General Description

The WSR4086 is the highest performance trench N-Channel MOSFET with extreme high cell density,which provide excellent RDSON and gate chargefor most of the device is suitable for use as a Battery protection or in other Switching application.

The WSR4086 meet the RoHS and GreenProduct requirement 100% EAS guaranteed withfull function reliability approved.

Features

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

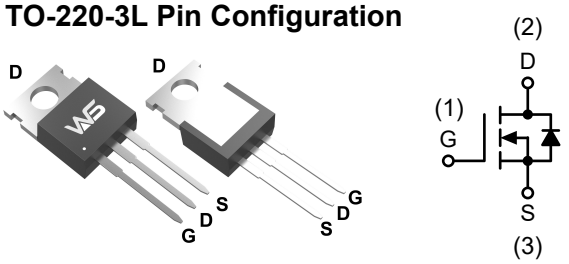
Product Summery

BV_{DSS}	R_{DSON}	I_D
40V	5.5mΩ	86A

Applications

- Battery protection
- Load switch
- Uninterruptible power supply

TO-220-3L Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	86	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1]	41	A
I_{DM}	Pulsed Drain Current[2],T_C=25°C	240	A
EAS	Avalanche Energy, Single pulse,L=0.5mH	100	mJ
I_{AS}	Avalanche Current, Single pulse,L=0.5mH	20	A
P_D@T_C=25℃	Total Power Dissipation[4]	46	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	---	62	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	2.7	℃/W

Electrical Characteristics (T_J=25℃, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	40	---	---	V
$\triangle BV_{DSS}/\triangle T_J$	BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	0.034	---	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V,I_D=30A	---	5.5	7.0	mΩ
		V_{GS}=4.5V,I_D=20A	---	9.0	12	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.0	1.5	2.5	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=40V , V_{GS}=0V , T_J=25℃	---	---	1	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
Q_g	Total Gate Charge (10V)	V_{DS}=20V , V_{GS}=10V , I_D=30A	---	37	---	nC
Q_{gs}	Gate-Source Charge		---	6	---	
Q_{gd}	Gate-Drain Charge		---	7	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=20V , I_D =30A , R_L=1Ω , R_G=3Ω , V_{GS} =10V	---	12	---	ns
T_r	Rise Time		---	12	---	
$T_{d(off)}$	Turn-Off Delay Time		---	9	---	
T_f	Fall Time		---	38	---	
C_{iss}	Input Capacitance	V_{DS}=20V , V_{GS}=0V , f=1MHz	---	2400	---	pF
C_{oss}	Output Capacitance		---	192	---	
C_{rss}	Reverse Transfer Capacitance		---	165	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	60	A
I_{SM}	Pulsed Source Current		---	---	240	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=30A , T_J=25℃	---	---	1.2	V
t_{rr}	Reverse Recovery Time	IF=20A,dI/dt=100A/μs,T_J=25℃	---	22	---	nS
Q_{rr}	Reverse Recovery Charge		---	11	---	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 ≦ 300us , duty cycle ≦ 2%
3. The EAS data shows Max. rating . The test condition is V_{DD}=25V,V_{GS}=10V,L=0.5mH,I_{AS}=20A
4. The power dissipation is limited by 150℃ 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

