Bi-Directional N-Channel 20-V (D-S) MOSFET

PRODUCT SUMMARY			
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)	Q_g (Typ.)
20	0.022 at V_{GS} = 4.5 V	10.3	9.1
	0.023 at V_{GS} = 4.0 V	10.0	
	0.026 at V_{GS} = 3.1 V	9.4	
	0.028 at V_{GS} = 2.5 V	9.0	

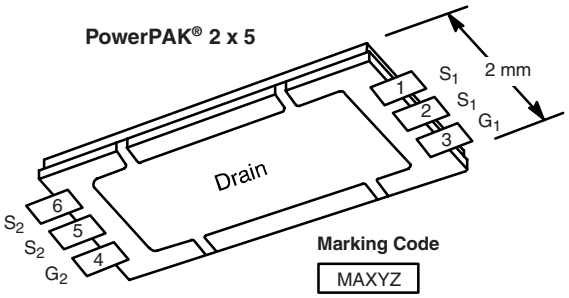
FEATURES

- **Halogen-free**
- TrenchFET® Power MOSFET: 2.5 V Rated
- ESD Protected: 4000 V

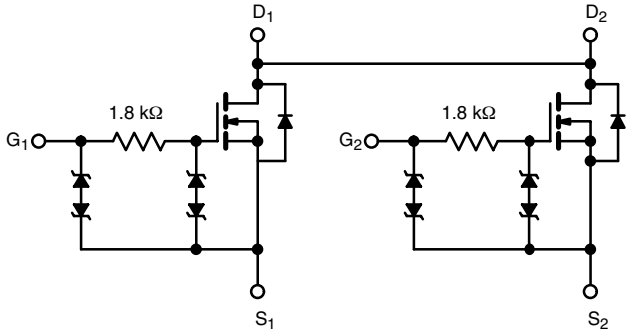
Pb-free
RoHS COMPLIANT

APPLICATIONS

- Battery Protection Circuitry
  - Cell Li-Ion LiB/LiP Battery Packs



Ordering Information: SiF902EDZ-T1-GE3 (Lead (Pb)-free and Halogen-free)



ABSOLUTE MAXIMUM RATINGS T_A = 25 °C, unless otherwise noted					
Parameter		**Symbol**	**10 s**	**Steady State**	**Unit**
Drain-Source Voltage		V_{DS}	20		V
Gate-Source Voltage		V_{GS}	± 12		
Continuous Drain Current (T_J = 150 °C)[a]	T_A = 25 °C	I_D	10.3	7.0	A
	T_A = 85 °C		7.4	5.1	
Pulsed Drain Current (V_{GS} = 8 V)		I_{DM}	40		
Continuous Diode Current (Diode Conduction)[a]		I_S	3.1	1.5	
Maximum Power Dissipation[a]	T_A = 25 °C	P_D	3.5	1.6	W
	T_A = 85 °C		1.8	0.86	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 150		°C

THERMAL RESISTANCE RATINGS					
Parameter		**Symbol**	**Typical**	**Maximum**	**Unit**
Maximum Junction-to-Ambient[a]	t ≤ 10 s	R_{thJA}	30	36	°C/W
	Steady State		61	76	
Maximum Junction-to-Case (Drain)	Steady State	R_{thJC}	4.8	6.0	

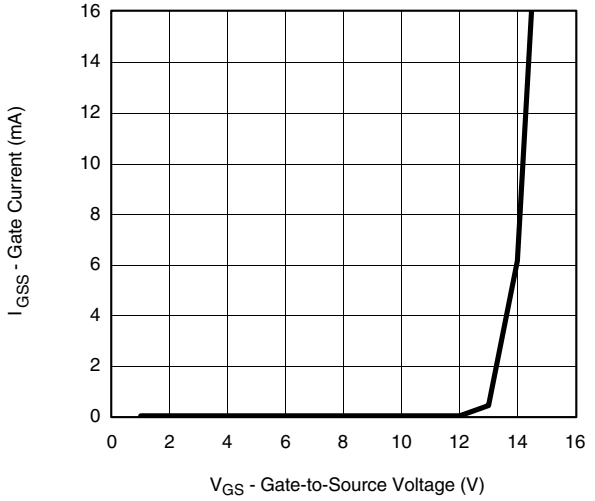
Notes:
a. Surface Mounted on 1" x 1" FR4 board.

