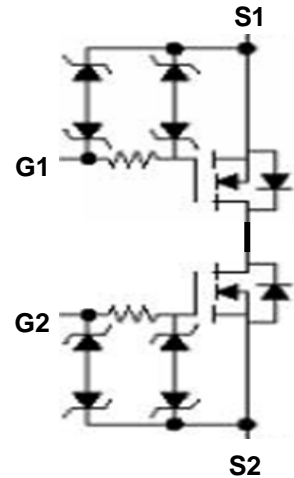


# GWS6968EW – Bi-directional N-Channel 2.5V specified in TSSOP-8 package

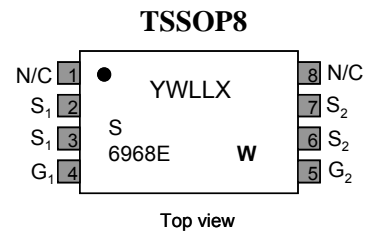
## General Description

- Advanced **Lateral Power™** technology
- Specially designed for Li-Ion battery packs and battery switch applications
- TSSOP-8 package
- “E” signifies ESD protection.
- “W” signifies Customers have obtained UL approval for this product in their application.



## Features

- 6.5A, 20V,  $r_{DS(ON)} = 22m\Omega$  max at 4.5 Volts
- 5.5A, 20V,  $r_{DS(ON)} = 31.5m\Omega$  max at 2.5 Volts
- Integrated gate diodes provide Electro-Static Discharge (ESD) protection of 2500V Human Body Model (HBM)..



### Maximum Ratings and Thermal Characteristics ( $T_A=25^\circ C$ unless otherwise noted)

Parameter	Symbol	10 secs	Steady State	Unit
Drain-Source Voltage	$V_{DS}$	20		V
Gate-Source Voltage	$V_{GS}$	$\pm 12$		
Drain Current <sup>a</sup>	$T_A=25^\circ C$	6.5	5.2	A
	$T_A=70^\circ C$	5.5	3.5	
Pulsed Drain Current	$I_{DM}$	30		
Maximum Power Dissipation <sup>a</sup>	$T_A=25^\circ C$	1.5	1.0	W
	$T_A=70^\circ C$	0.96	0.67	
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-55 to 150		$^\circ C$

Thermal Resistance Ratings					
Parameter	Symbol	Typ	Max	Unit	
Junction-to-Ambient	$R_{thJA}$	$t \leq 10$ sec	68	83	$^\circ C/W$
		Steady State	105	120	
Junction-to-Foot (Lead)	$R_{thJF}$	55	70		

<sup>a</sup> Surface Mounted on FR4 Board.

**Electrical Characteristics** ( $T_J = 25\text{ }^\circ\text{C}$  unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
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**Static**

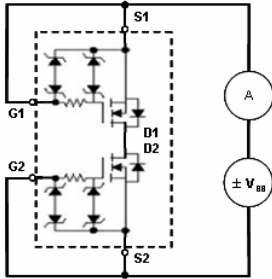
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	20			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{GS} = 0V, V_{DS} = 20V$			5	$\mu A$
Gate Body Leakage	$I_{GSS}$	$V_{DS} = 0V, V_{GS} = +/-12V$			+/-10	$\mu A$
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	0.5	0.6	1.5	V
Drain-Source On-State Resistance	$r_{DS(on)}$	$V_{GS} = 4.5V, I_D = 6.5A$			22	m $\Omega$
		$V_{GS} = 2.5V, I_D = 5.5A$			31.5	

**Dynamic**

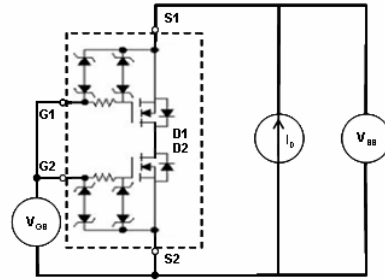
Total Gate Charge	$Q_g$	$V_{DS} = 16V, I_D = 6.5A, V_{GS} = 4.5V$		15		nC
Input Capacitance	$C_{iss}$	$V_{DS} = 20V, V_{GS} = 0V, f = 1\text{ MHz}$		1100		pF
Output Capacitance	$C_{oss}$			400		
Reverse Transfer Capacitance	$C_{rss}$			300		

**Source Drain Diode**

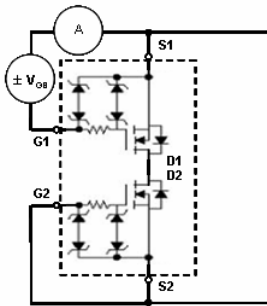
Source Drain Reverse Recovery	$t_{rr}$	$I_S = 1A, V_{GS} = 0V, di/dt = 100A/\mu S$		40		ns
Diode Forward Voltage	$V_{SD}$	$I_S = 1A, V_{GS} = 0V$		0.71		V

