General Description

The WSF2069 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.

Features

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- 100% E_{AS} Guaranteed
- Green Device Available

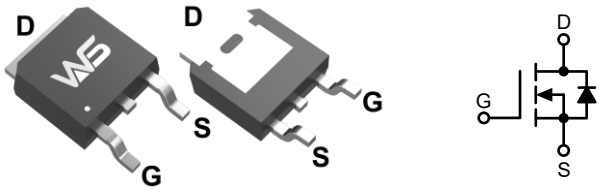
Product Summery

BV_{DSS}	$R_{DS(ON)}$	I_D
20V	3.1mΩ	69A

Applications

- Battery protection
- Load switch.
- Uninterruptible power supply

TO-252-2L Pin Configuration



Absolute Maximum Ratings (T_C=25°C, Unless Otherwise Noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	±12	
I_D@T_A=25°C	Continuous Drain Current, V_{GS} @ 4.5V	69	A
I_D@T_A=70°C	Continuous Drain Current, V_{GS} @ 4.5V	36	
I_{DM}	Pulse Drain Current [1]	210	
E_{AS}	Single Pulse Avalanche Energy [2]	56.2	mJ
I_{AS}	Avalanche Current	38	A
P_D@T_A=25°C	Total Power Dissipation	57	W
T_{STG}	Storage Temperature Range	-55 to 175	°C
T_J	Operating Junction Temperature Range	-55 to 175	

Thermal Data

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	---	62	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case	---	2.63	

Electrical Characteristics (T_C=25°C, Unless Otherwise Noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250μA	20	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=4.5V , I_D=30A	---	3.1	4.0	mΩ
		V_{GS}=2.5V , I_D=20A	---	3.9	5.0	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D=250μA	0.5	0.8	1.1	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=20V , V_{GS}=0V	---	---	1.0	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±12V , V_{DS}=0V	---	---	±100	nA
Q_g	Total Gate Charge	V_{DS}=10V , V_{GS}=0 to 4.5V , I_D=30A	---	36	---	nC
Q_{gs}	Gate-Source Charge		---	6	---	
Q_{gd}	Gate-Drain Charge		---	10	---	
$T_{d(on)}$	Turn-On Delay Time	V_{GS}=4.5V , V_{DD}=10V , I_D=30A , R_{GEN}=3Ω	---	13	---	ns
T_r	Turn-On Rise Time		---	31	---	
$T_{d(off)}$	Turn-Off Delay Time		---	73	---	
T_f	Turn-Off Fall Time		---	92	---	
C_{iss}	Input Capacitance	V_{DS}=10V , V_{GS}=0V , f=1.0MHz	---	3174	---	pF
C_{oss}	Output Capacitance		---	396	---	
C_{rss}	Reverse Transfer Capacitance		---	365	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
I_S	Maximum Continuous Drain to Source Diode Forward Current		---	---	70	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		---	---	300	
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=30A	---	---	1.2	V
t_{rr}	Reverse Recovery Time	I_F=20A , di/dt=100A/μs	---	13	---	ns
Q_{rr}	Reverse Recovery Charge		---	4	---	nC

Note:

1. The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.
2. The data tested by pulsed, pulse width. The E_{AS} data shows Max. rating.
3. The E_{AS} condition: T_J=25°C, V_{DD}=16V, V_{GS}=4.5V, R_G=25Ω, L=0.1mH, I_{AS}=38A
4. The power dissipation is limited by 175°C junction temperature.
5. The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics

