

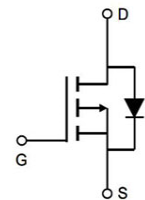
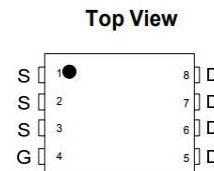
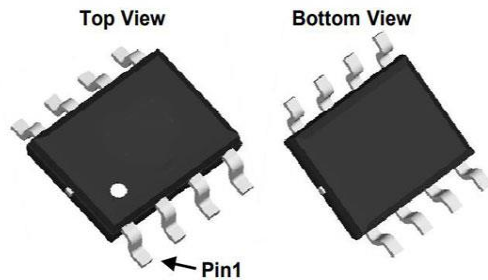
-40V /-6A Single P Power MOSFET
General Description

-40V /-6A Single P Power MOSFET

Very low on-resistance $R_{DS(on)}$ @ $V_{GS}=4.5\text{ V}$

Pb-free lead plating; RoHS compliant

V_{DS}	-40	V
$R_{DS(on),TYP@V_{GS}=10V}$	44.1	mΩ
$R_{DS(on),TYP@V_{GS}=4.5}$	69.3	mΩ
I_D	-6	A



Part ID	Package Type	Marking	Tape and reel information
SM4614BPRL	SOP8	4614	3000



100% UIS Tested
100% Kg Tested

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	-40	V
Gate-Source Voltage		V_{GS}	20	±V
Continuous Drain Current A	$T_A=25^\circ\text{C}$	I_D	-6.0	A
	$T_A=70^\circ\text{C}$		-5.0	
Pulsed Drain Current B		I_{DM}	-9.6	
Avalanche Current G		I_{AR}	-1.9	
Repetitive avalanche energy $L=0.1\text{mH}$ G		E_{AR}	-4.4	mJ
Power Dissipation A	$T_A=25^\circ\text{C}$	P_D	3.1	W
	$T_A=70^\circ\text{C}$		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	$t \leq 10\text{s}$	$R_{\theta JA}$	157	236	°C/W
Maximum Junction-to-Ambient A	Steady State		315	378	°C/W
Maximum Junction-to-Lead c	Steady State	$R_{\theta JL}$	94	151	°C/W

