30V /13A Single N Power MOSFET
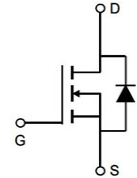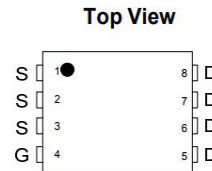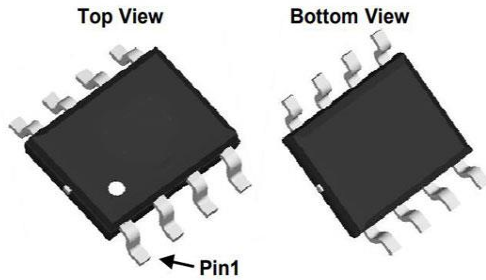
General Description

30V /13A Single N Power MOSFET

Very low on-resistance RDS(on) @ VGS=4.5 V

Pb-free lead plating; RoHS compliant

V_{DS}	30	V
$R_{DS(on),TYP}$@VGS=10V	10.9	mΩ
$R_{DS(on),TYP}$@VGS=4.5	17.1	mΩ
I_D	13	A

Top View   Bottom View   Pin1

Top View

S 1 8 D
S 2 7 D
S 3 6 D
G 4 5 D

Part ID	Package Type	Marking	Tape and reel infomation	
SM4306PRL	SOP8	4306	3000	100% UIS Tested 100% Rg Tested

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	20	±V
Continuous Drain Current A	T_A=25°C	I_D	13.0	A
	T_A=70°C		10.4	
Pulsed Drain Current B		I_{DM}	20.8	
Avalanche Current G		I_{AR}	4.2	
Repetitive avalanche energy L=0.1mH G		E_{AR}	9.6	mJ
Power Dissipation A	T_A=25°C	P_D	3.1	W
	T_A=70°C		2	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C

Thermal Characteristics

Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient A	t ≤ 10s	$R_{\theta JA}$	38	58	°C/W
Maximum Junction-to-Ambient A	Steady State		77	93	°C/W
Maximum Junction-to-Lead C	Steady State	$R_{\theta JL}$	23	37	°C/W

STATIC PARAMETERS

Symbol	Parameter	Conditions	Min	Typ	Max	Units
BV$_{DSS}$	Drain-Source Breakdown Voltage	I$_D$ = -250uA, V$_{GS}$ = 0V	30			V
I$_{DSS}$	Zero Gate Voltage Drain Current	VDS=30V, VGS=0V			1	uA
					5	
I$_{GSS}$	Gate-Body leakage current	V$_{DS}$ = 0V, V$_{GS}$ = ±20V			±100	nA
V$_{GS(th)}$	Gate Threshold Voltage	V$_{DS}$ = V$_{GS}$ I$_D$ = 250μA	1.3	1.9	2.5	V
R$_{DS(ON)}$	Static Drain-Source On-Resistance	VGS=-10V, ID=13A		10.9	15.5	mΩ
		VGS=4.5V, ID=13A		17.1	22.2	
g$_{FS}$	Forward Transconductance	VDS=5V, ID=13A		70		S
V$_{SD}$	Diode Forward Voltage	IS=1A,VGS=65V		0.72	1	V
I$_S$	Maximum Body-Diode Continuous Current				13	A

DYNAMIC PARAMETERS

Symbol	Parameter	Conditions	Min	Typ	Max	Units
C$_{iss}$	Input Capacitance	VGS=0V, VDS=15V, f=1MHz		760	927	pF
C$_{oss}$	Output Capacitance			125	153	pF
C$_{rss}$	Reverse Transfer Capacitance			70	83	pF
R$_g$	Gate resistance	VGS=0V, VDS=0V, f=1MHz			1.5	Ω

