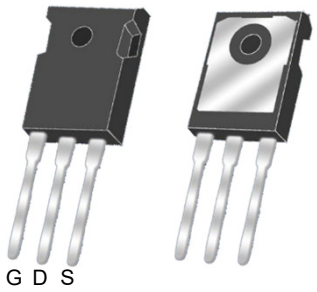
Prisemi®

PSICMTAF65R60

SiC MOSFET

Description

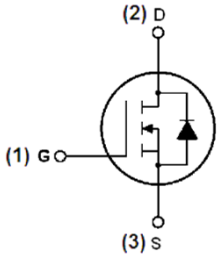
MOSFET Product Summary		
V_{DS}(V)	$R_{DS(on)}$(mΩ)	I_D(A)
650	60@ V_{GS} = 18V	29



TO-247-3L (Top View)

Feature

- High Blocking Voltage with Low On-Resistance
- High Speed Switching with Low Capacitances
- Avalanche Ruggednes



Schematic diagram

Applications

- Solar Inverters
- Switch Mode Power Supplies
- UPS
- Batterry Chargers

Absolute maximum rating@25℃

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	650	V
Gate-Source Voltage		V_{GS}	-4/+18	V
Gate-Source Voltage(Absolute Maximum Values)		V_{GSmax}	-8/+22	V
Continuous Drain Current	T_C=25℃	I_D	29	A
	T_C=100℃		20	
Pulsed Drain Current		I_{DM}	80	A
Power Dissipation		P_D	152	W
Avalanche Energy, Single Pulse		E_{AS}	600	mJ
Operating Junction Temperature		T_J	-55 to +175	℃
Storage Temperature		T_{STG}	-55 to +175	℃

Thermal Resistance

Parameter	Symbol	Min	Typ	Max	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	-	-	0.99	℃/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	-	-	40	℃/W

Electrical characteristics per line@25℃ (unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Statistic Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0V,I_D = 100μA	650	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 600V,V_{GS} = 0V T_C=25℃	-	1.0	10	μA
		V_{DS} = 600V,V_{GS} = 0V T_C=175℃	-	5.0	-	
Gate-Body Leakage Current	I_{GSS}	V_{GS} = 18V,V_{DS} = 0V	-	-	100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS},I_D = 5mA	2.3	2.8	3.6	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS} = 18V,I_D = 15A	-	60	79	mΩ
Transconductance	g_{fs}	V_{DS} = 20V,I_D = 15A	-	10	-	S
Dynamic Characteristics						
Input Capacitance	C_{lss}	V_{DS} = 600V,V_{GS} = 0V, V_{AC} = 25mV,f = 1MHz	-	930	-	pF
Output Capacitance	C_{oss}		-	71	-	
Reverse Transfer Capacitance	C_{rss}		-	4.2	-	
Turn-On Switching Energy	E_{on}	V_{DD} = 400V, I_D = 15A V_{GS} = -4/+18V, R_G = 0Ω,L=120μH	-	230	-	μJ
Turn-Off Switching Energy	E_{off}		-	30	-	
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 400V, I_D = 15A V_{GS} = -4/+18V, R_G = 0Ω,L=120μH	-	19	-	ns
Turn-on Rise Time	t_r		-	21	-	
Turn-Off Delay Time	$t_{d(off)}$		-	15	-	
Turn-Off Fall Time	t_f		-	17	-	
Total Gate Charge	Q_g	V_{DS} = 400V,I_D = 15A, V_{GS} = -4/+18V	-	40	-	nC
Gate-Source Charge	Q_{gs}		-	7.0	-	
Gate-Drain Charge	Q_{gd}		-	19	-	
Gate Resistance	R_G	f=1MHz,V_{AC} = 25mV	-	1.5	-	Ω
Reverse Diode Characteristics						
Diode Forward Voltage	V_{SD}	V_{GS} = -4V,I_{SD} = 7.5A T_J=25℃	-	4.0	-	V
		V_{GS} = -4V,I_{SD} = 7.5A T_J=175℃	-	3.5	-	
Reverse Recovery Time	t_{rr}	V_R=400V, V_{GS} = -4V, I_D=15A,T_J=150℃ dI_F/dt=700A/μs	-	41	-	ns
Reverse Recovery Charge	Q_{rr}		-	405	-	μC