SPECIFICATIONS T_J = 25 °C, unless otherwise noted						
Parameter	**Symbol**	**Test Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Static						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA	0.6		1.5	V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 4.5 V			± 10	µA
		V_{DS} = 0 V, V_{GS} = ± 12 V			± 500	
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 20 V, V_{GS} = 0 V			1	
		V_{DS} = 20 V, V_{GS} = 0 V, T_J = 85 °C			5	
On-State Drain Current[a]	$I_{D(on)}$	V_{DS} = 5 V, V_{GS} = 4.5 V	40			A
Drain-Source On-State Resistance[a]	$R_{DS(on)}$	V_{GS} = 4.5 V, I_D = 7.0 A		0.018	0.022	Ω
		V_{GS} = 4.0 V, I_D = 6.5 A		0.019	0.023	
		V_{GS} = 3.1 V, I_D = 4.0 A		0.021	0.026	
		V_{GS} = 2.5 V, I_D = 3.5 A		0.023	0.028	
Forward Transconductance[a]	g_{fs}	V_{DS} = 10 V, I_D = 7.0 A		38		S
Diode Forward Voltage[a]	V_{SD}	I_S = 3.1 A, V_{GS} = 0 V		0.76	1.1	V
Dynamic[b]						
Total Gate Charge	Q_g	V_{DS} = 10 V, V_{GS} = 4.5 V, I_D = 7.0 A		9.1	14	nC
Gate-Source Charge	Q_{gs}			1.9		
Gate-Drain Charge	Q_{gd}			2.7		
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 10 V, R_L = 10 Ω I_D ≅ 1 A, V_{GEN} = 4.5 V, R_g = 6 Ω		1.7	2.6	µs
Rise Time	t_r			2.3	3.5	
Turn-Off Delay Time	$t_{d(off)}$			1.1	1.7	
Fall Time	t_f			4.4	6.6	

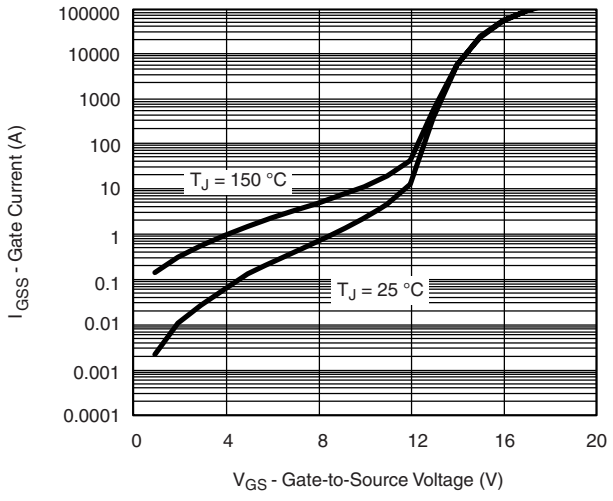
Notes:
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