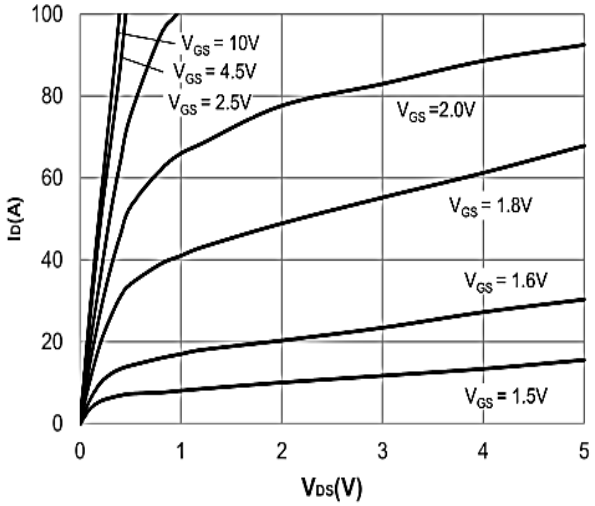


Figure1: Output Characteristics

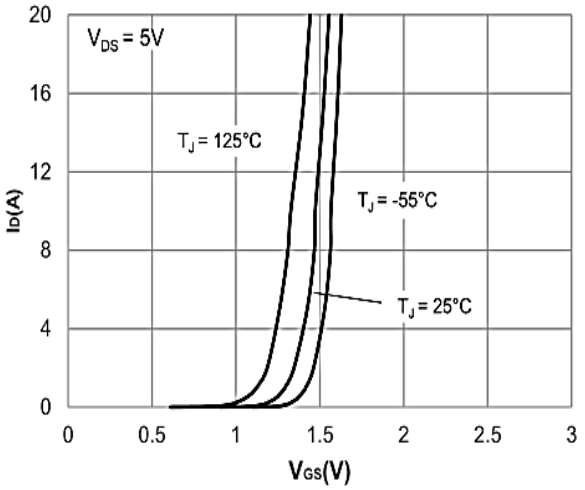


Figure 2: Typical Transfer Characteristics

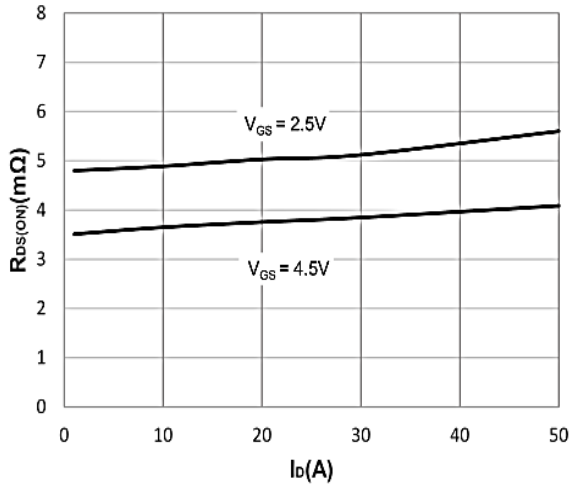


Figure 3:On-resistance vs. Drain Current

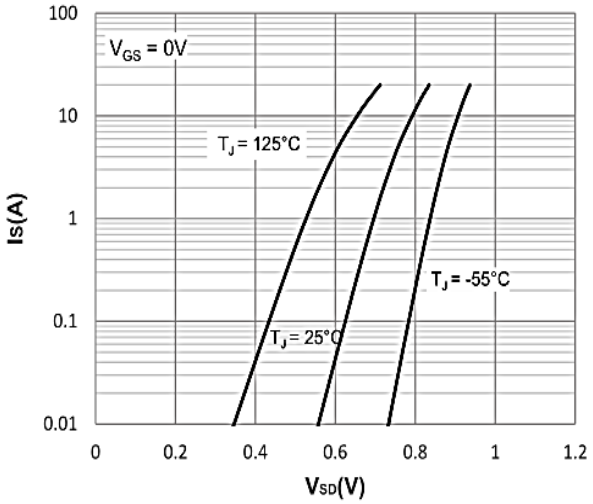


Figure 4: Body Diode Characteristics

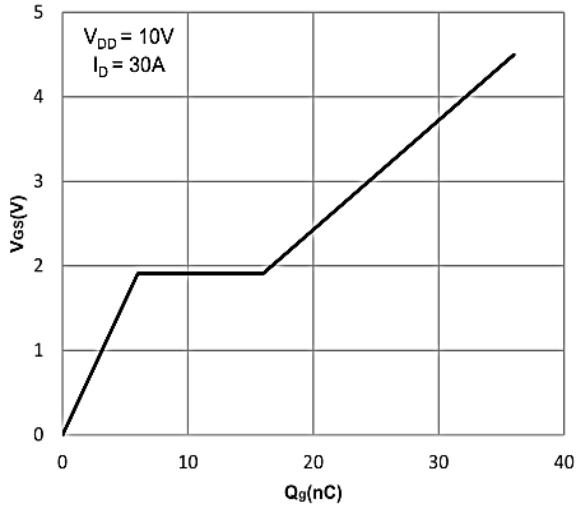


Figure 5: Gate Charge Characteristics

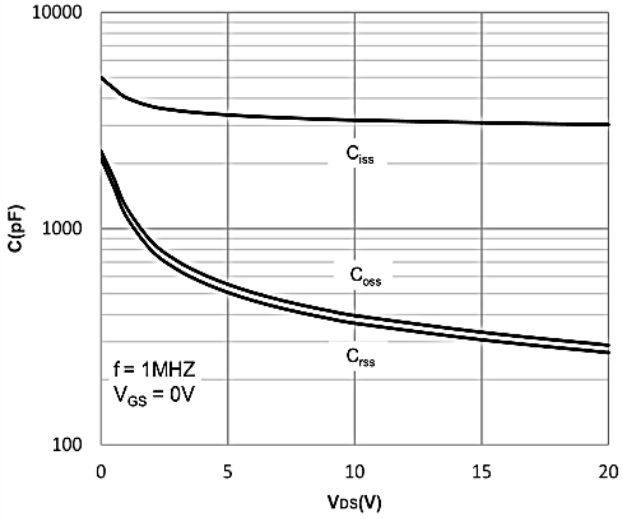


Figure 6: Capacitance Characteristics

Typical Characteristics (Cont.)

