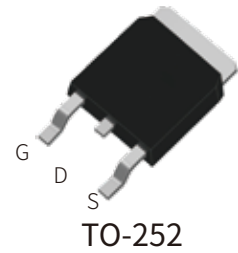


FEATURES

$V_{DS}=12V, I_D=90A$

$R_{DS(ON)} < 4.5m\Omega @ V_{GS}=4.5V$ (Typ. : 3.5m Ω)

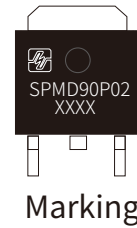


APPLICATION

Battery protection

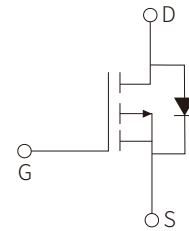
Load switch

Uninterruptible power supply



APPROVALS

RoHS	Compliance with 2011/65/EU
HF	Compliance with IEC61249-2-21:2003



Schematic Symbol

ABSOLUTE MAXIMUM RATINGS ($T_A=25^{\circ}C$)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	-12	V
Gate-Source Voltage	V_{GS}	± 12	V
Continuous Drain Current, $V_{GS} @ 10V^1$	I_D	$T_C=25^{\circ}C$ -90	A
		$T_C=100^{\circ}C$ -54	A
Drain Current – Pulsed ¹	I_{DM}	-240	A
Avalanche Current	IAS	50	A
Single Pulsed Avalanche Energy	EAS	560	mJ
Operating Junction Temperature & Storage Temperature	T_{STG}, T_J	-55 to +150	$^{\circ}C$
Thermal Resistance Junction to ambient	$R_{\theta JA}$	62.5	$^{\circ}C/W$
Thermal Resistance Junction to Case	$R_{\theta JC}$	3	$^{\circ}C/W$

ELECTRICAL CHARACTERISTICS (T_A=25°C)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Drain-source Breakdown Voltage	V _{(BR)DSS}	V _{GS} =0V, I _D =-250μA	-12	-18		V
BVDSS Temperature Coefficient	ΔBV _{DSS} /ΔT _J	Reference to 25°C, I _D =-1mA		-0.008		V/°C
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} =-4.5V, I _D =-20A		3.5	4.5	mΩ
		V _{GS} =-2.5V, I _D =-20A		4.8	6.0	mΩ
Gate Threshold Voltage	V _{GS(th)}	V _{GS} =V _{DS} , I _D =-250μA	-0.4	-0.6	-1.0	V
VGS(th) Temperature Coefficient	ΔV _{GS}			-3.44		mV/°C
Drain-Source Leakage Current	I _{DSS}	V _{DS} =-20V, V _{GS} =0V, T _J =25°C			-1	μA
		V _{DS} =-16V, V _{GS} =0V, T _J =125°C			-30	μA
Gate-Source Leakage Current	I _{GSS}	V _{GS} = ±12V, V _{DS} = 0V			±500	nA
Forward Transconductance	gfs	V _{DS} = -10V, I _S = -3A		30		S
Turn-on Delay Time	td(on)	V _{DD} =-15V, I _D =-1A, R _G =25Ω V _{GS} =-4.5V		21.2	42	ns
Rising time	tf			20.6	40	ns
Turn-off Delay Time	td(off)			26	52	ns
Input capacitance	tf			400	600	ns
Total gate charge	Q _g	V _{DS} =-16V, I _D =-5A, V _{GS} =-4.5V		149	225	nC
Gate-source charge	Q _{gs}			14.4	22	nC
Gate-drain charge	Q _{gd}			42.8	65	nC
Input Capacitance	C _{iss}	V _{DS} =-15V, V _{GS} =0V, F=1MHz		6800		pF
Output Capacitance	C _{oss}			769		pF
Reverse Transfer Capacitance	C _{rss}			726		pF
Gate resistance	Rg	V _{DS} =0V, V _{GS} =0V, F=1MHz		2.6		Ω
Contineous Source Current	Is	V _g =V _d =0V, Force Current			-90	A
Pulsed Source Current	Qrr				-180	A
Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =1A, T _J =25°C			-1	V

Note :

1. The data tested by surface mounted on a 1 inch 2 FR-4 board with 20Z copper.
2. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%
3. The EAS data shows Max. rating . The test condition is VDD=8V,VGS=4.5V,L=0.1mH,IAS=50A
4. The power dissipation is limited by 150°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.

