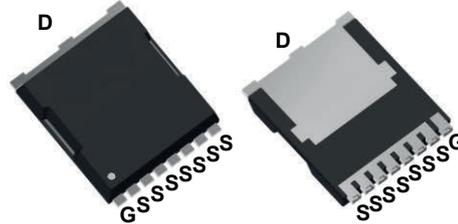
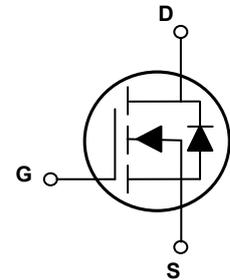


### Main Product Characteristics

$V_{(BR)DSS}$	40V
$R_{DS(ON)}$	0.85mΩ (Max.)
$I_D$	490A



TOLL



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 GSGTL0R904 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 ( $T_A=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Parameter	Unit
Drain-Source Voltage	$V_{DS}$	40	V
Gate-to-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current, @ Steady-State ( $T_C=25^\circ\text{C}$ ) <sup>1</sup>	$I_D$	490	A
Continuous Drain Current, @ Steady-State ( $T_C=100^\circ\text{C}$ ) <sup>1</sup>		342	A
Pulsed Drain Current ( $T_C=25^\circ\text{C}$ ) <sup>2</sup>	$I_{DM}$	1960	A
Power Dissipation ( $T_C=25^\circ\text{C}$ ) <sup>3</sup>	$P_D$	254	W
Single Pulse Avalanche Energy	$E_{AS}$	169	mJ
Single Pulse Current	$I_{AS}$	52	A
Junction-to-Ambient (PCB Mounted, Steady-State)	$R_{\theta JA}$	50	$^\circ\text{C/W}$
Junction-to-Case	$R_{\theta JC}$	0.49	$^\circ\text{C/W}$
Operating Junction and Storage Temperature Range	$T_J/T_{STG}$	-55 to + 150	$^\circ\text{C}$
Soldering Temperature (SMD)	$T_{sold}$	260	$^\circ\text{C}$

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>On / Off Characteristics</b>						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	40	-	-	V
Drain-to-Source Leakage Current	$I_{DSS}$	$V_{DS}=40V, V_{GS}=0V, T_J=25^\circ\text{C}$	-	-	1.0	$\mu A$
		$V_{DS}=40V, V_{GS}=0V, T_J=125^\circ\text{C}$	-	2.5	-	
Gate-to-Source Forward Leakage	$I_{GSS}$	$V_{DS}=0V, V_{GS}=20V$	-	-	100	nA
		$V_{DS}=0V, V_{GS}=-20V$	-	-	-100	
Static Drain-to-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=50A$	-	0.49	0.85	m $\Omega$
		$V_{GS}=4.5V, I_D=50A$	-	0.86	1.1	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.1	1.8	2.9	V
<b>Dynamic and Switching Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{GS}=0V, V_{DS}=15V, f=1\text{MHz}$	-	9040	-	$\mu F$
Output Capacitance	$C_{oss}$		-	5389	-	
Reverse Transfer Capacitance	$C_{rss}$		-	291	-	
Total Gate Charge <sup>4,5</sup>	$Q_g$	$I_D=45A, V_{DD}=15V, V_{GS}=10V$	-	121	-	nC
Gate-to-Source Charge <sup>4,5</sup>	$Q_{gs}$		-	36	-	
Gate-to-Drain ("Miller") Charge <sup>4,5</sup>	$Q_{gd}$		-	7.5	-	
Gate-to-Plateau <sup>4,5</sup>	$V_{plateau}$		-	4.0	-	V
Turn-On Delay Time <sup>4,5</sup>	$t_{d(on)}$	$V_{DD}=20V, V_{GS}=10V, R_G=3.0\Omega, I_D=20A$	-	27	-	nS
Rise Time <sup>4,5</sup>	$t_r$		-	71	-	
Turn-Off Delay Time <sup>4,5</sup>	$t_{d(off)}$		-	102	-	
Fall Time <sup>4,5</sup>	$t_f$		-	32	-	
Gate Resistance	$R_g$	$f=1\text{MHz}$	-	1.5	-	$\Omega$
<b>Source-Drain Ratings and Characteristics</b>						
Continuous Source Current (Body Diode)	$I_S$	MOSFET symbol showing the integral reverse p-n junction diode.	-	-	490	A
Diode Pulse Current	$I_{S, pulse}$		-	-	1960	A
Diode Forward Voltage	$V_{SD}$	$I_S=50A, V_{GS}=0V$	-	-	1.4	V
Reverse Recovery Time <sup>4</sup>	$T_{rr}$	$I_S=14A, V_{GS}=0V, V_R=30V, dI_F/dt=100A/\mu s$	-	90	-	nS
Reverse Recovery Charge <sup>4</sup>	$Q_{rr}$		-	170	-	nC