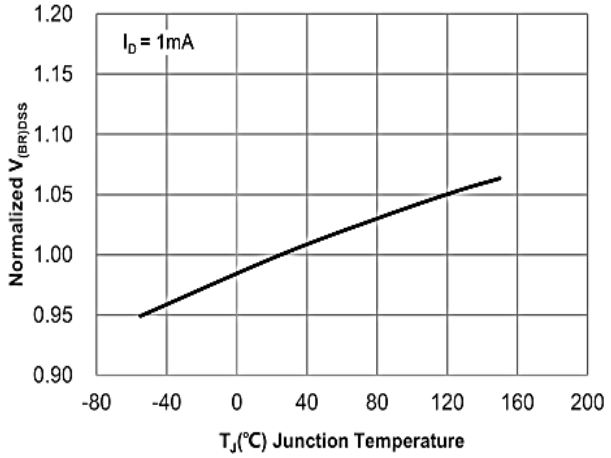


Figure 7: Normalized Breakdown Voltage vs Junction Temperature

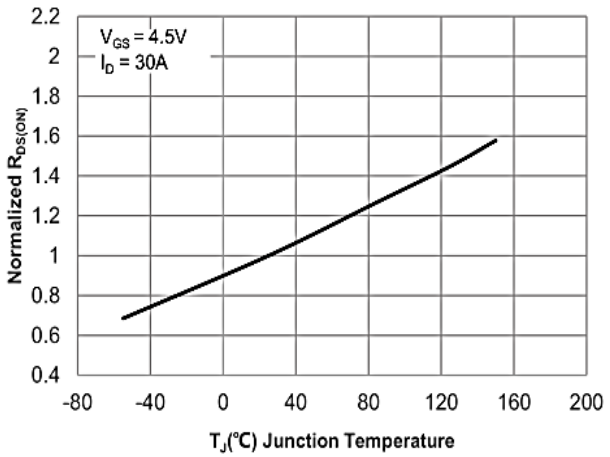


Figure 8: Normalized on Resistance vs. Junction Temperature

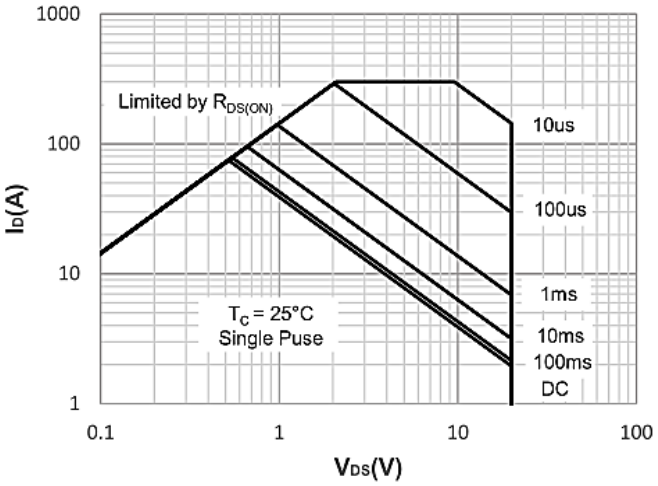


Figure 9: Maximum Safe Operating Area

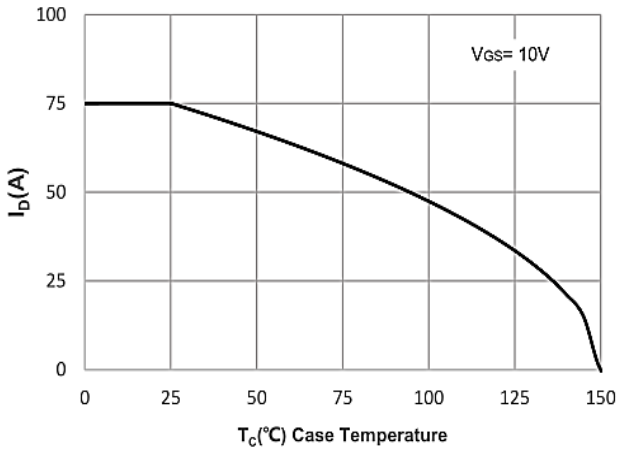


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

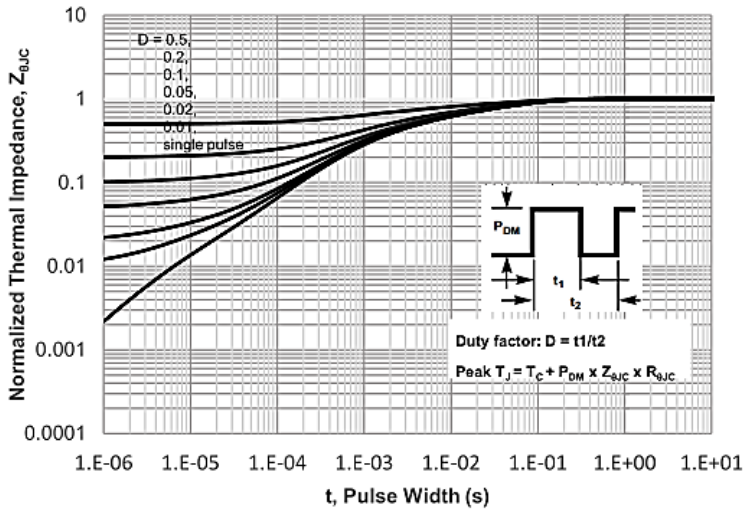
