

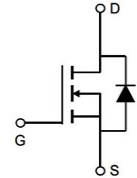
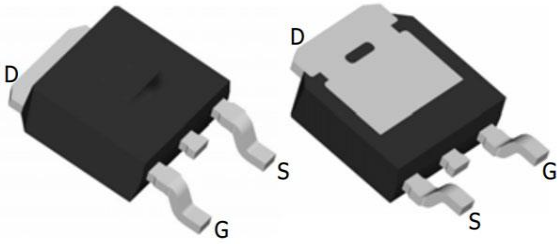
40V /50A Single N Power MOSFET
General Description

40V /50A Single N 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
$R_{DS(on),TYP@V_{GS}=10V}$	4.9	m Ω
$R_{DS(on),TYP@V_{GS}=4.5}$	6.7	m Ω
I_D	50	A



Part ID	Package Type	Marking	Tape and reel information
SM4184T9RL	TO-252	50N04	2500


 100% UIS Tested
 100% Kg Tested

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	20	$\pm V$
Continuous Drain Current ^A	I_D	$T_A=25^\circ C$	A
		$T_A=70^\circ C$	
Pulsed Drain Current ^B	I_{DM}	80.0	
Avalanche Current ^C	I_{AR}	16.0	
Repetitive avalanche energy $L=0.1mH$ ^C	E_{AR}	36.8	mJ
Power Dissipation ^A	P_D	$T_A=25^\circ C$	W
		$T_A=70^\circ C$	
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	$^\circ C$

Thermal Characteristics

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	$t \leq 10s$	23	$^\circ C/W$
Maximum Junction-to-Ambient ^A		Steady State	47	$^\circ C/W$
Maximum Junction-to-Lead ^C	$R_{\theta JL}$	14	22	$^\circ C/W$