CHARACTERISTIC CURVES

Fig.1 Power Dissipation

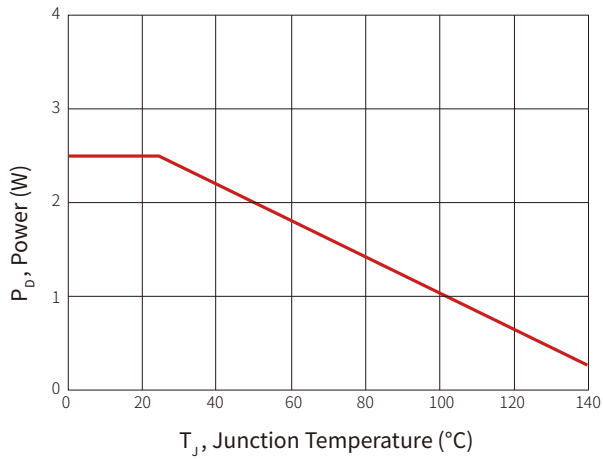


Fig.2 Drain Current

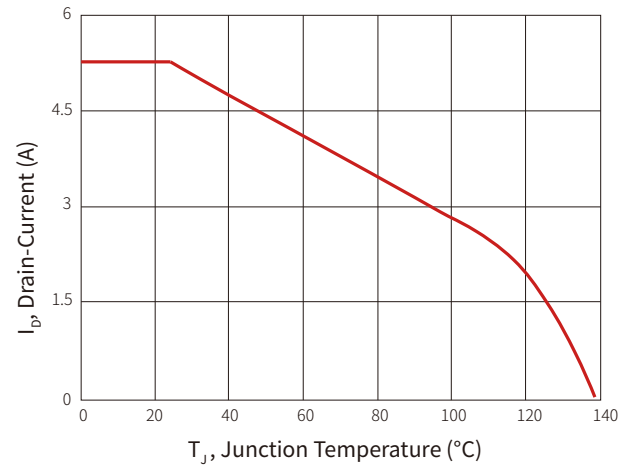


Fig.3 Output Characteristics

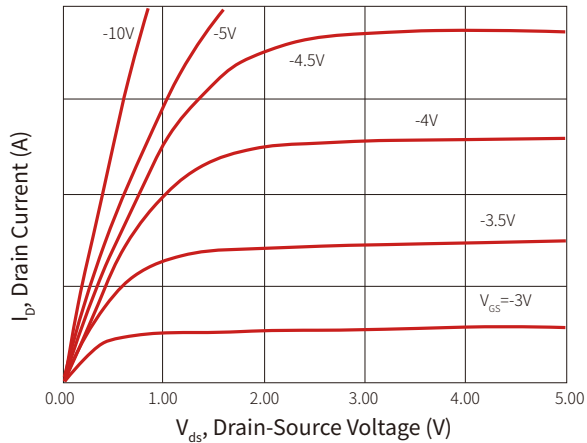