Typical Characteristics

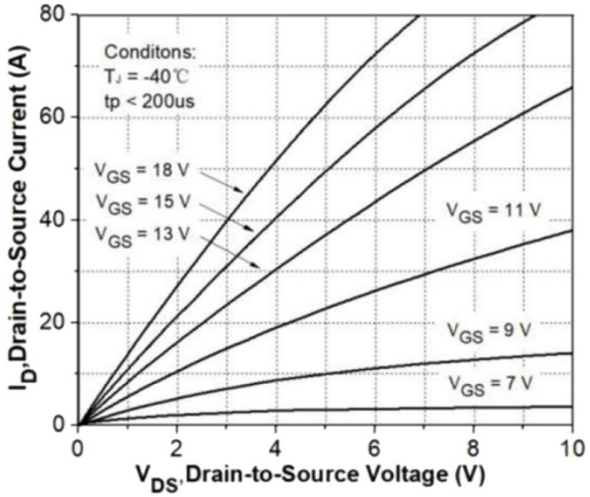


Fig 1. Output Characteristic (T_J=-40℃)

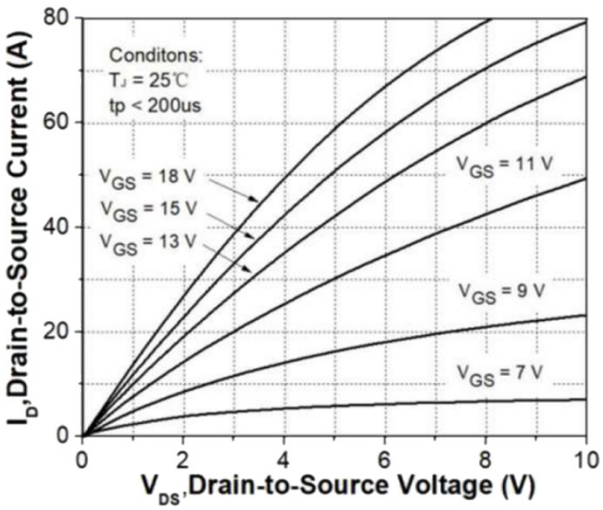


Fig 2. Output Characteristic (T_J=25℃)

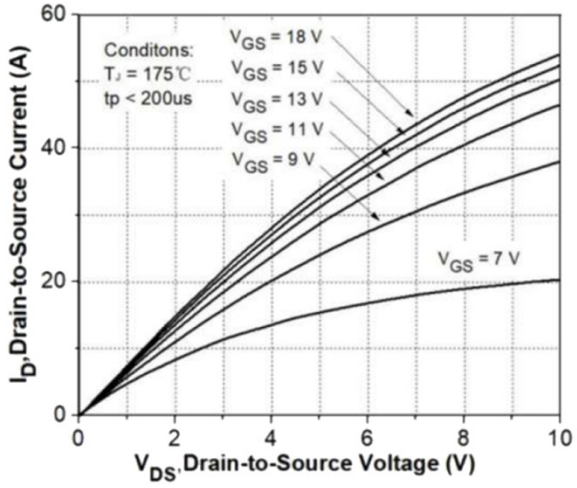


Fig 3. Output Characteristic (T_J=175℃)