SWITCHING PARAMETERS

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Q$_g$ (10V)	Total Gate Charge	VGS=10V, VDS=15V, ID=13A		6.6		nC
Q$_g$ 4.5V)	Total Gate Charge			3.3		
Q$_{gs}$	Gate Source Charge			2.1		
Q$_{gd}$	Gate Drain Charge			3		
t$_{D(on)}$	Turn-On DelayTime	VGS=10V, VDS=15V,RL=0.75Ω, RGEN=3Ω		3.5		ns
t$_r$	Turn-On Rise Time			2.8		
t$_{D(off)}$	Turn-Off DelayTime			9.8		
t$_f$	Turn-Off Fall Time			3.15		
t$_{rr}$	Body Diode Reverse Recovery Time	IF=-8A, dI/dt=500A/μs		7		ns
Q$_{rr}$	Body Diode Reverse Recovery Charge	IF=18A, dI/dt=500A/μs		8		nC

V01

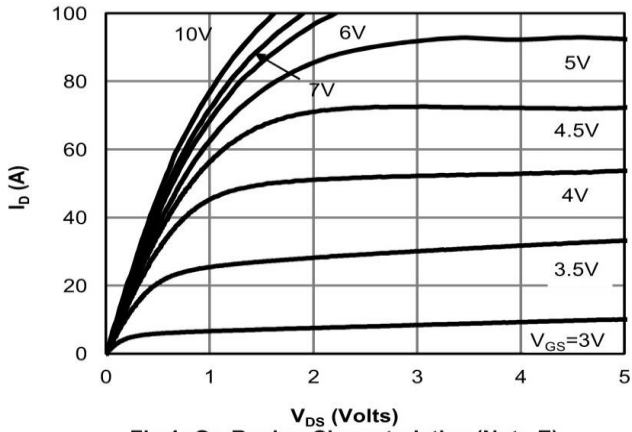## TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

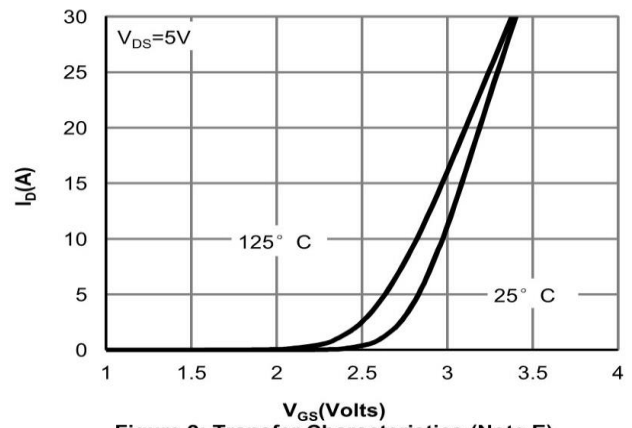Fig 1: On-Region Characteristics (Note E)

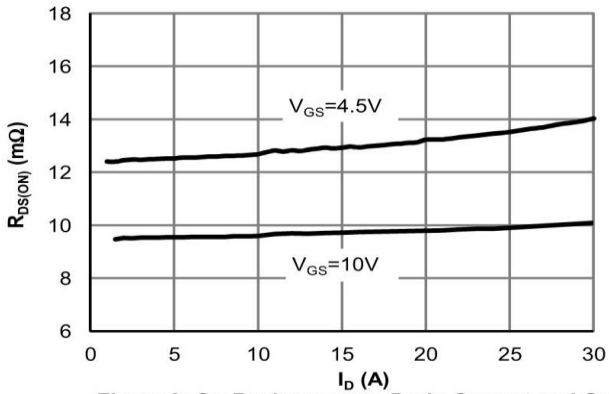

Figure 2: Transfer Characteristics (Note E)

Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)
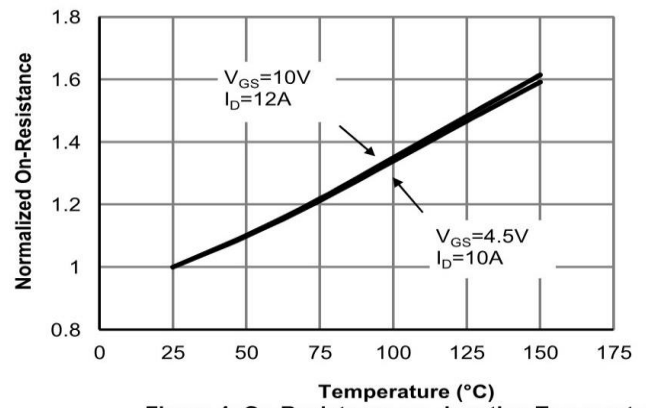