Fig.4 Drain-Source On-Resistance

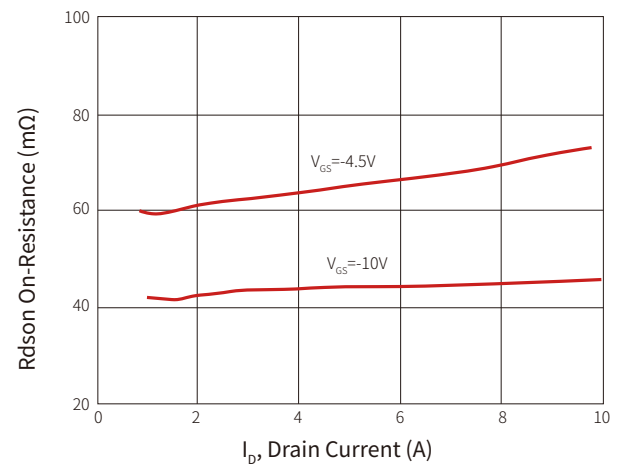


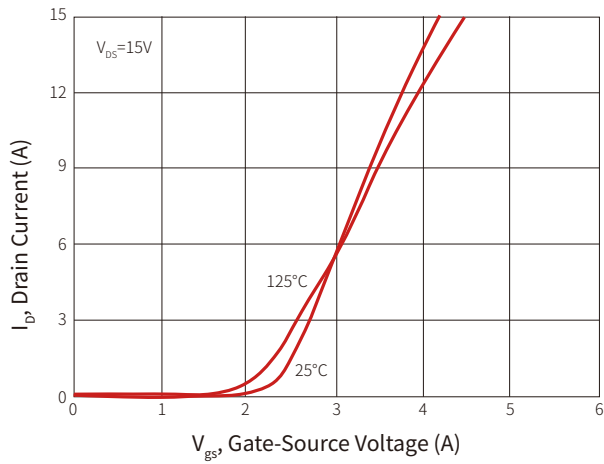
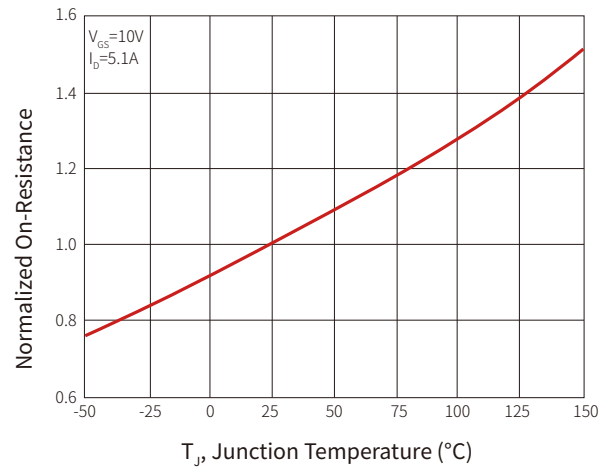
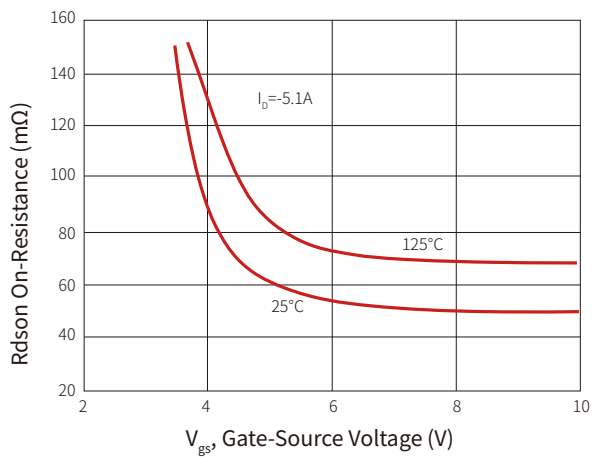