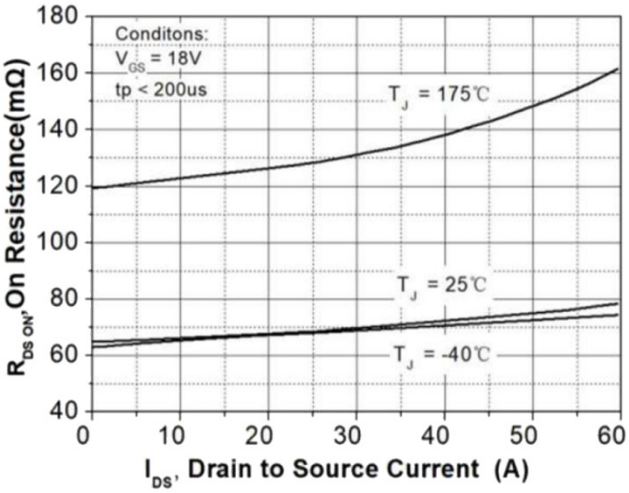


Fig 4: Rdson Vs Ids Characteristic

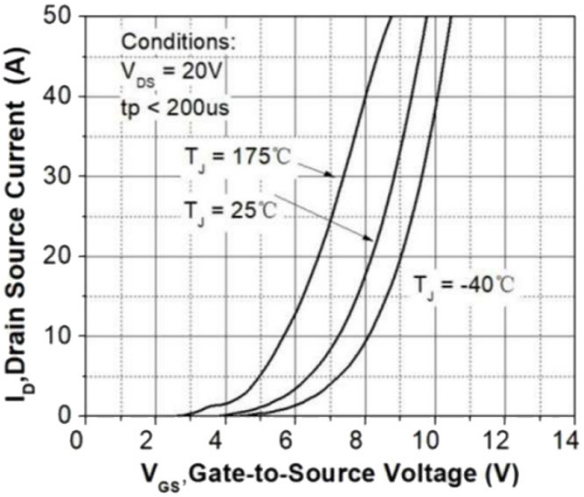


Fig 5: Transfer Characteristic

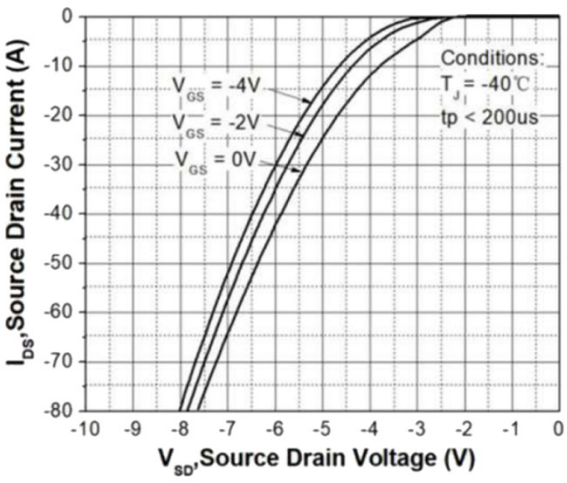


Fig 6: Body-diode Characteristic (TJ=-40℃)

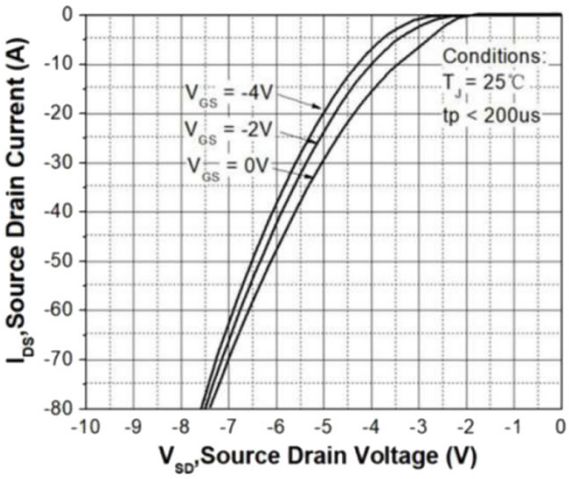


Fig 7: Body-diode Characteristic (TJ=25℃)

