EVVOSEMI®
THINK CHANGE DO

ESD TVS MOS LDO Diode Sensor DC-DC

Product Specification

Domestic Part Number	IPW65R080CF
Overseas Part Number	IPW65R080CF
Equivalent Part Number	IPW65R080CF

650V N-Channel Enhancement Mode MOSFET

Description

The IPW65R080CF use super junction technology and design to provide excellent RDS(ON) with low gate charge. This super junction MOSFET fits the industry's AC-DC SMPS requirements for PFC, AC/DC power conversion, and industrial power applications.

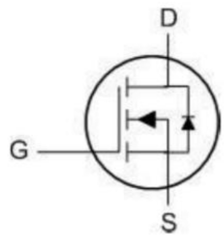
The IPW65R080CF meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

- ★ Super Low Gate Charge
- ★ 100% EAS Guaranteed
- ★ Green Device Available
- ★ Excellent CdV/dt effect decline
- ★ Advanced trench gate super junction technology

General Features

V_{DS} = 650V, I_D = 40A
$R_{DS(ON)}$ = 75mΩ @ V_{GS} = 10V

TO-247-3L Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	650	V
V_{GS}	Gate-Source Voltage	±30	V
I_D@T_C=25°C	Continuous Drain Current, V_{GS} @ 10V[1,6]	40	A
I_D@T_C=100°C	Continuous Drain Current, V_{GS} @ 10V[1,6]	29	A
I_{DM}	Pulsed Drain Current[2]	160	A
EAS	Single Pulse Avalanche Energy[3]	750	mJ
I_{AS}	Avalanche Current	---	A
P_D@T_C=25°C	Total Power Dissipation[4]	470	W
T_{STG}	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{θJA}$	Thermal Resistance Junction-Ambient [1]	---	41	°C/W
$R_{θJC}$	Thermal Resistance Junction-Case[1]	---	0.27	°C/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	650	---	---	V
△BV_{DSS}/△T_J	BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	---	---	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=21.5A	---	75	90	mΩ
		V_{GS}=4.5V , I_D=21.5A	---	---	---	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	3.2	---	4.5	V
△$V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	---	---	mV/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=650V , V_{GS}=0V , T_J=25℃	---	---	5	uA
		V_{DS}=650V, V_{GS}=0V , T_J=150℃	---	1000	---	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±30V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=20V , I_D=21.5A	---	30	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	1	---	Ω
Q_g	Total Gate Charge	V_{DS}=480V , V_{GS}=10V , I_D=21.5A	---	84	---	nC
Q_{gs}	Gate-Source Charge		---	28	---	
Q_{gd}	Gate-Drain Charge		---	36	---	
$T_{d(on)}$	Turn-On Delay Time	VGS=10V, VDS=400V, RG=27Ω, ID=21.5A	---	89	---	ns
T_r	Rise Time		---	131	---	
$T_{d(off)}$	Turn-Off Delay Time		---	204	---	
T_f	Fall Time		---	69	---	
C_{iss}	Input Capacitance	V_{DS}=100V , V_{GS}=0V , f=1MHz	---	3445	---	pF
C_{oss}	Output Capacitance		---	134	---	
C_{rss}	Reverse Transfer Capacitance		---	0.6	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current[1,4]	V_G=V_D=0V , Force Current	---	---	40	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=21.5A , T_J=25C	0.7	0.9	1.1	V
t_{rr}	Reverse Recovery Time	IF=21.5 , di/dt=100A/μs , T_J=25C	---	113	---	nS
Q_{rr}	Reverse Recovery Charge		---	0.6	---	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 TJ = 25℃,VDD=200V,VGS=10V,L=30mH

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.

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Typical Performance Characteristics

Fig 1. Output Characteristics (T_j=25℃)

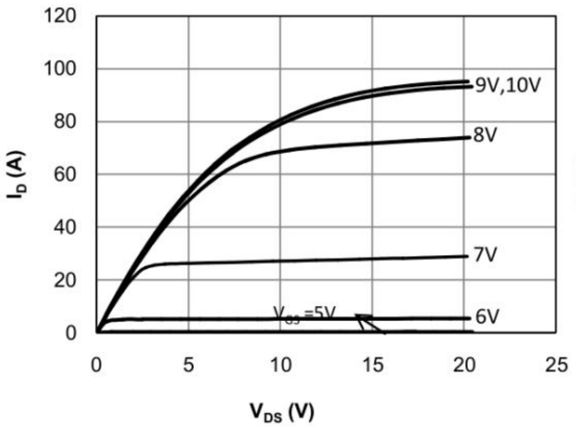

Fig 2. Output Characteristics (T_j=150℃)