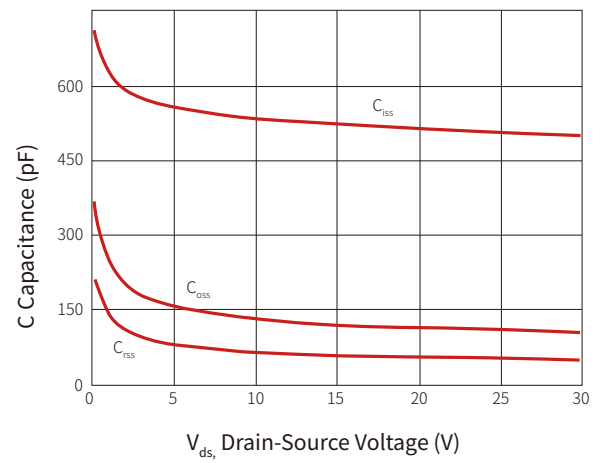
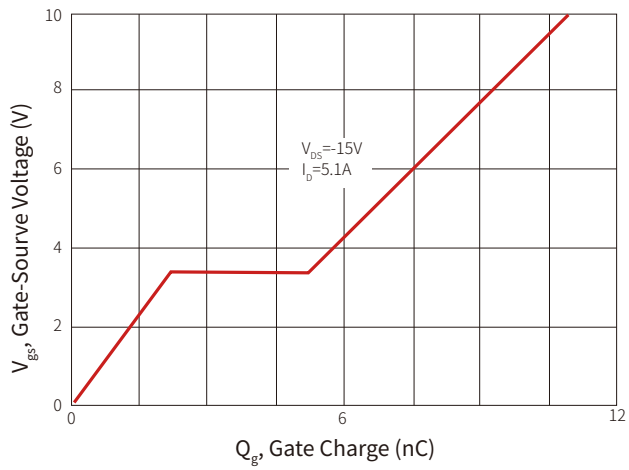
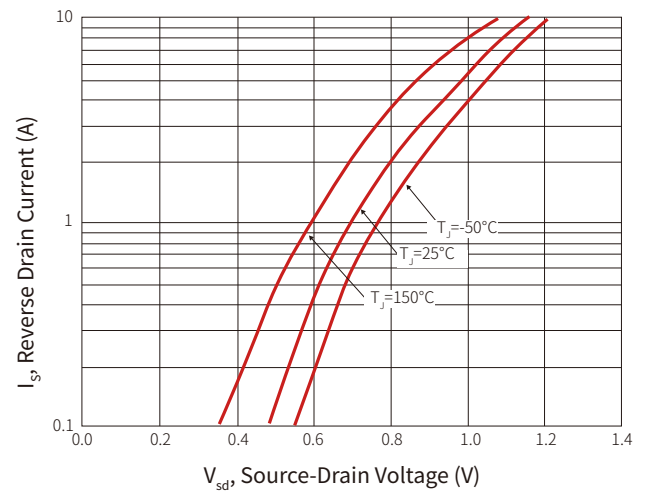
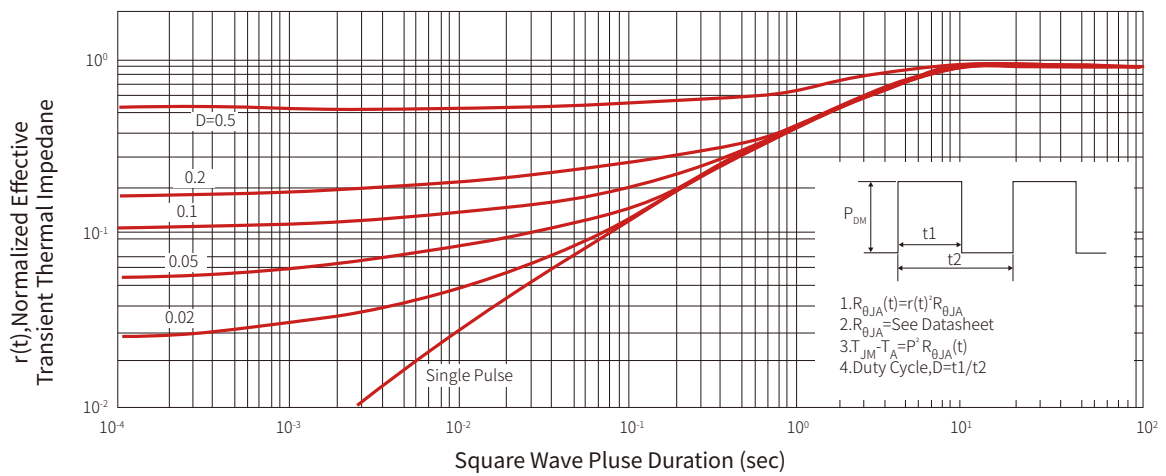
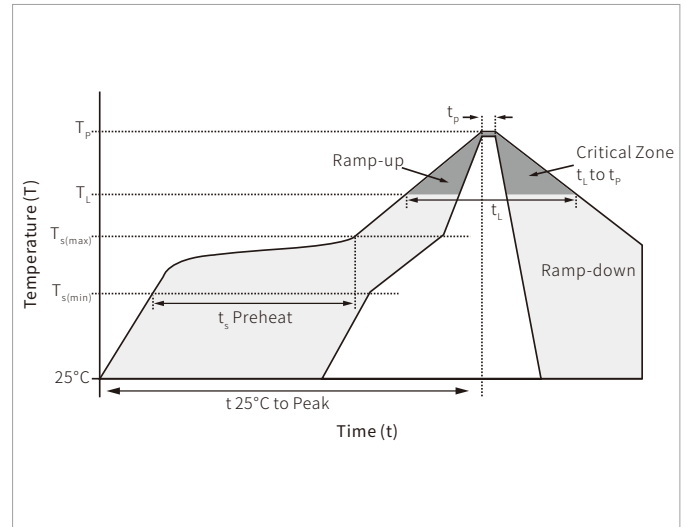
Fig.5 Transfer Characteristics