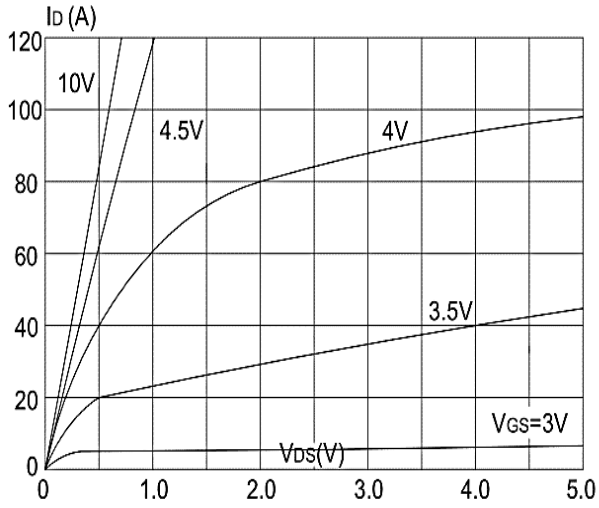


Figure1: Output Characteristics

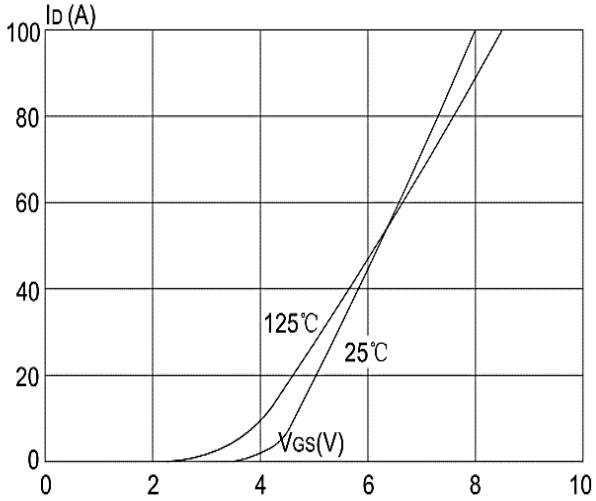


Figure 2: Typical Transfer Characteristics

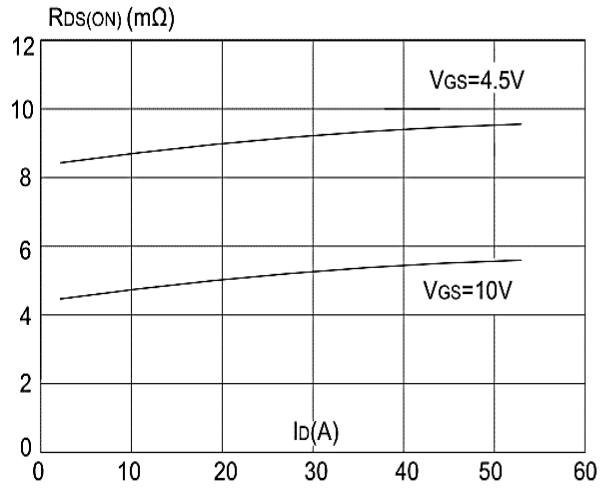


Figure 3:On-resistance vs. Drain Current

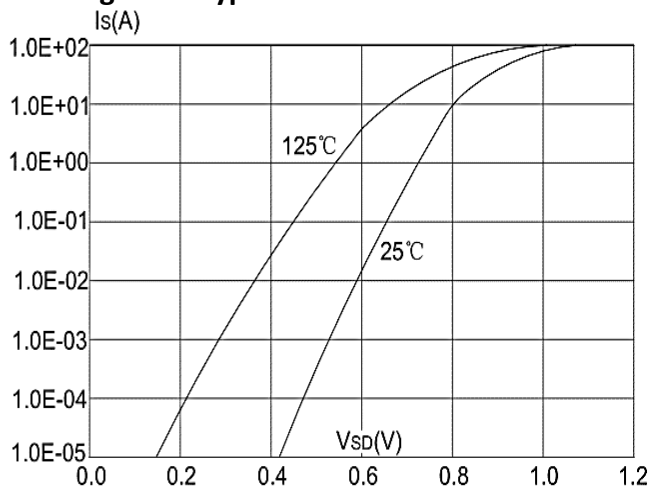


Figure 4: Body Diode Characteristics

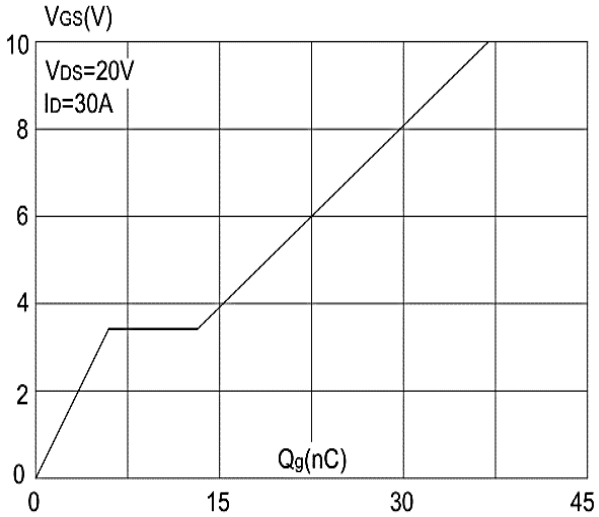


Figure 5: Gate Charge Characteristics

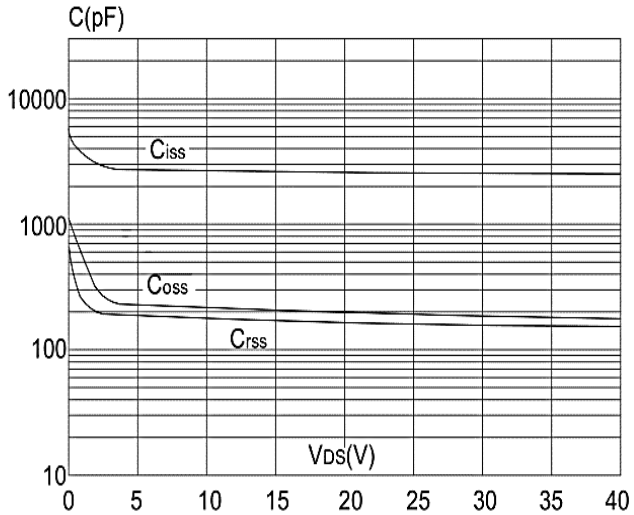


Figure 6: Capacitance Characteristics