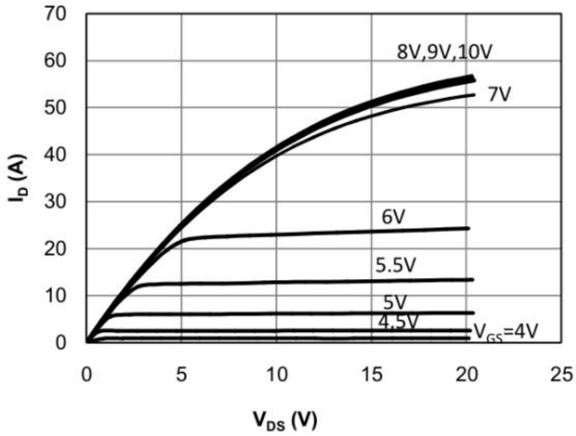

Fig 3: Transfer Characteristics

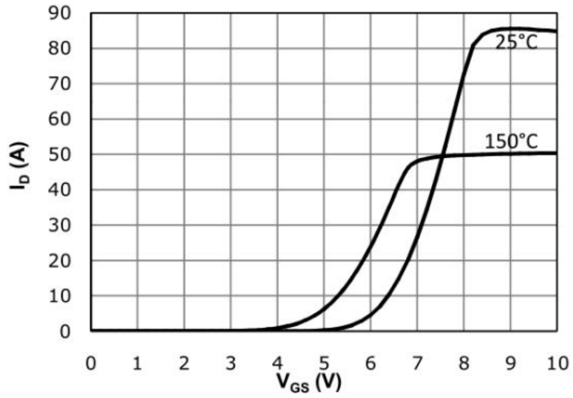

Fig 4: V_{TH} vs. T_j Temperature Characteristics

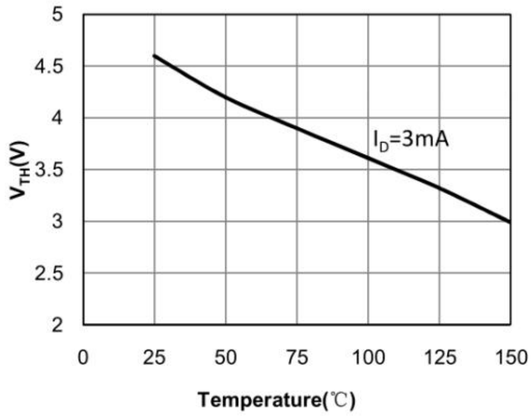

Fig 5: $R_{DS(on)}$ vs. I_{DS} Characteristics(T_j=25℃)

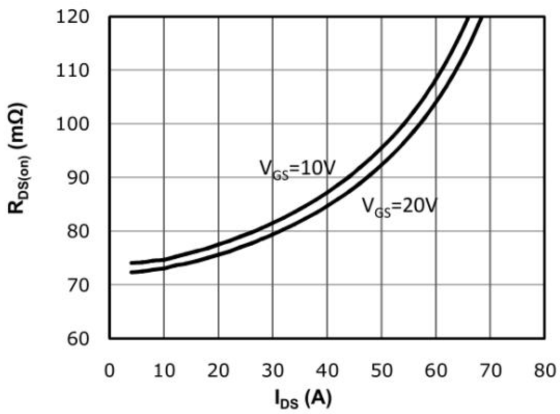

Fig 6: $R_{DS(on)}$ vs. Temperature

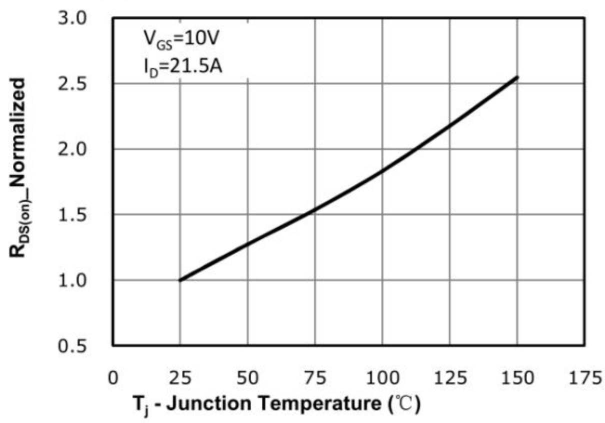

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Fig 7: BV_{DSS} vs. Temperature