Fig. 6 Drain-Source On-Resistance

Fig.7 Rdson vs Vgs

Fig.8 Capacitance vs Vds


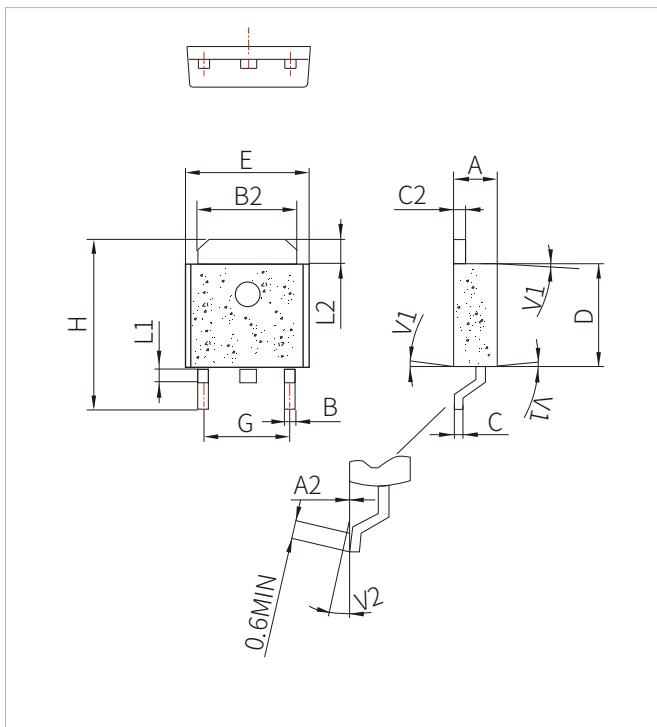
Fig.9 Gate Charge

Fig. 10 Source-Drain Diode Forward

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


SOLDERING PARAMETERS

Reflow Condition		Lead-free assembly
Pre Heat	Temperature Max ($T_{s(min)}$)	150°C
	Temperature Max ($T_{s(max)}$)	200°C
	Time (min to max) (t_s)	60 – 180 secs
Average ramp up rate (Liquidus Temp (T_L) to peak		3°C/second max
$T_{s(max)}$ to T_L - Ramp-up Rate		3°C/second max
Reflow	Temperature (T_L) (Liquidus)	217°C
	Time (min to max) (t_L)	60 – 150 seconds
Peak Temperature (T_p)		260°C
Time within 5°C of actual peak Temperature (t_p)		20 – 40 seconds
Ramp-down Rate		6°C/second max
Time 25°C to peak Temperature (T_p)		8 minutes max.
Do not exceed		260°C



TO-252 PACKAGE MECHANICAL DATA



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0.03		0.23	0.001		0.009
B	0.55		0.65	0.022		0.026
B2	5.10		5.40	0.200		0.213
C	0.45		0.62	0.018		0.024
C2	0.48		0.62	0.019		0.024
D	6.00		6.20	0.236		0.244
E	6.40		6.80	0.252		0.268
G	4.40		4.70	0.173	0.1	0.185
H	9.35		10.7	0.368		0.421
L1	1.30		1.70	0.051	0.143	0.067
L2	1.37		1.50	0.054		0.059
V1		4°			0.130	
V2	0°		8°	0°		8°

ORDERING INFORMATION

Part Number	Component Package	QTY/Reel	Reel Size
SPMD90P02	TO-252	5000PCS	13"

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