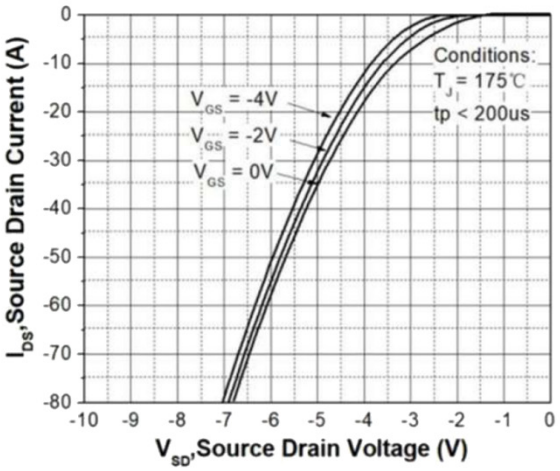


Fig 8: Body-diode Characteristic (T_J=175℃)

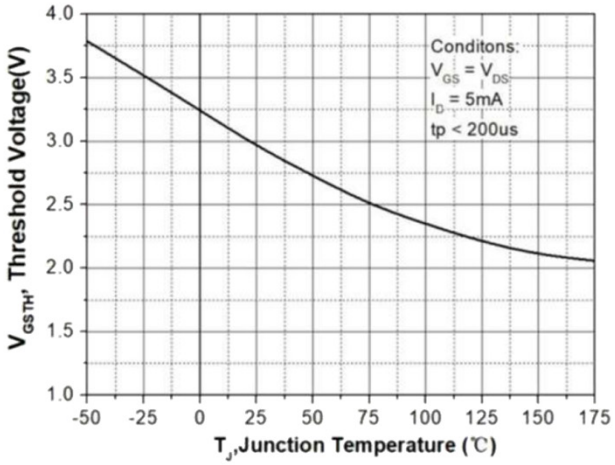


Fig 9: VTH Vs TJ Temperature Characteristic

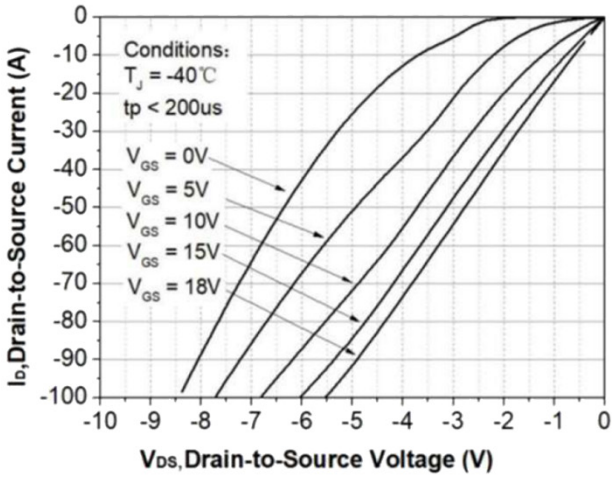


Fig 10: 3rd Quadrant Characteristic(TJ=-40℃)

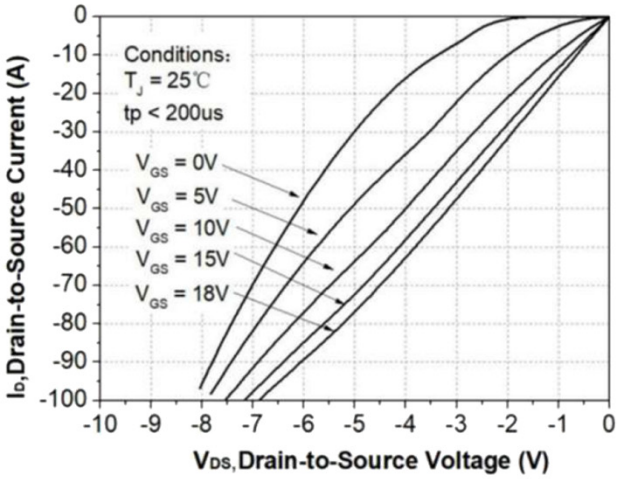


Fig 11: 3rd Quadrant Characteristic(TJ=25℃)