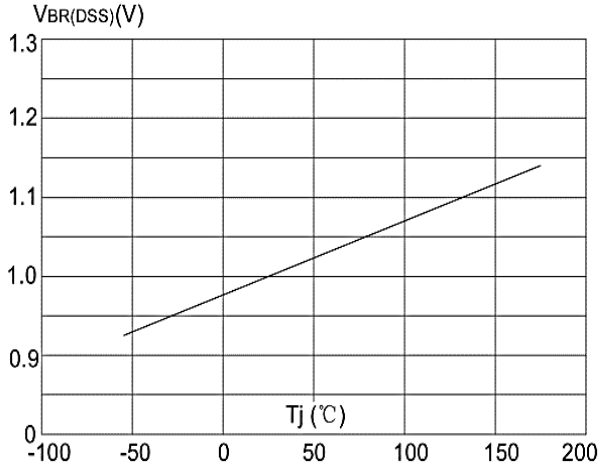


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

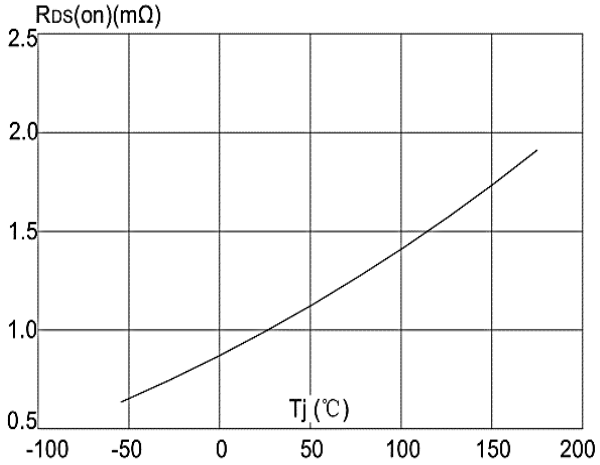


Figure 8: Normalized on Resistance vs Junction Temperature

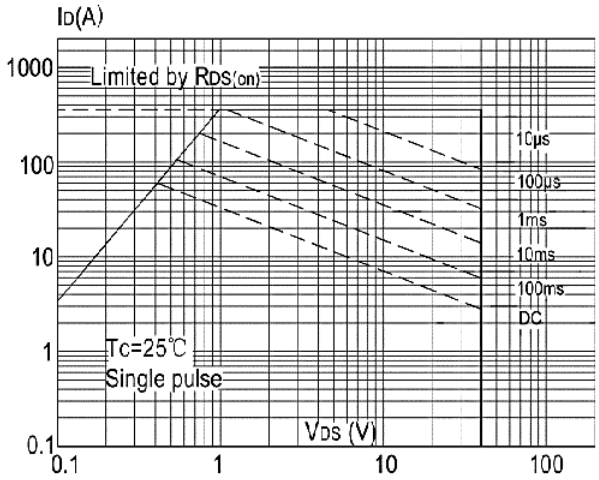


Figure 9: Maximum Safe Operating Area

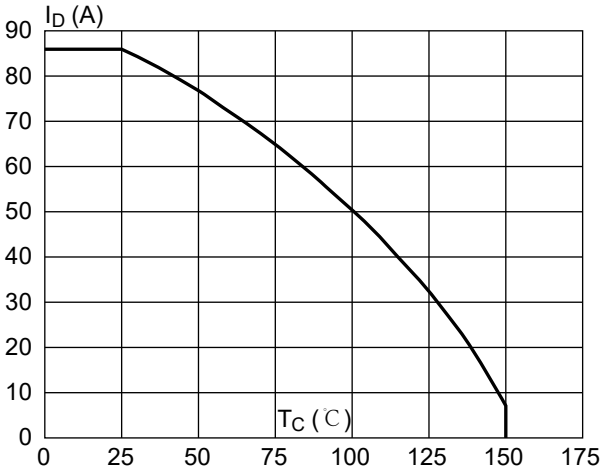


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

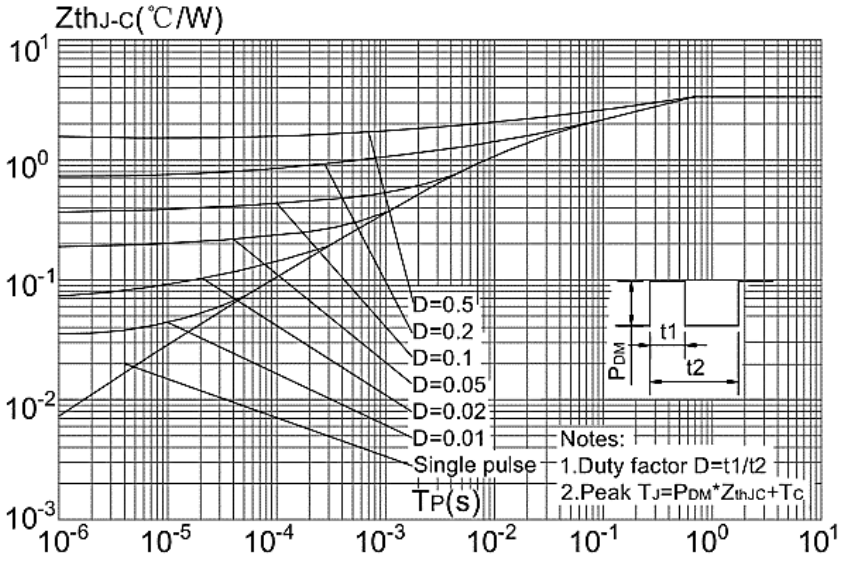
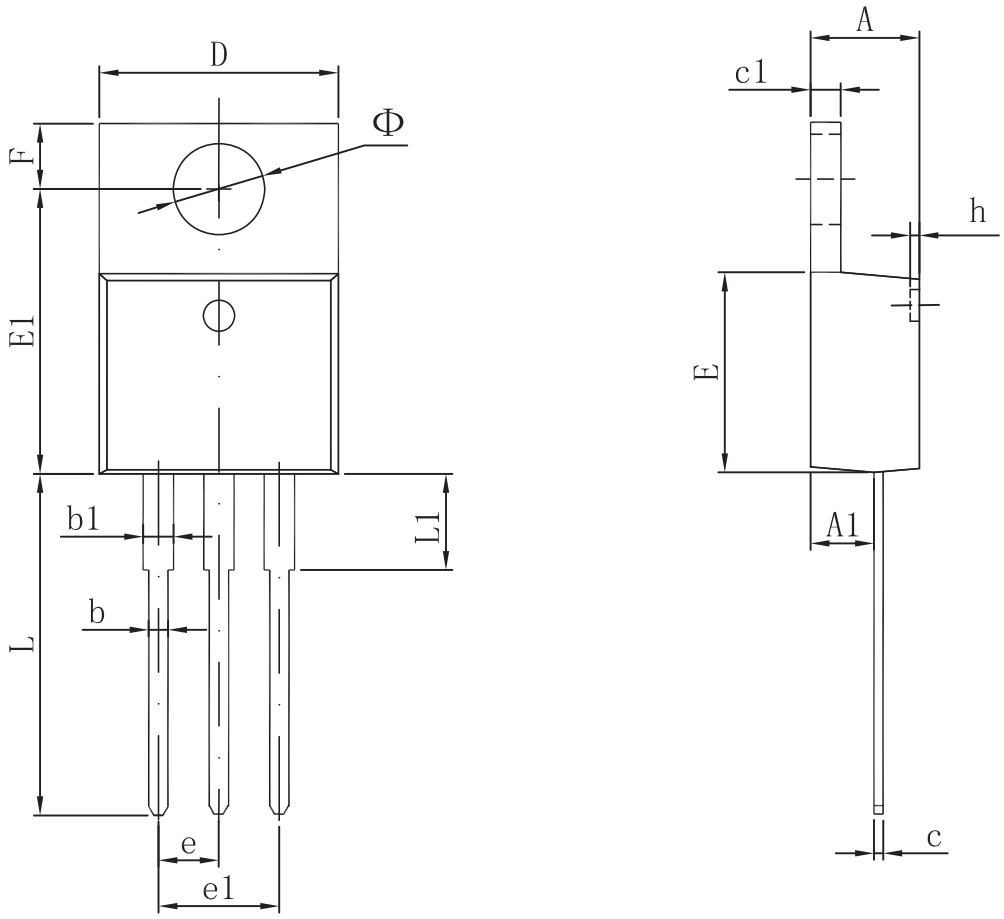


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

Packaging information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.470	4.670	0.176	0.184
A1	2.520	2.820	0.099	0.111
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	0.335	0.350
E1	12.060	12.460	0.475	0.491
e	2.540 TYP		0.100 TYP	
e1	4.980	5.180	0.196	0.204
F	2.590	2.890	0.102	0.114
h	0.000	0.300	0.000	0.012
L	13.400	13.800	0.528	0.543
L1	3.560	3.960	0.140	0.156
Φ	3.735	3.935	0.147	0.155

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