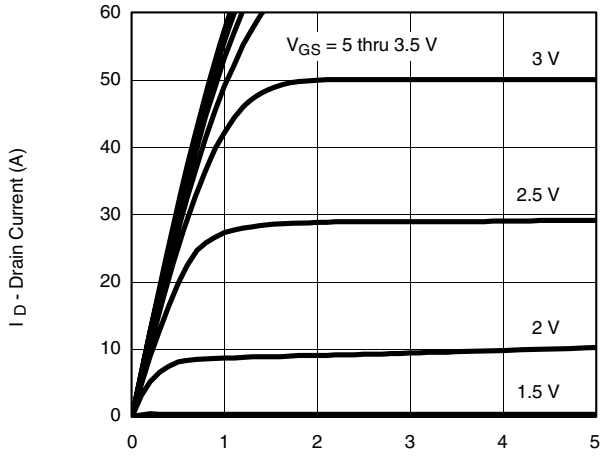


Gate-Current vs. Gate-Source Voltage

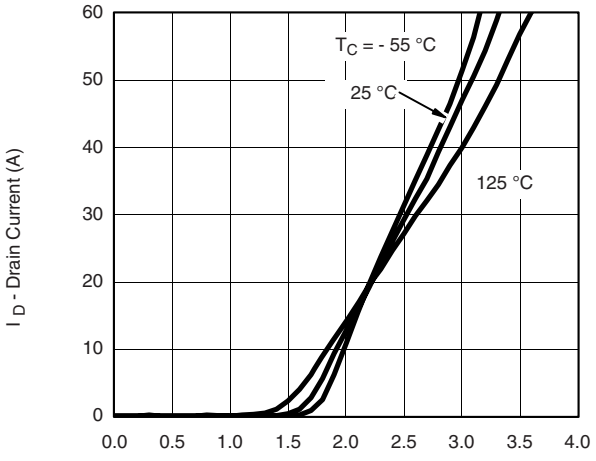


Gate Current vs. Gate-Source Voltage

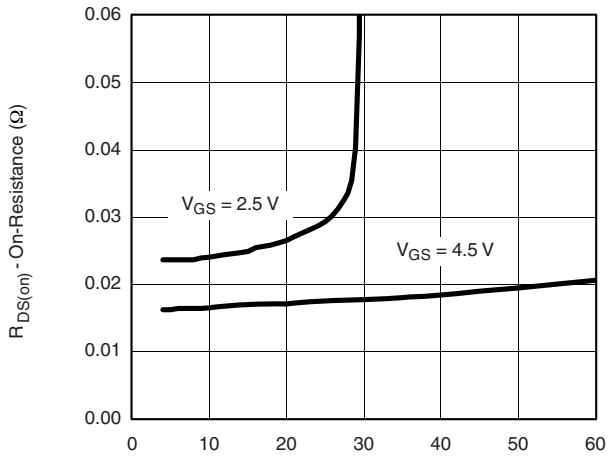
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