STATIC PARAMETERS

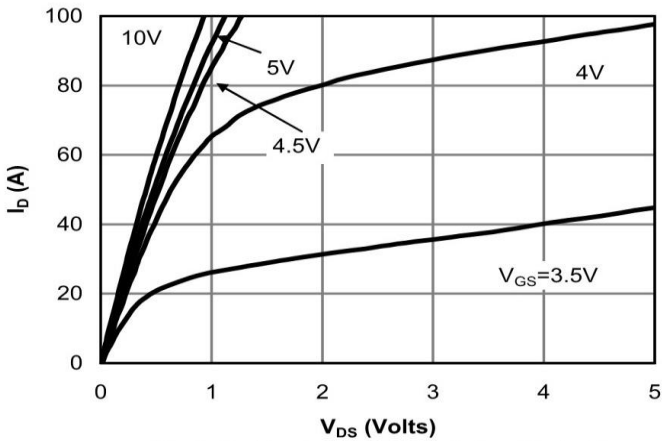
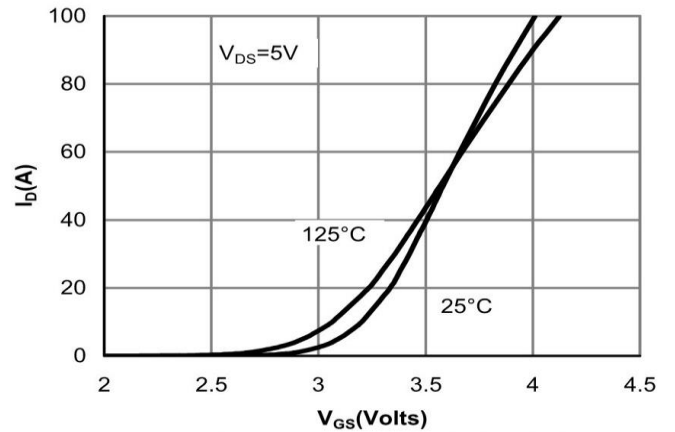
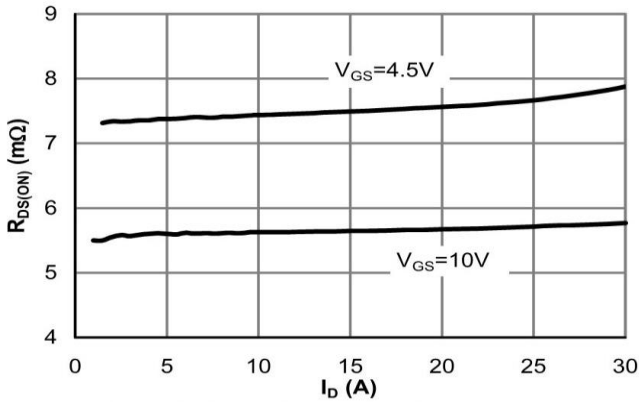
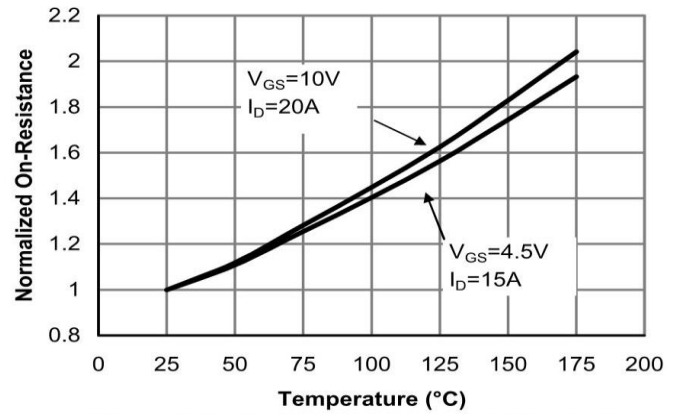
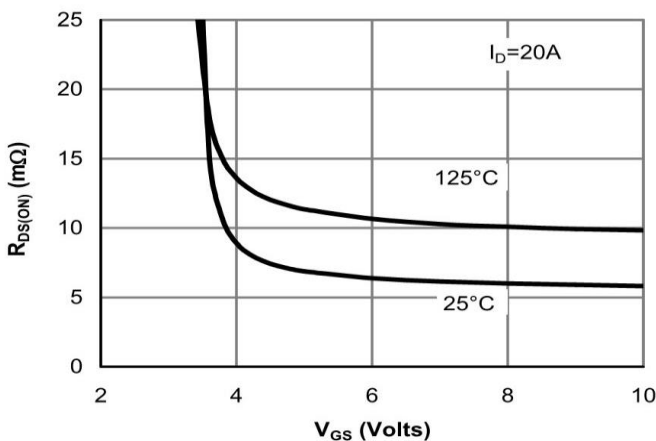
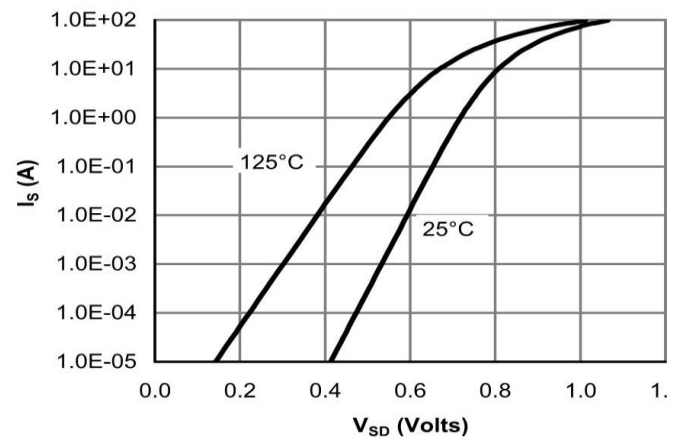
Symbol	Parameter	Conditions	Min	Typ	Max	Units
BV _{DSS}	Drain-Source Breakdown Voltage	I _D = -250uA, V _{GS} = 0V	40			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =40V, V _{GS} =0V			1 5	uA
I _{GSS}	Gate-Body leakage current	V _{DS} = 0V, V _{GS} = ±20V			±100	nA
V _{GS(th)}	Gate Threshold Voltage	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 =20A		4.9	7.0	mΩ
		V _{GS} =4.5V, I _D =20A		6.7	9.5	
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =20A		57		S
V _{SD}	Diode Forward Voltage	I _S =1A, V _{GS} =172V		0.72	1	V
I _S	Maximum Body-Diode Continuous Current				50	A