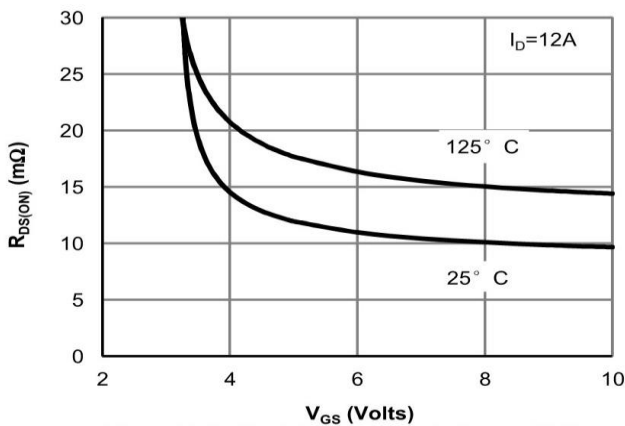Figure 4: On-Resistance vs. Junction Temperature (Note E)

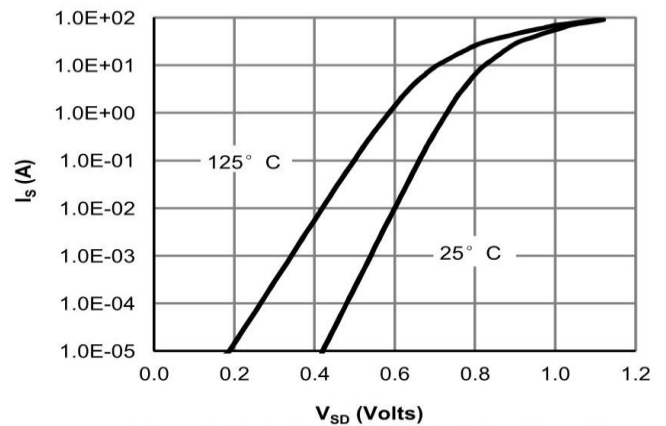
Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

Figure 6: Body-Diode Characteristics (Note E)
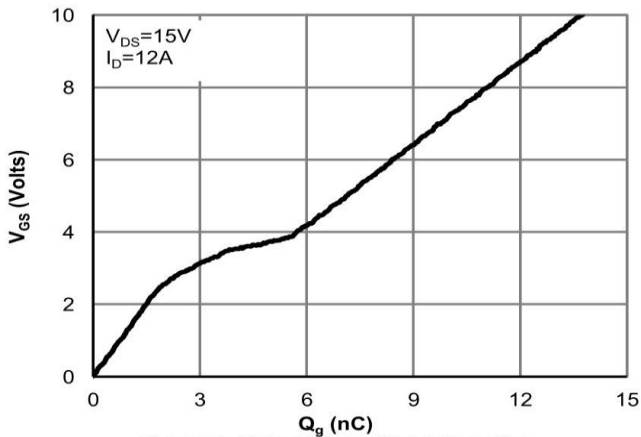
TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