Note:

1. The rated value only refers to the maximum absolute value under the case temperature of 25 degrees in the manual. If the case temperature is higher than 25 degrees, the frequency needs to be reduced according to the actual environmental conditions.
2. Pulse time of 5 $\mu s$ , pulse width limited by maximum junction temperature.
3. The dissipated power value will change with the temperature. When it is greater than 25 $^\circ\text{C}$ , the dissipated power value will decrease by 0.74 $^\circ\text{C}/\text{W}$  for every 1 degree of temperature increase.
4. Pulse test : pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
5. Basically unaffected by operating temperature.

### Typical Electrical and Thermal Characteristic Curves

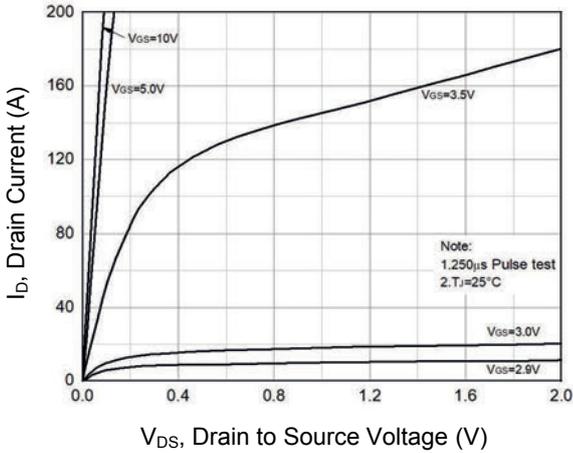


Figure 1. Typical Output Characteristics

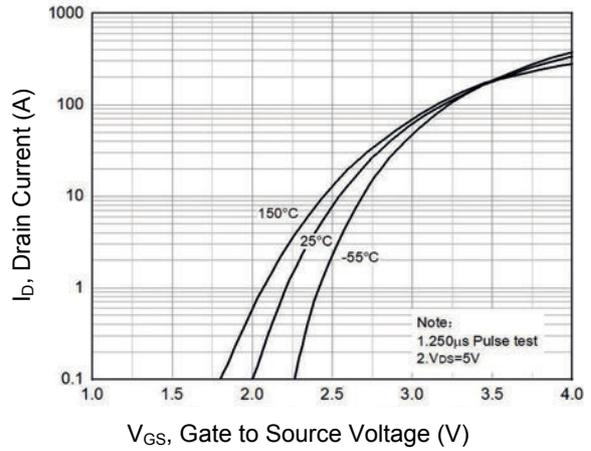


Figure 2. Transfer Characteristics

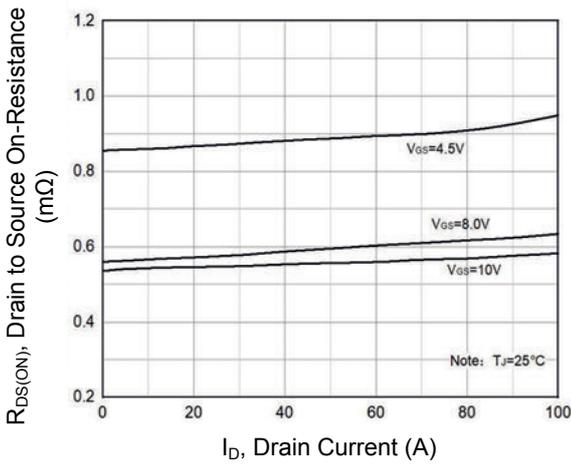


Figure 3.  $R_{DS(on)}$  Vs. Drain Current

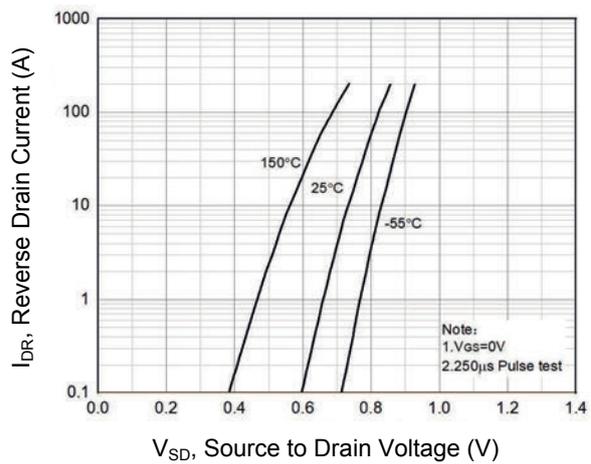


Figure 4. Body Diode Characteristics

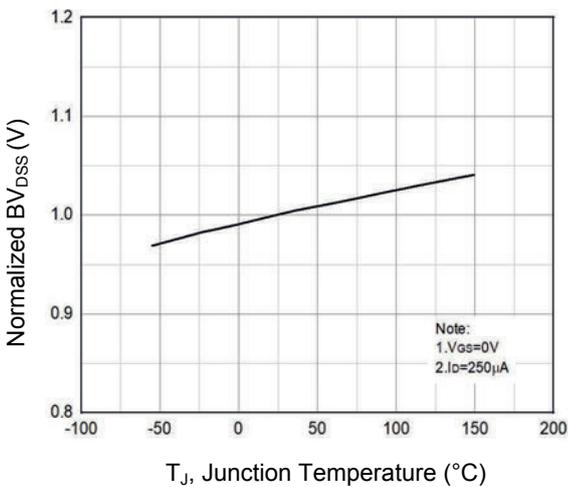


Figure 5. Normalized  $BV_{DSS}$  Vs.  $T_J$

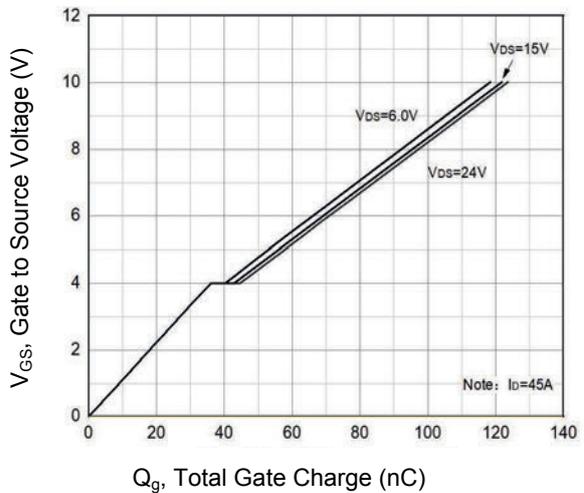
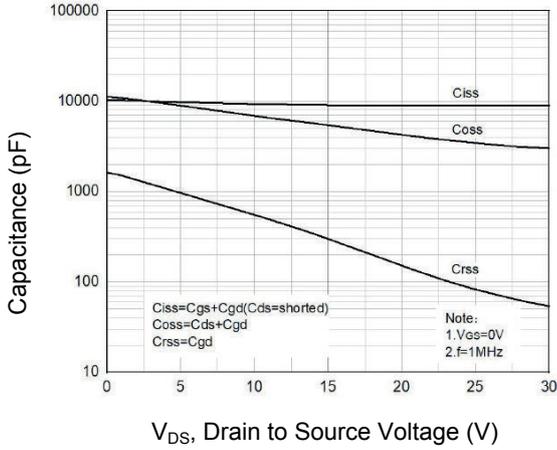
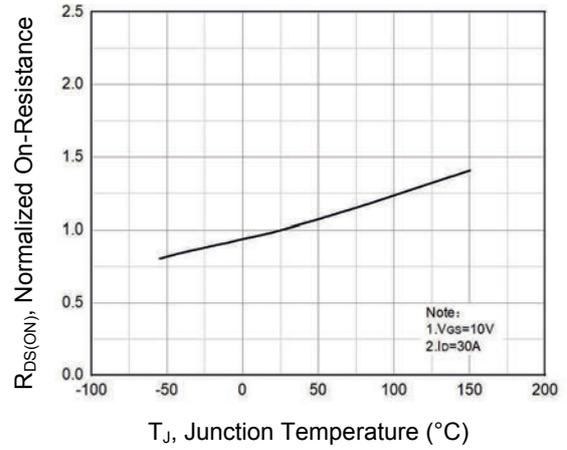