**Test Circuit 1:**  $I_{DSS}$ , Zero Gate Voltage Drain Current


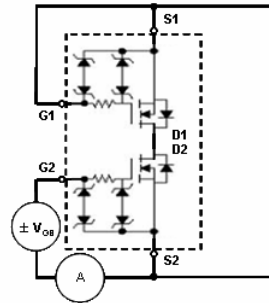
FET (1)  $I_{DSS}$ :  $V_{S2}=V_{G2}=20V, V_{S1}=V_{G1}=0V$   
 FET (2)  $I_{DSS}$ :  $V_{S1}=V_{G1}=20V, V_{S2}=V_{G2}=0V$

**Test Circuit 2:**  $R_{DS(ON)}$ , Drain-to-Source ON State Resistance


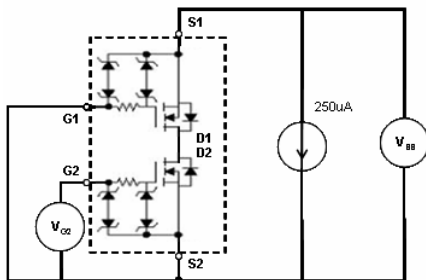
FET (1 or 2)  $R_{DS(ON)} = (V_{DS} / I_D) / 2$

**Test Circuit 3:**  $I_{GSS}$ , Gate Body Leakage


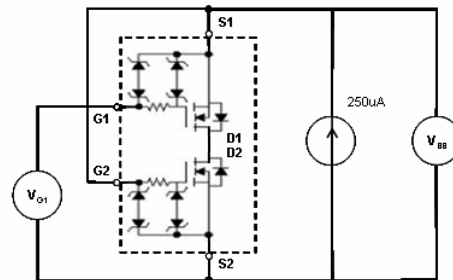
FET (1)  $I_{GSS}$ :  $V_{GS1} = \pm 12V, V_{S1}=V_{S2}=V_{G2}=0V$



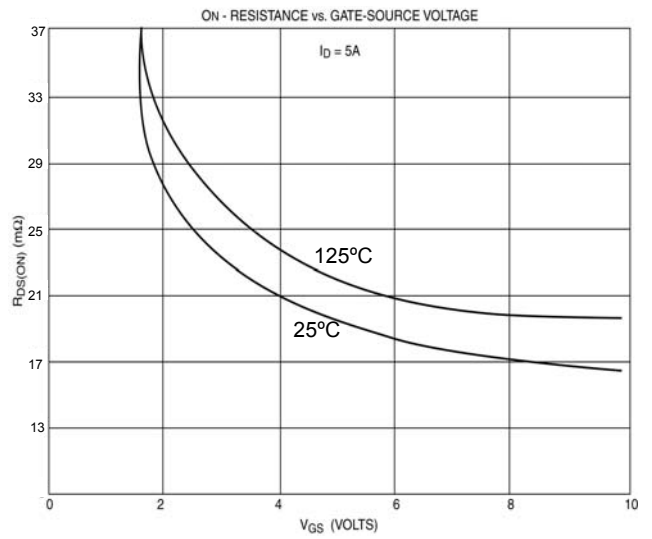
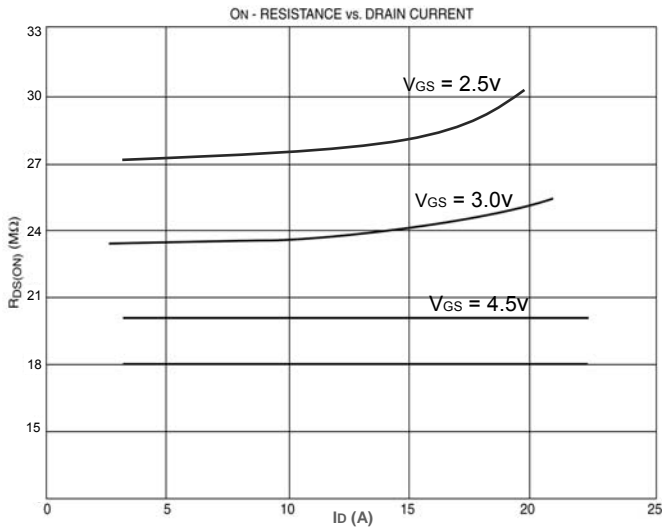
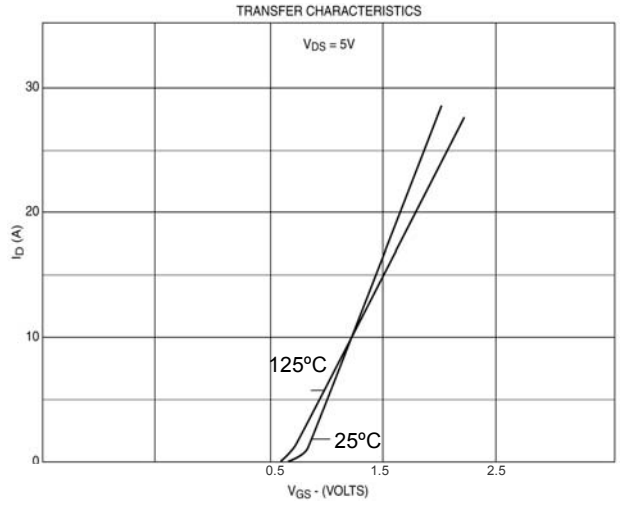
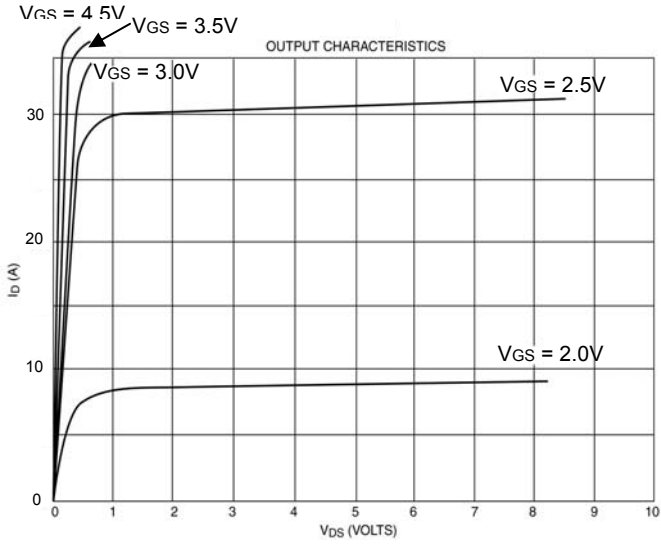
FET (2)  $I_{GSS}$ :  $V_{GS2} = \pm 12V, V_{S1}=V_{S2}=V_{G1}=0V$