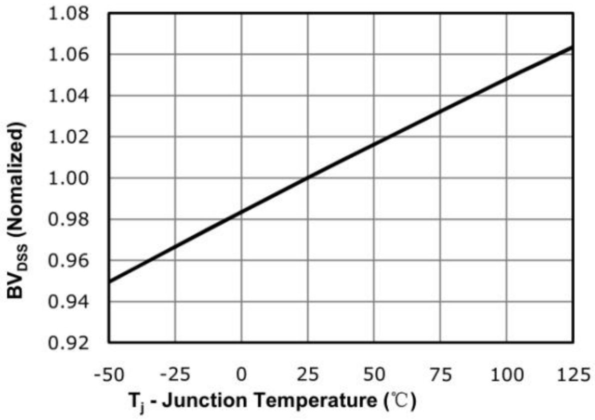

Fig 8: $R_{DS(on)}$ vs. Gate Voltage

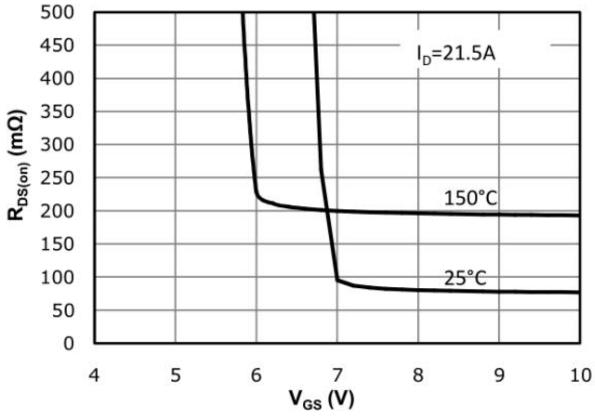

Fig 9: Body-diode Forward Characteristics

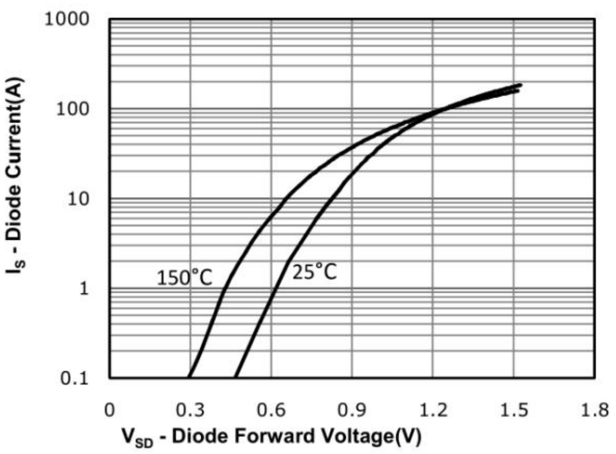

Fig 10: Gate Charge Characteristics

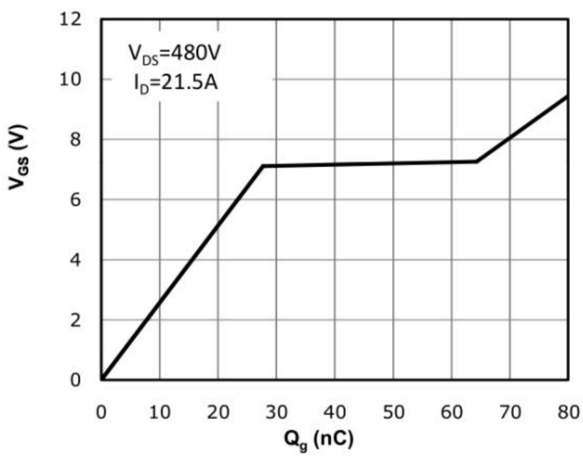

Fig 11: Capacitance Characteristics