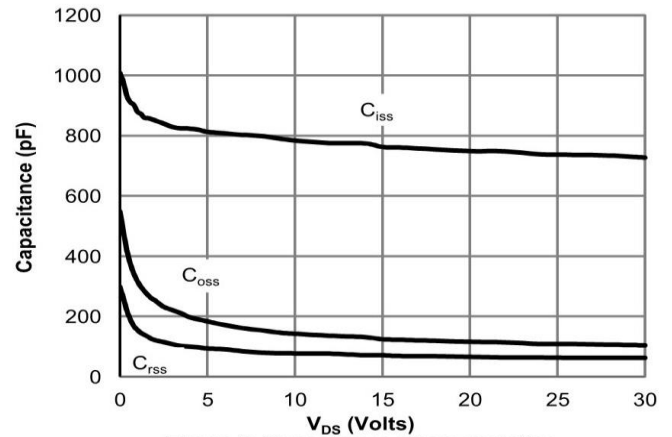Figure 7: Gate-Charge Characteristics
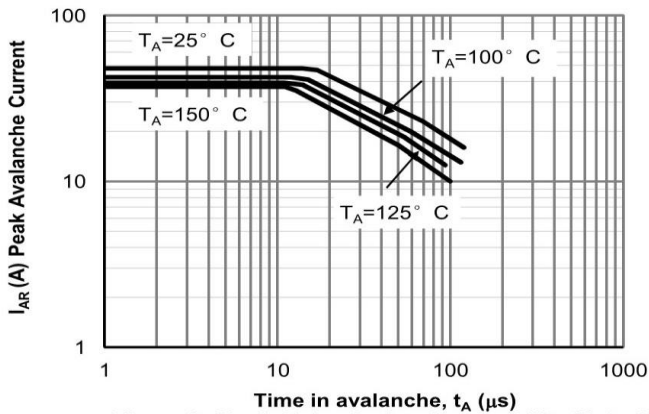

Figure 8: Capacitance Characteristics

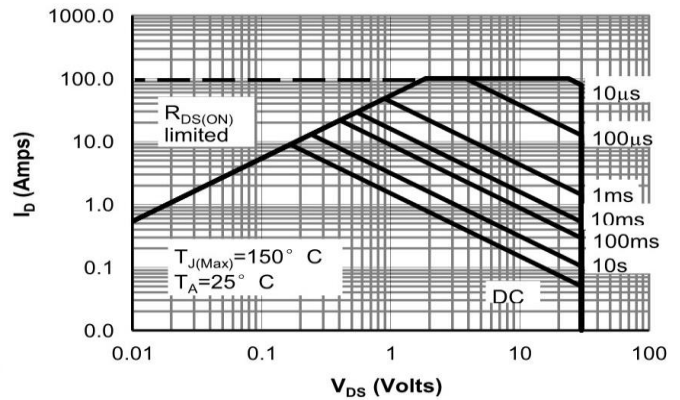
Figure 9: Single Pulse Avalanche capability (Note C)

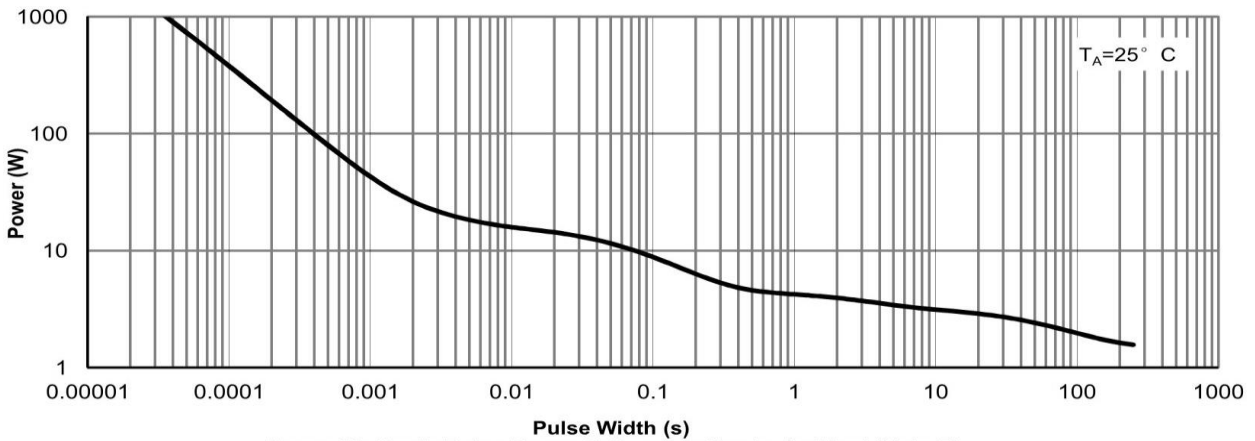Figure 10: Maximum Forward Biased
Safe Operating Area (Note F)

Figure 11: Single Pulse Power Rating Junction-to-Ambient (Note F)

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