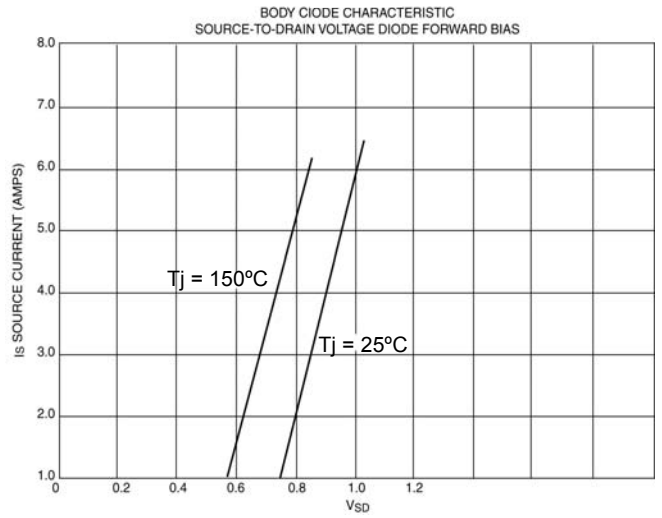
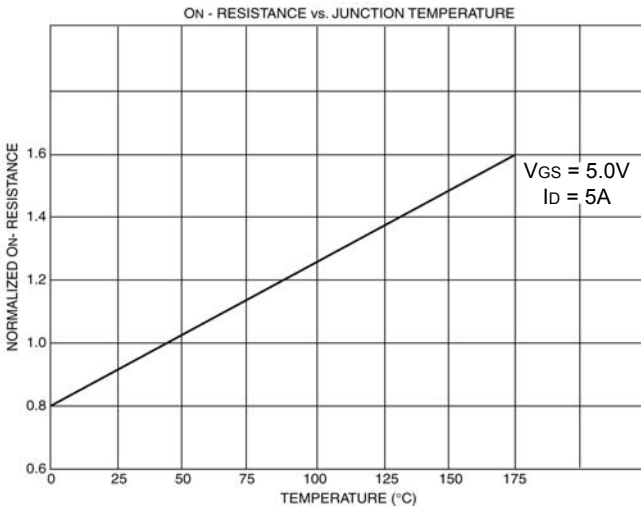
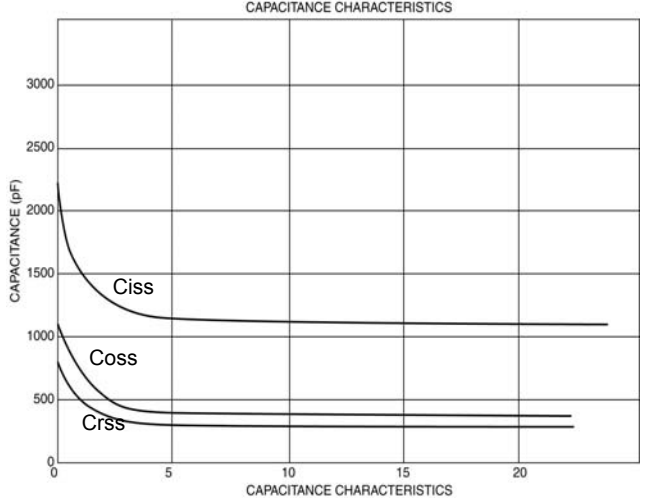
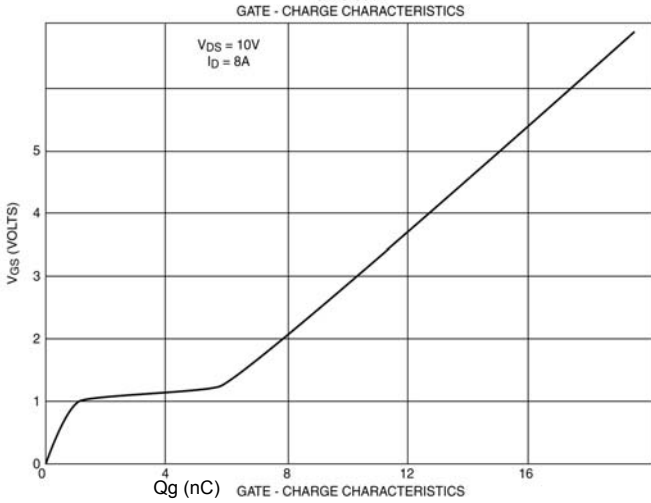
**Test Circuit 4:**  $V_{GS(th)}$ , Gate Body Leakage