**STATIC PARAMETERS**

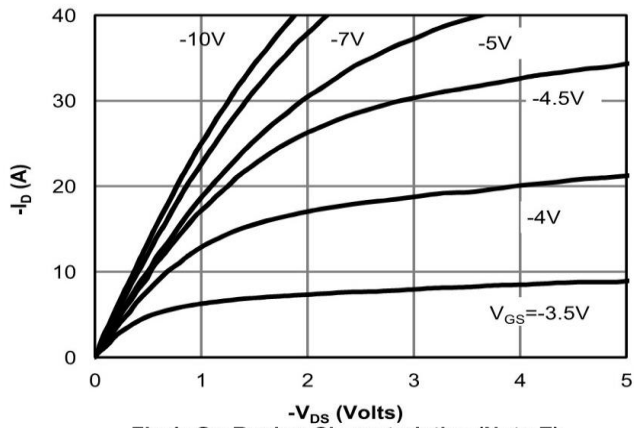
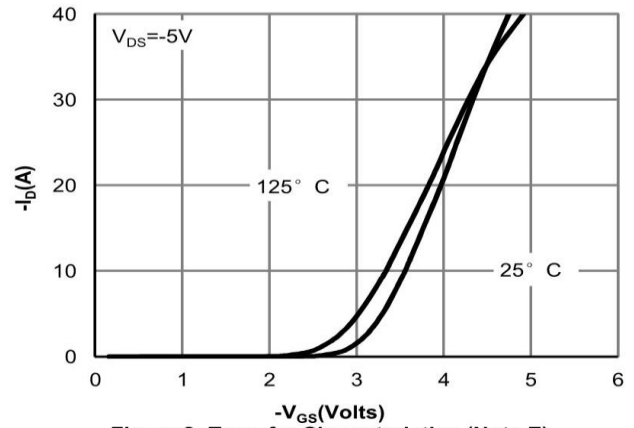
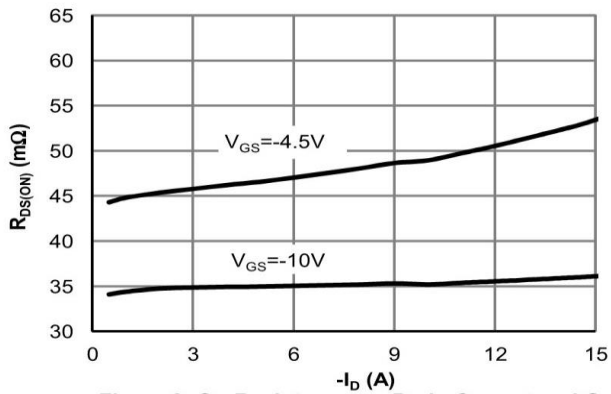
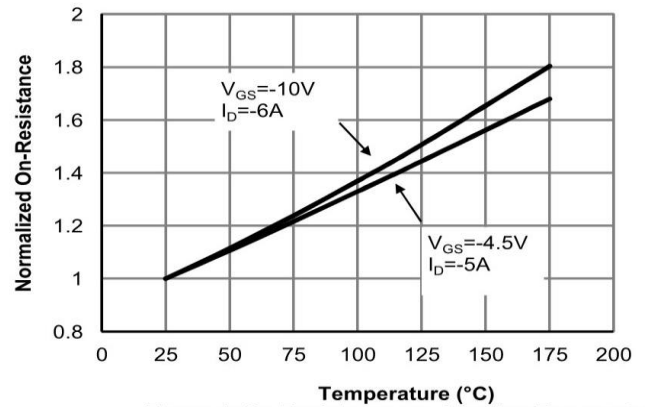
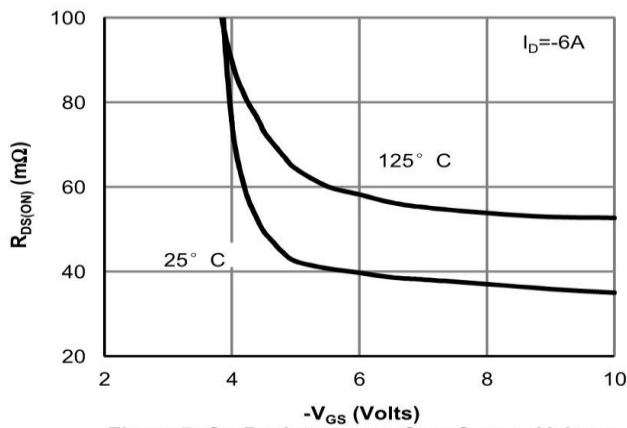
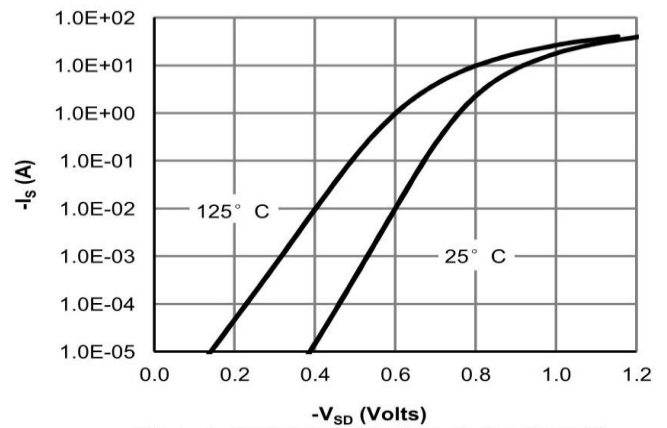
Symbol	Parameter	Conditions	Min	Typ	Max	Units
BV _{DSS}	Drain-Source Breakdown Voltage	I _D = -250uA, V _{GS} = 0V	-40			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = -40V, V _{GS} = 0V			-1	uA
					-5	
I _{GSS}	Gate-Body leakage current	V _{DS} = 0V, V _{GS} = ±20V			±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} I _D = 250μA	-1.3	-2	-2.6	V
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} = -10V, I _D = -6A		44.1	63.0	mΩ
		V _{GS} = -4.5V, I _D = -6A		69.3	90.1	
g _{FS}	Forward Transconductance	V _{DS} = -5V, I _D = -6A		46		S
V _{SD}	Diode Forward Voltage	I _S = -1A, V _{GS} = 0V		-0.72	-1	V
I _S	Maximum Body-Diode Continuous Current				-6	A

