. On-Resistance vs. I_D

Typical Electrical and Thermal Characteristic Curves

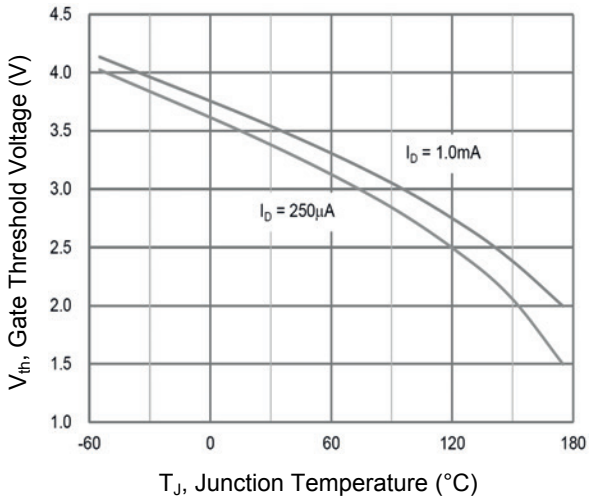


Figure 7. Gate Threshold Voltage vs. T_J

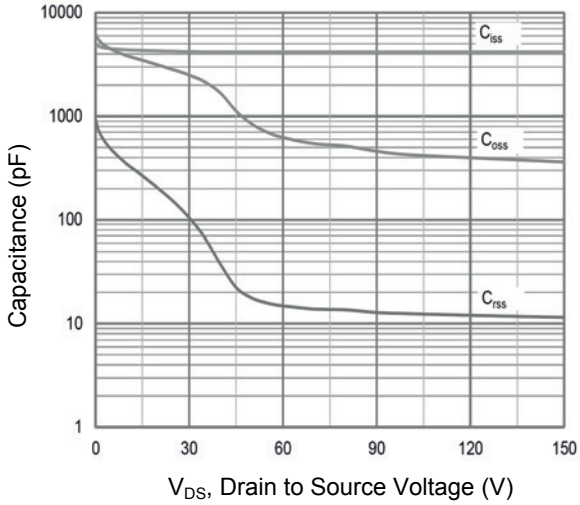


Figure 8. Typical Capacitance Characteristics

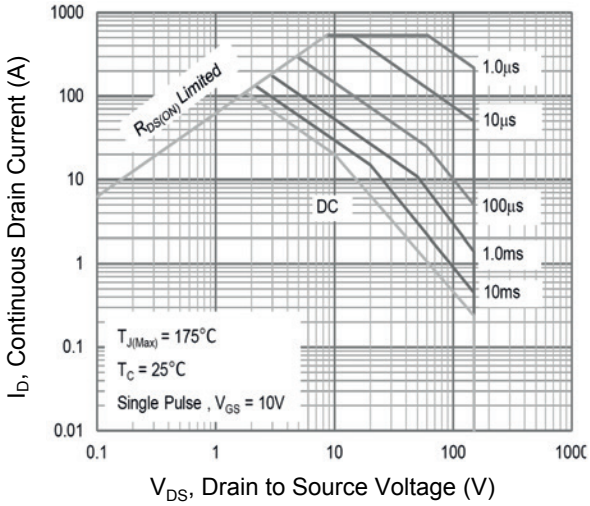


Figure 9. Safe Operation Area

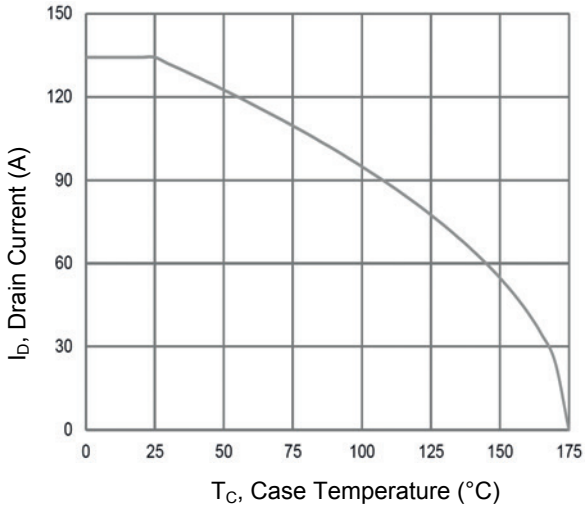
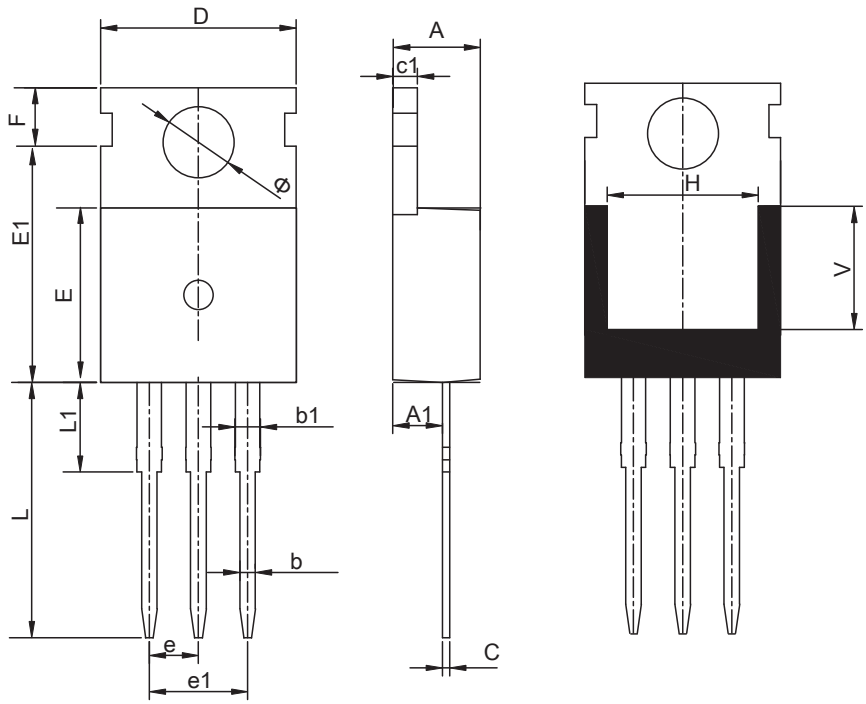


Figure 10. Current Derating

Package Outline Dimensions (TO-220)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
A1	2.25	2.70	0.089	0.106
b	0.71	0.91	0.028	0.036
b1	1.17	1.37	0.046	0.054
C	0.33	0.65	0.013	0.026
c1	1.20	1.40	0.047	0.055
D	9.91	10.25	0.390	0.404
E	8.95	9.75	0.352	0.384
E1	12.65	13.00	0.498	0.512
e	2.54 TYP		0.100 TYP	
e1	4.98	5.18	0.196	0.204
F	2.65	2.95	0.104	0.116
H	7.90	8.10	0.311	0.319
L	12.90	13.40	0.508	0.528
L1	2.68	3.25	0.106	0.128
V	6.90 REF		0.272 REF	
Φ	3.40	3.80	0.134	0.150

Order Information

Device	Package	Marking	Carrier	Quantity
GSGH6R515	TO-220	H6R515	Tube	50pcs / Tube