Figure 6. Gate Charge

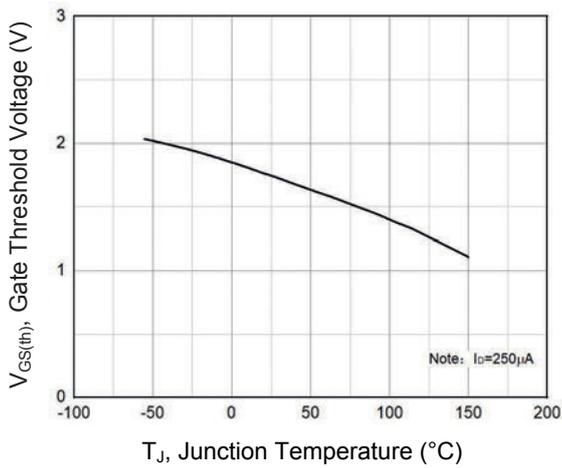
### Typical Electrical and Thermal Characteristic Curves



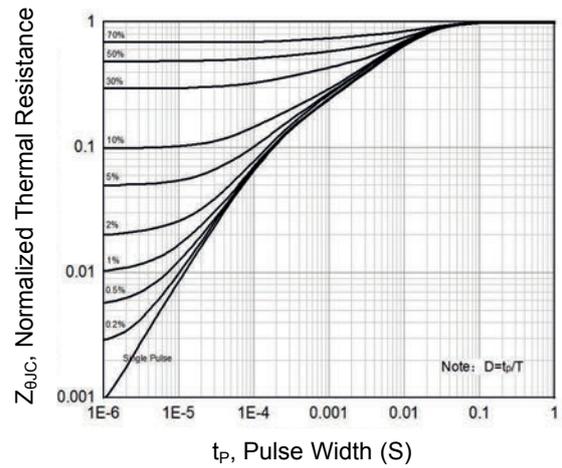
**Figure 7. Capacitance Characteristics**



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

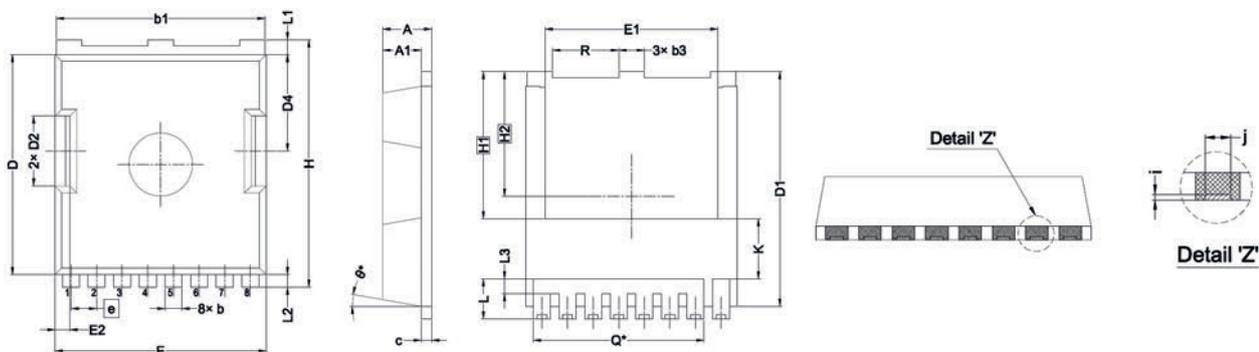


**Figure 9. Gate Threshold Voltage Vs.  $T_J$**



**Figure 10. Transient Thermal Impedance Vs.  $t_p$**

### Package Outline Dimensions (TOLL)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.20	2.40	0.087	0.094
A1	1.70	1.90	0.067	0.075
b	0.70	0.90	0.028	0.035
b1	9.70	9.90	0.382	0.390
b3	1.10	1.30	0.043	0.051
c	0.40	0.60	0.016	0.024
D	10.28	10.48	0.405	0.413
D1	10.98	11.18	0.432	0.440
D2	3.20	3.40	0.126	0.134
D4	4.45	4.65	0.175	0.183
E	9.80	10.00	0.386	0.394
E1	8.00	8.20	0.315	0.323
E2	0.60	0.80	0.024	0.031
e	1.20 BSC		0.047 BSC	
H	11.58	11.78	0.456	0.464
H1	6.95 BSC		0.274 BSC	
H2	5.89 BSC		0.232 BSC	
i	0.10 REF		0.004 REF	
j	0.46 REF		0.018 REF	
K	2.80 REF		0.110 REF	
L	1.40	2.10	0.055	0.083
L1	0.60	0.80	0.024	0.031
L2	0.50	0.70	0.020	0.028
L3	0.30	0.80	0.012	0.031
Q	8.00 REF		0.315 REF	
R	3.00	3.20	0.118	0.126
θ	10° REF		10° REF	

## Recommended Pad Layout