DYNAMIC PARAMETERS

Symbol	Parameter	Conditions	Min	Typ	Max	Units
C _{iss}	Input Capacitance	V _{GS} = 0V, V _{DS} = -15V, f = 1MHz		940	1146	pF
C _{oss}	Output Capacitance			97	119	pF
C _{rss}	Reverse Transfer Capacitance			72	85	pF
R _g	Gate resistance	V _{GS} = 0V, V _{DS} = 0V, f = 1MHz			2.15	Ω

SWITCHING PARAMETERS

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Q _g (10V)	Total Gate Charge	V _{GS} = -10V, V _{DS} = -15V, I _D = -6A		8.4		nC
Q _g 4.5V)	Total Gate Charge			4.2		
Q _{gs}	Gate Source Charge			3.01		
Q _{gd}	Gate Drain Charge			4.3		
t _{D(on)}	Turn-On DelayTime	V _{GS} = -10V, V _{DS} = -15V, R _L = 0.75 Ω, R _{GEN} = 3Ω		8.5		ns
t _r	Turn-On Rise Time			6.8		
t _{D(off)}	Turn-Off DelayTime			23.8		
t _f	Turn-Off Fall Time			7.65		
t _{rr}	Body Diode Reverse Recovery Time	I _F = -8A, dI/dt = 500A/μs		17		ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F = 18A, dI/dt = 500A/μs		11.5		nC