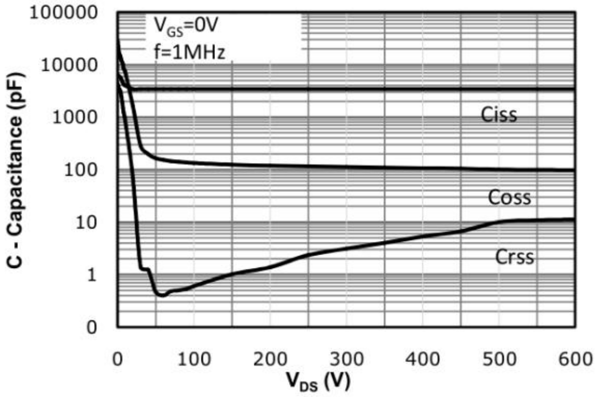

Fig 12: Safe Operating Area

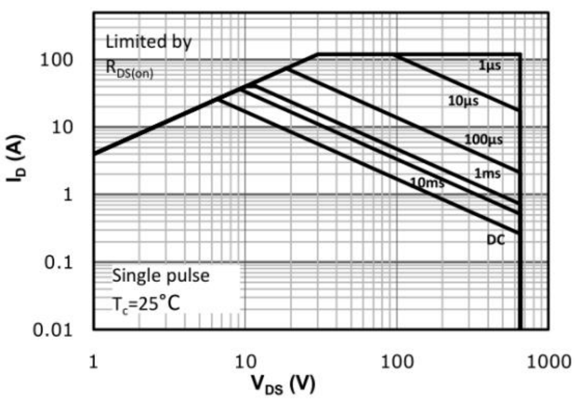

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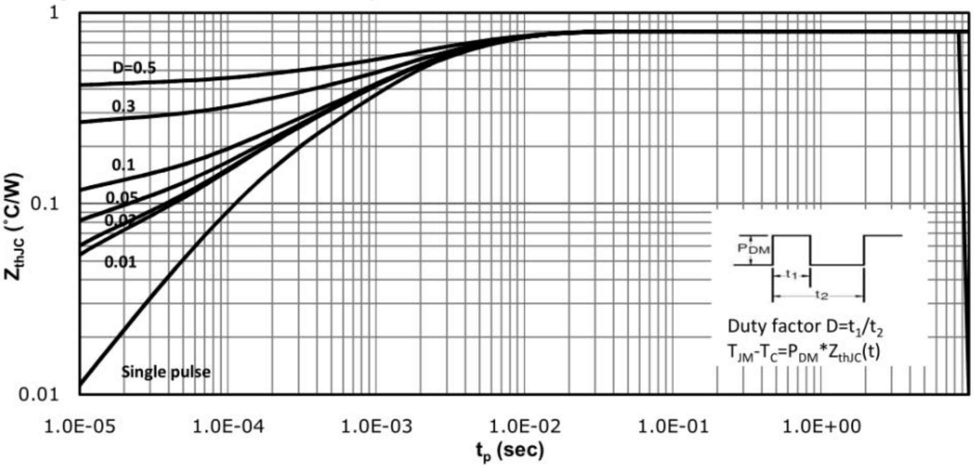
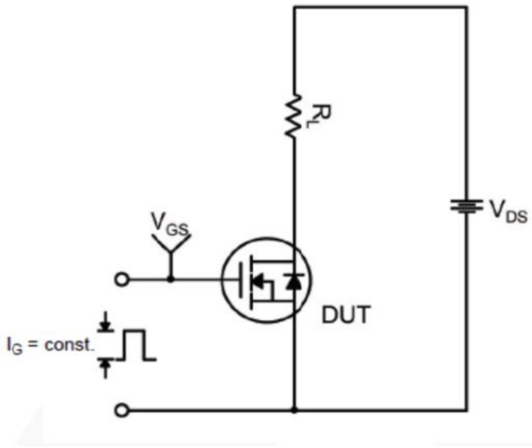
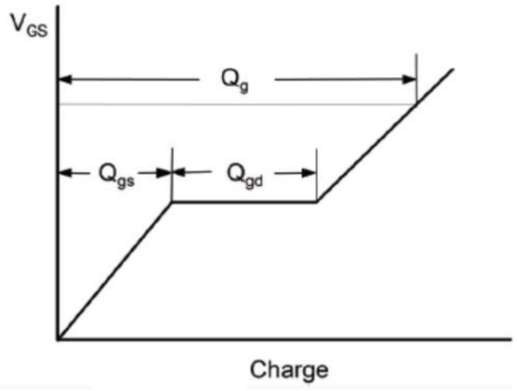
Fig 13: Max. Transient Thermal Impedance