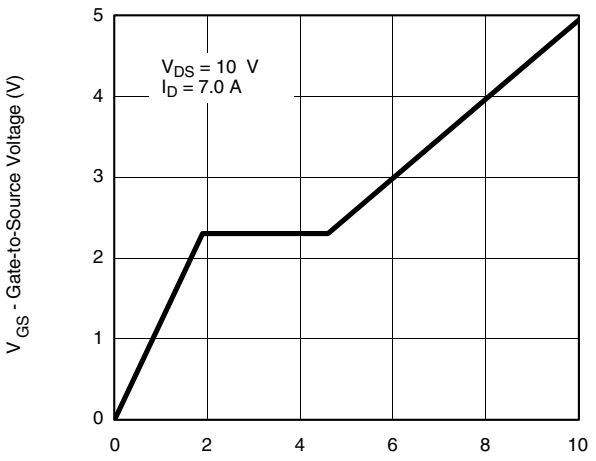
Output Characteristics



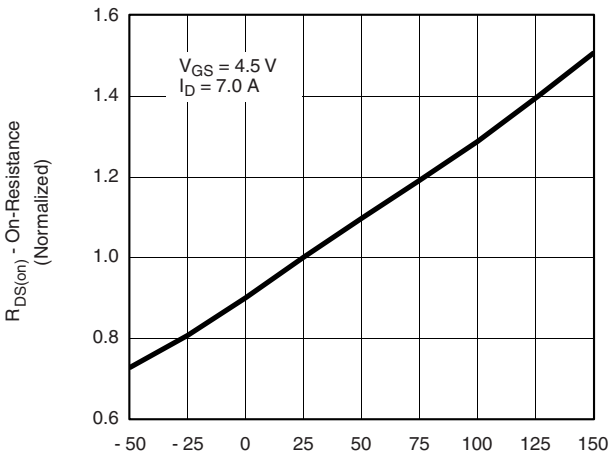
Transfer Characteristics



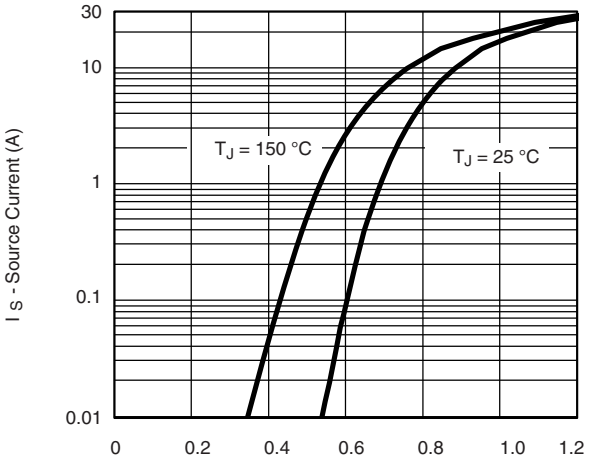
On-Resistance vs. Drain Current



Gate Charge

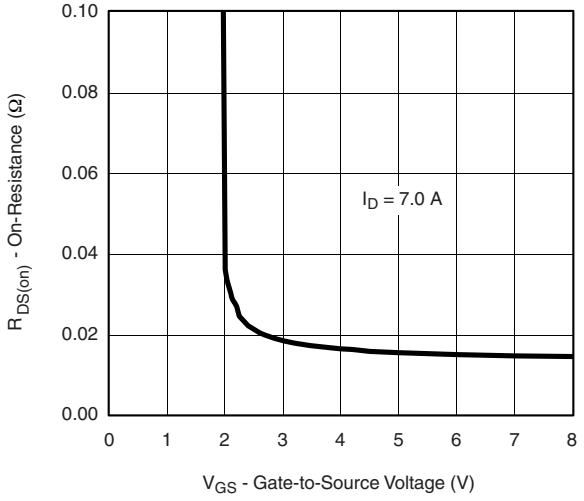


On-Resistance vs. Junction Temperature

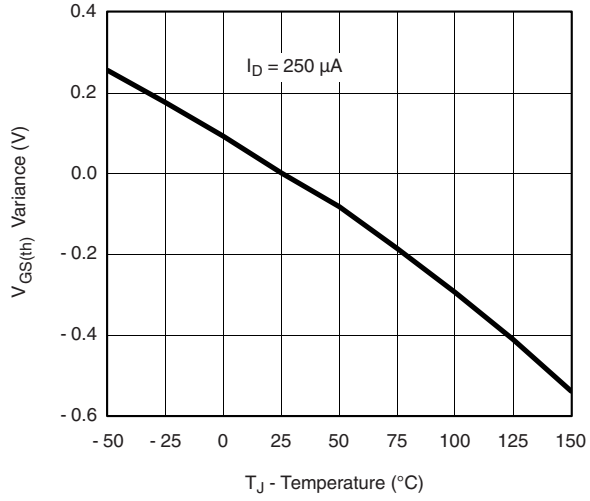


Source-Drain Diode Forward Voltage

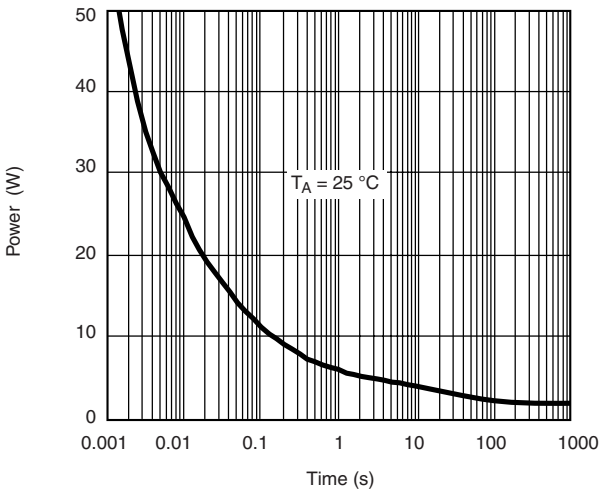
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



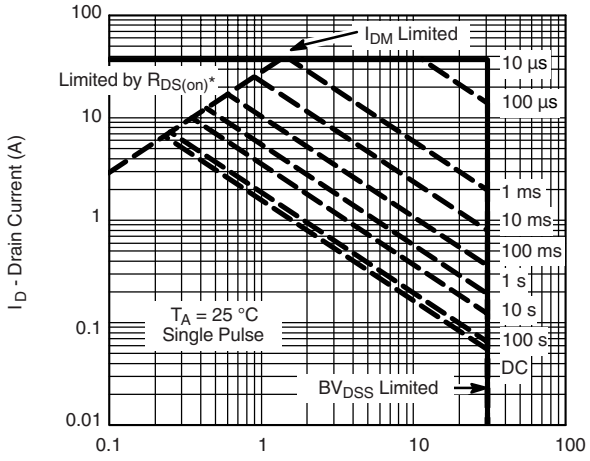
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