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

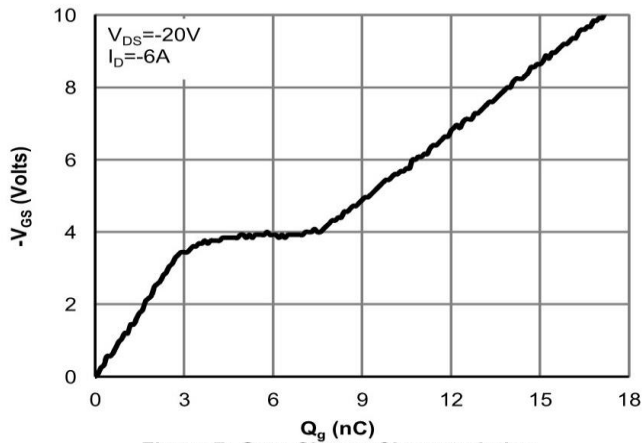


Figure 7: Gate-Charge Characteristics

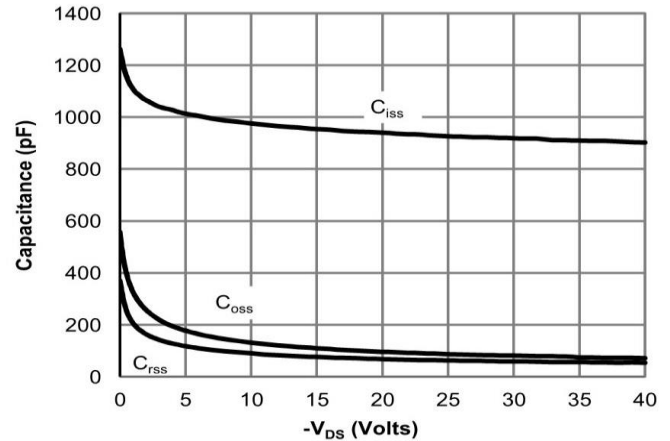


Figure 8: Capacitance Characteristics

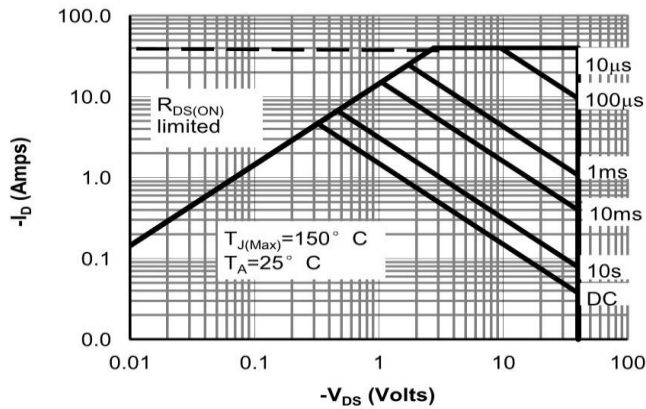


Figure 10: Maximum Forward Biased Safe Operating Area (Note F)

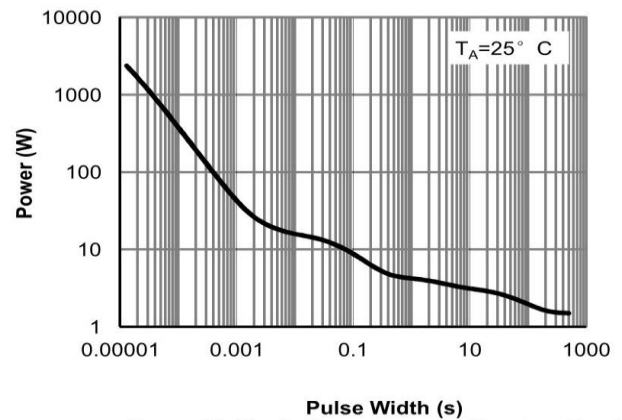


Figure 11: Single Pulse Power Rating Junction-to-Ambient (Note F)

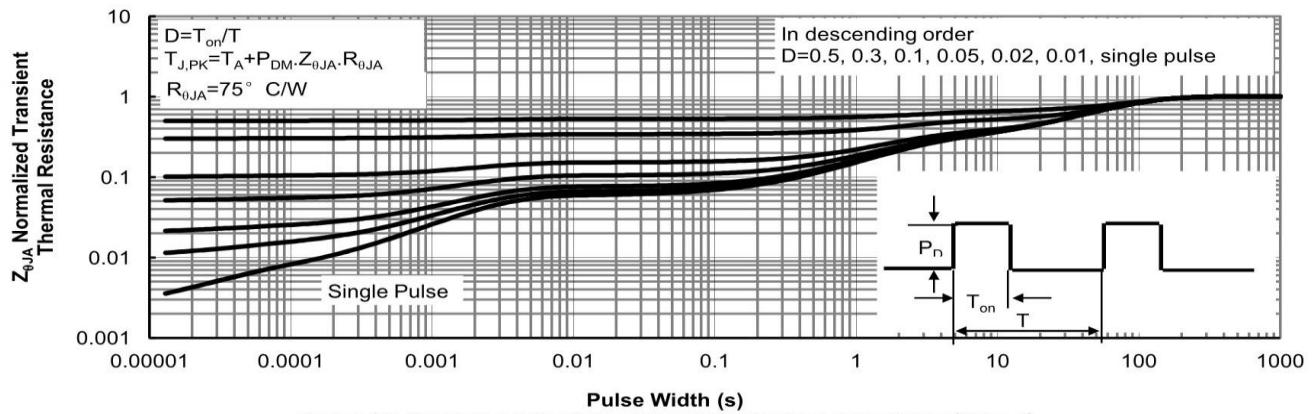


Figure 12: Normalized Maximum Transient Thermal Impedance (Note F)