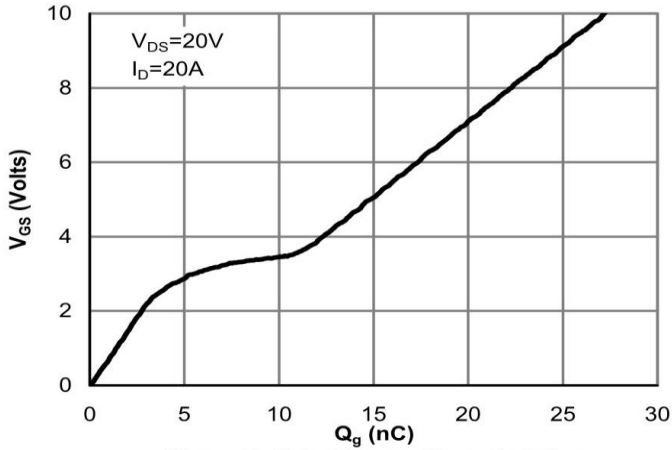
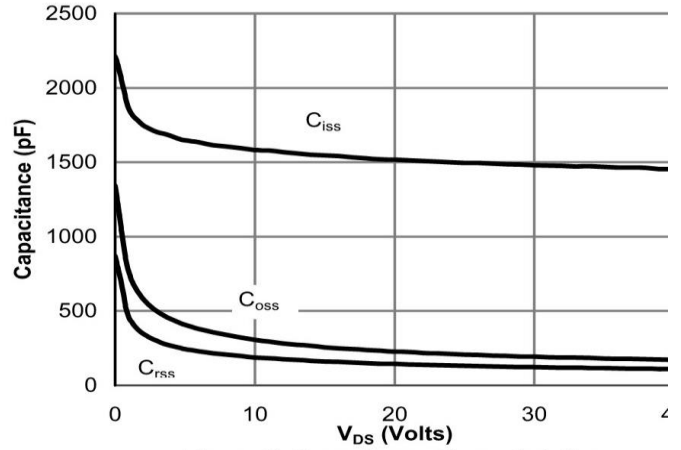
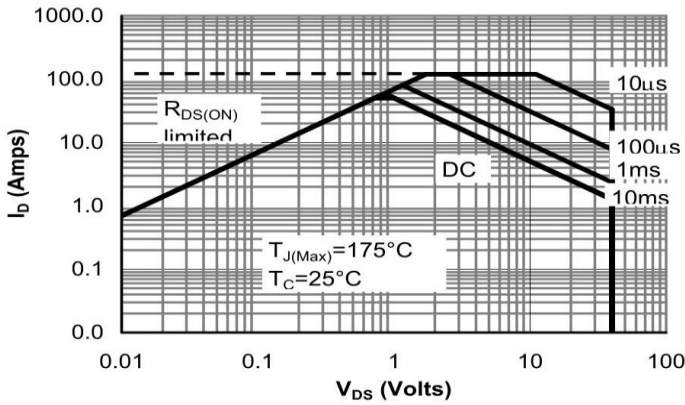
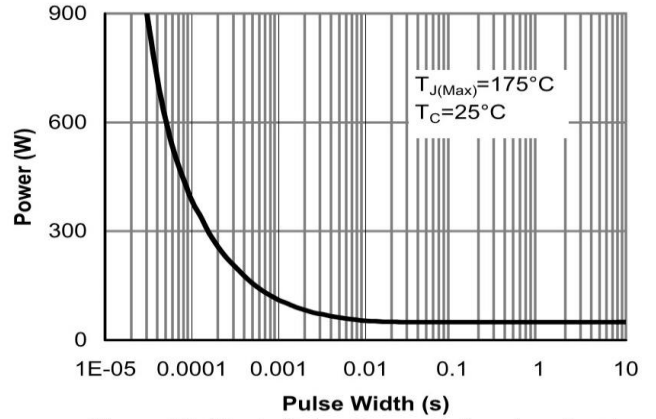
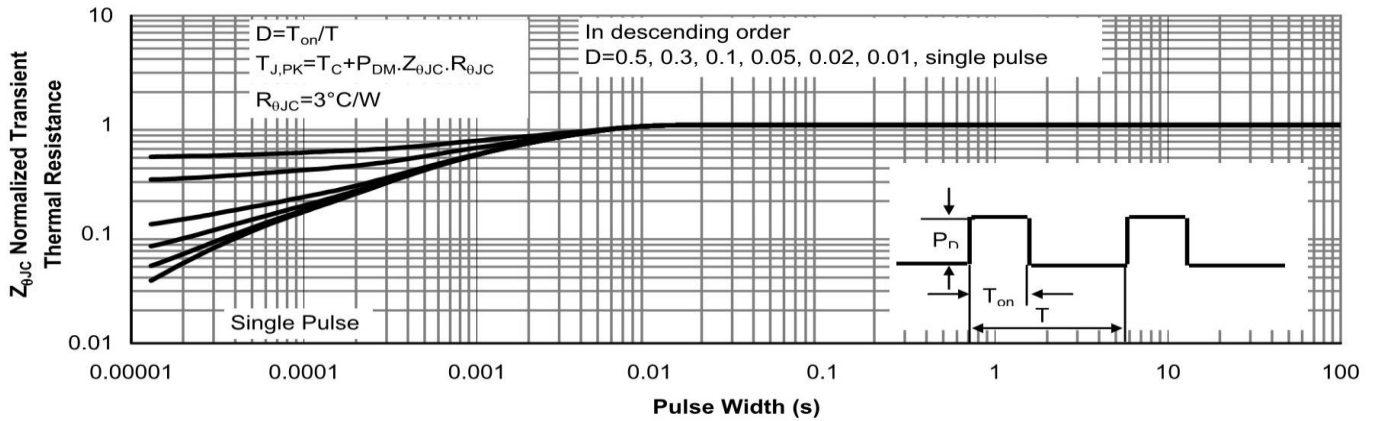
DYNAMIC PARAMETERS

Symbol	Parameter	Conditions	Min	Typ	Max	Units
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =15V, f=1MHz		1500	1830	pF
C _{oss}	Output Capacitance			215	264	pF
C _{rss}	Reverse Transfer Capacitance			135	160	pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz			3	Ω

SWITCHING PARAMETERS

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Q _g (10V)	Total Gate Charge	V _{GS} =10V, V _{DS} =15V, I _D =20A		14		nC
Q _g 4.5V)	Total Gate Charge			7		
Q _{gs}	Gate Source Charge			4.2		
Q _{gd}	Gate Drain Charge			6		
t _{D(on)}	Turn-On DelayTime	V _{GS} =10V, V _{DS} =15V, R _L =0.75Ω, R _{GEN} =3Ω		14.5		ns
t _r	Turn-On Rise Time			11.6		
t _{D(off)}	Turn-Off DelayTime			40.6		
t _f	Turn-Off Fall Time			13.05		
t _{rr}	Body Diode Reverse Recovery Time	I _F =-8A, dI/dt=500A/µs		29		ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =18A, dI/dt=500A/µs		26		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 9: Maximum Forward Biased Safe Operating Area (Note F)

Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

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