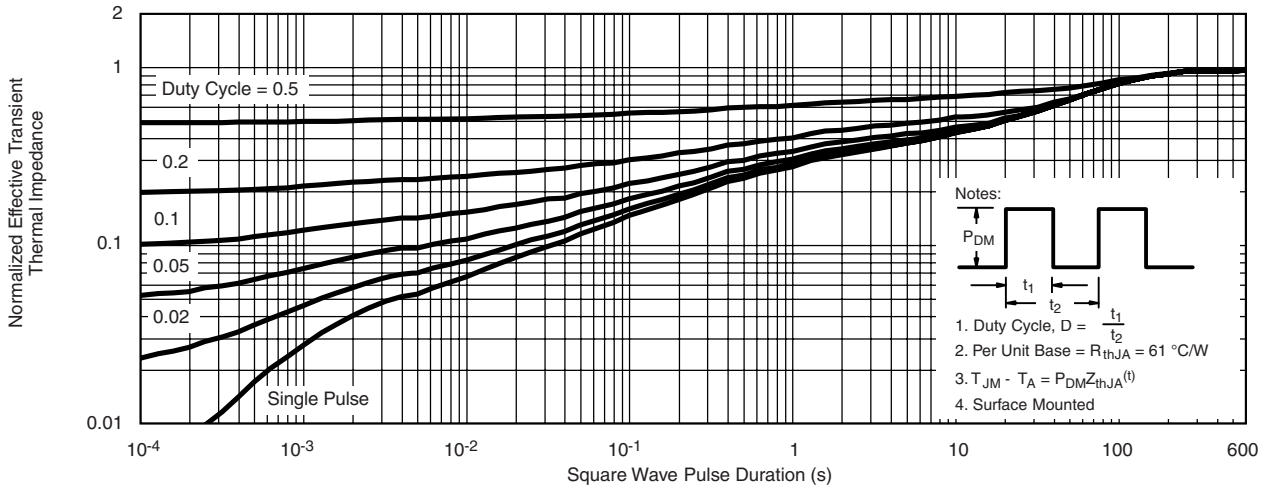


Single Pulse Power, Junction-to-Ambient



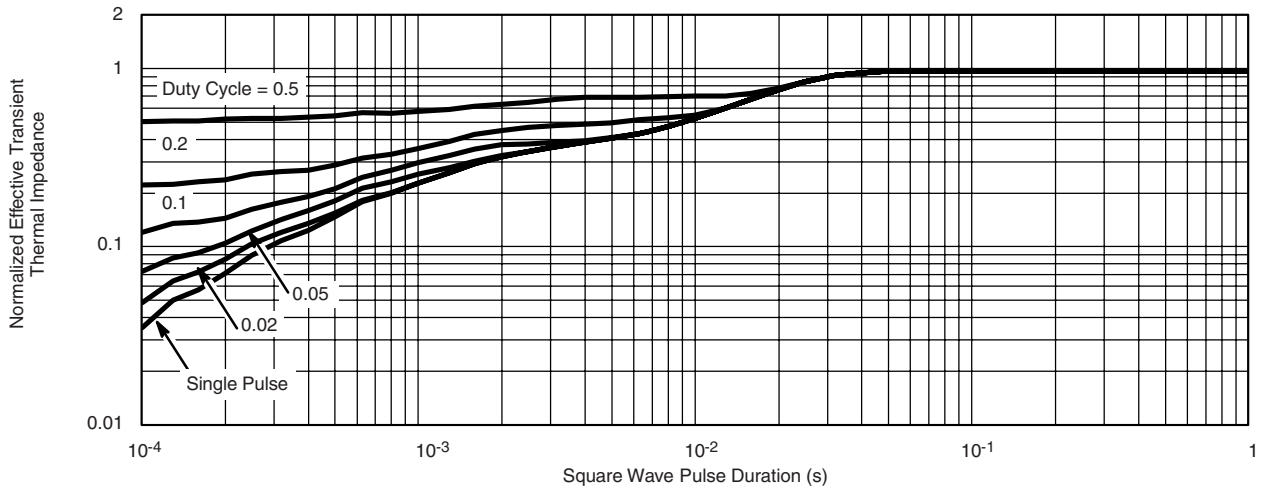
* V_{GS} > minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Ambient

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Normalized Thermal Transient Impedance, Junction-to-Case

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