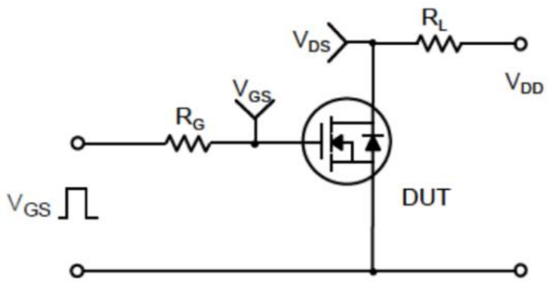


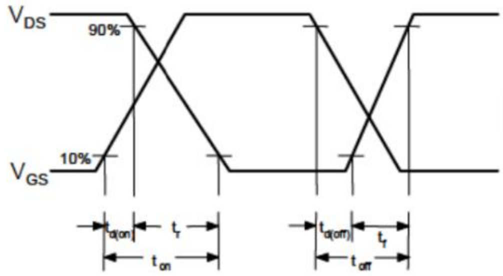
Gate Charge Test Circuit & Waveform



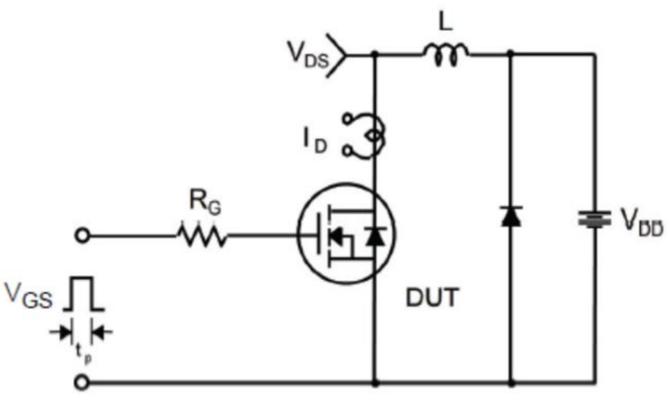


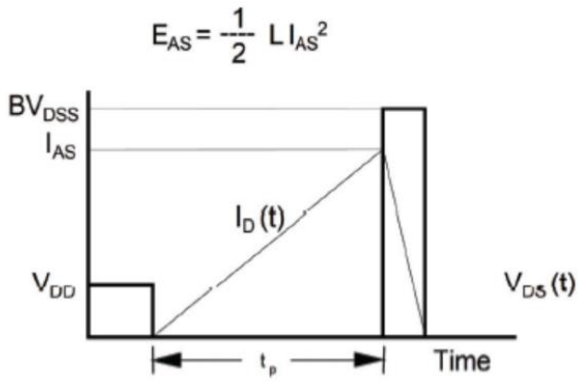
Switching Test Circuit & Waveforms



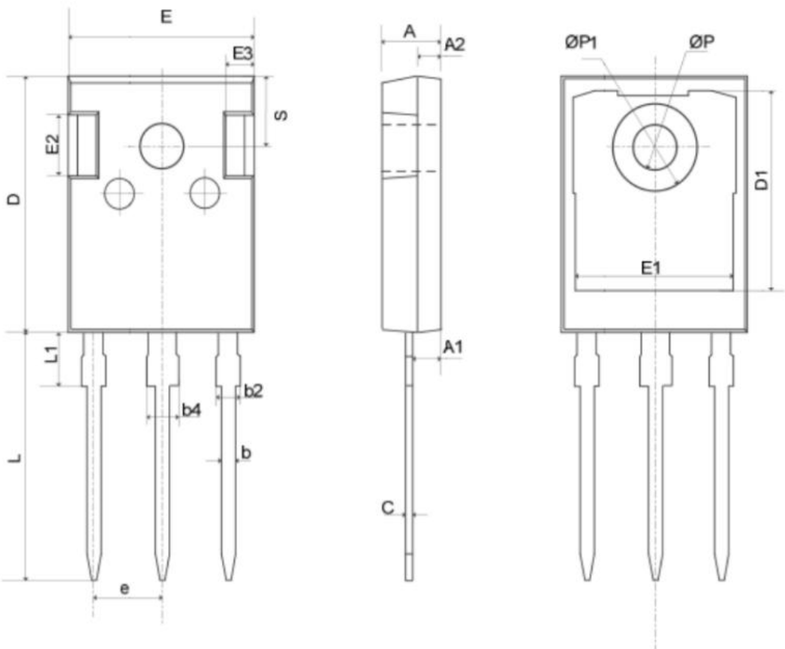


Unclamped Inductive Switching Test Circuit & Waveforms





Mechanical Dimensions for TO-247



COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	4.80	5.20
A1	2.21	2.61
A2	1.85	2.15
b	1.11	1.36
b2	1.91	2.21
b4	2.91	3.21
c	0.51	0.75
D	20.70	21.30
D1	16.25	16.85
E	15.50	16.10
E1	13.00	13.60
E2	4.80	5.20
E3	2.30	2.70
e	5.44BSC	
L	19.62	20.22
L1	—	4.30
ØP	3.40	3.80
ØP1	—	7.30
S	6.15BSC	

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