FET (1)  $V_{GS(th)1} = V_{SS}$   
 Where:  $V_{G1}=V_{S2}, V_{S1}=0V, V_{G2}=4.5V, I_{Ss}=250\mu A$

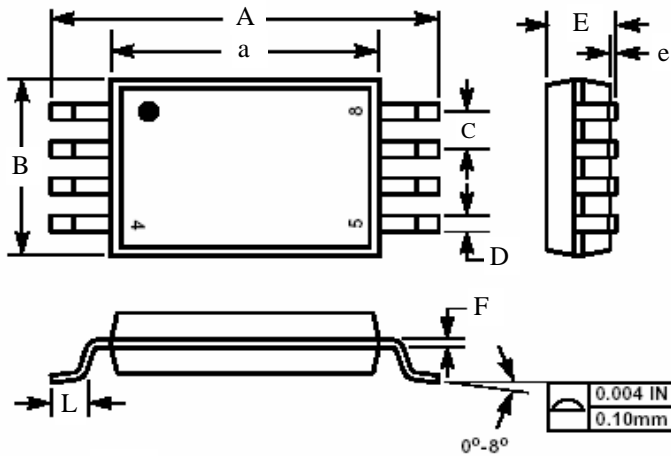


FET (2)  $V_{GS(th)2} = V_{SS}$   
 Where:  $V_{G2}=V_{S2}, V_{S1}=0V, V_{G1}=4.5V, I_{Ss}=250\mu A$



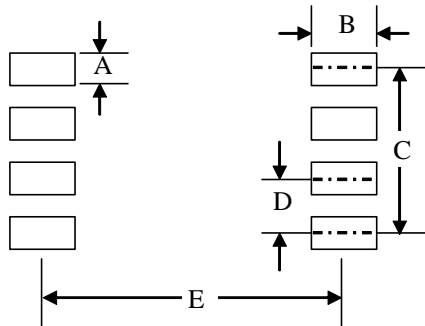


## Package Outline



Symbol	inches		Millimeters	
	Min	Max	Min	Max
A	0.244	0.260	6.20	6.60
a	0.170	0.177	4.30	4.50
B	0.114	0.122	2.90	3.10
C	0.025BSC		0.65BSC	
D	0.010	0.012	0.25	0.30
E	0.041	0.047	1.05	1.20
e	0.002	0.006	0.05	0.15
F	0.005		0.127	
L	0.020	0.028	0.50	0.70
REF	MO-153AA			

## Mounting Pad Layout



Symbol	inches		Millimeters	
	Min	Max	Min	Max
A	0.01	0.012	0.25	0.30
B	0.020	0.028	0.50	0.70
C	0.077	-	1.95	-
D	0.025	-	0.65	-
E	0.260	-	6.60	-

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