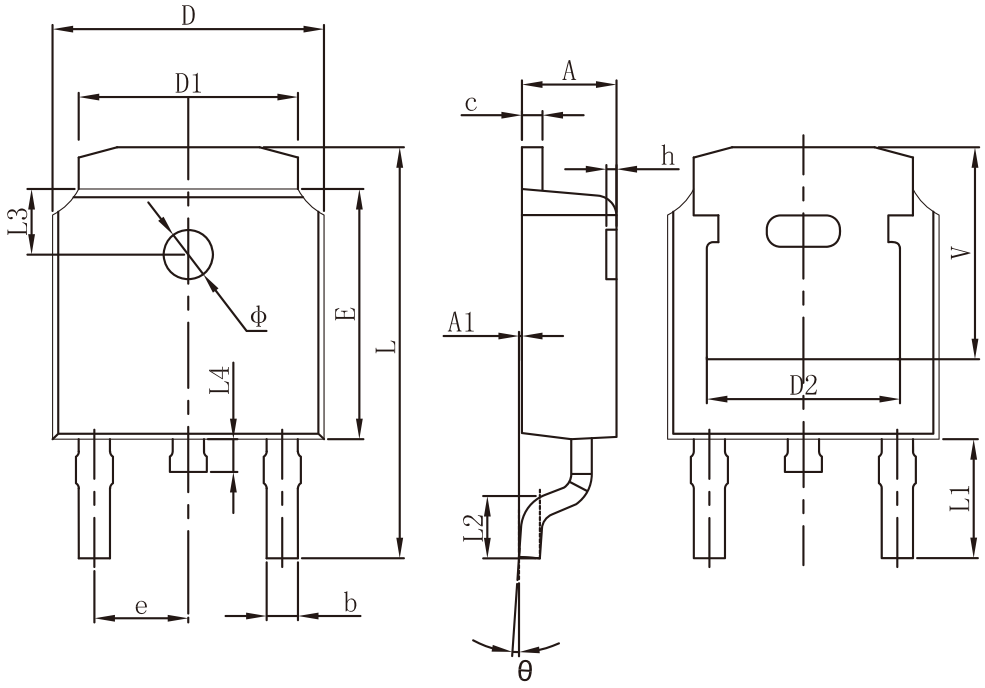


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambien

Packaging information



SYMBOL	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.635	0.770	0.025	0.030
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.712	10.312	0.382	0.406
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.250 REF.		0.207 REF.	

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