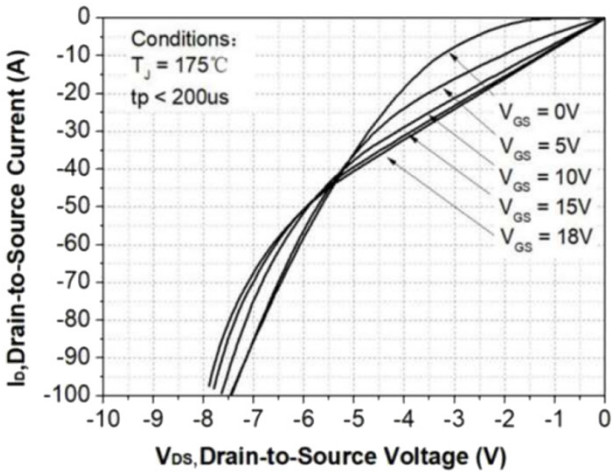
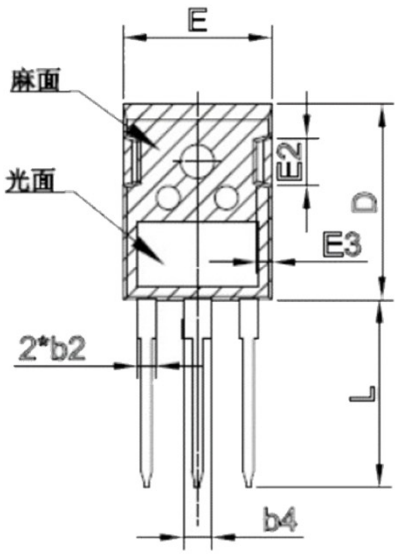
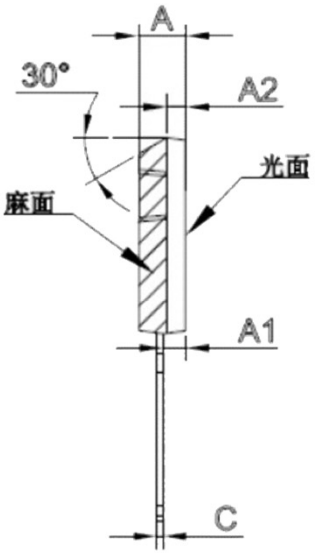
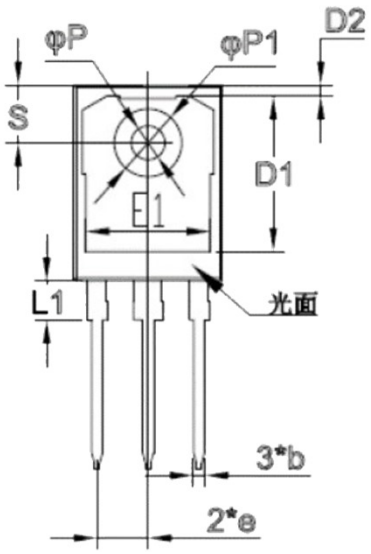


Fig 12: 3rd Quadrant Characteristic(TJ=175℃)

Product dimension (TO-247-3L)







Dim	Millimeters		Inches	
	Min	Max	Min	Max
A	4.70	5.20	0.185	0.205
A1	2.30	2.50	0.091	0.098
A2	1.90	2.10	0.075	0.083
b	1.10	1.30	0.043	0.051
b2	2.00 typ.		0.079 typ.	
b4	3.00 typ.		0.118 typ.	
C	0.50	0.70	0.020	0.028
D	20.80	21.10	0.819	0.831
D1	16.55 typ.		0.652 typ.	
D2	0.95	1.35	0.037	0.053
E	15.48	16.28	0.609	0.641
E1	13.06	13.56	0.514	0.534
E2	4.90	5.10	0.193	0.201
E3	1.50	1.70	0.059	0.067
e	5.34	5.54	0.210	0.218
L	19.80	20.32	0.780	0.800
L1	-	4.50	-	0.177
P	3.50	3.70	0.138	0.146
P1	7.00	7.40	0.276	0.291
S	6.04	6.30	0.238	0.248

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