

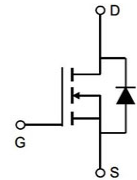
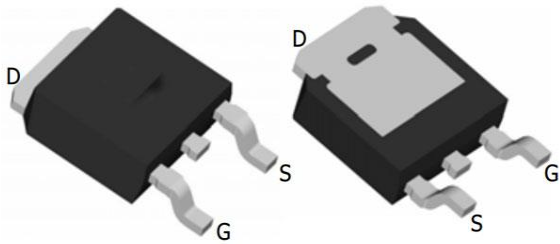
30V /46A Single N Power MOSFET
General Description

30V /46A 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}	30	V
$R_{DS(on),TYP@V_{GS}=10V}$	4.1	m Ω
$R_{DS(on),TYP@V_{GS}=4.5}$	8.3	m Ω
I_D	46	A



Part ID	Package Type	Marking	Tape and reel information
SM514T9RL	TO-252	46N03	2500


 100% UIS Tested
 100% Kg Tested

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	30	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}	73.6	
Avalanche Current ^C	I_{AR}	14.7	
Repetitive avalanche energy $L=0.1\text{mH}$ ^C	E_{AR}	33.9	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	$R_{\theta JA}$	29	44	$^\circ C/W$
Maximum Junction-to-Ambient ^A		Steady State	59	71
Maximum Junction-to-Lead ^C	$R_{\theta JL}$	17	28	$^\circ C/W$



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	V _{DS} =30V, 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	1.2	1.8	2.4	V
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =20A		4.1	5.9	mΩ
		V _{GS} =4.5V, I _D =20A		8.3	11.9	
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =20A		40		S
V _{SD}	Diode Forward Voltage	I _S =1A, V _{GS} =155V		0.72	1	V
I _S	Maximum Body-Diode Continuous Current				46	A

DYNAMIC PARAMETERS

Symbol	Parameter	Conditions	Min	Typ	Max	Units
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =15V, f=1MHz		1187	1448	pF
C _{oss}	Output Capacitance			483	594	pF
C _{rss}	Reverse Transfer Capacitance			60	71	pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz			1.8	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		8.8		nC
Q _g 4.5V)	Total Gate Charge			4.4		
Q _{gs}	Gate Source Charge			2.52		
Q _{gd}	Gate Drain Charge			3.6		
t _{D(on)}	Turn-On DelayTime	V _{GS} =10V, V _{DS} =15V, R _L =0.75Ω, R _{GEN} =3Ω		7.35		ns
t _r	Turn-On Rise Time			5.88		
t _{D(off)}	Turn-Off DelayTime			20.58		
t _f	Turn-Off Fall Time			6.615		
t _{rr}	Body Diode Reverse Recovery Time	I _F =-8A, dI/dt=500A/µs		14.7		ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =18A, dI/dt=500A/µs		24		nC

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

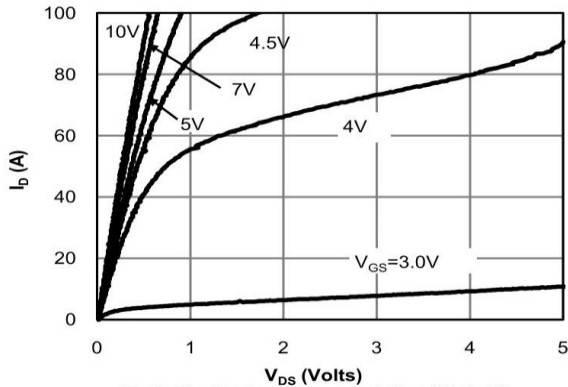


Fig 1: On-Region Characteristics (Note E)

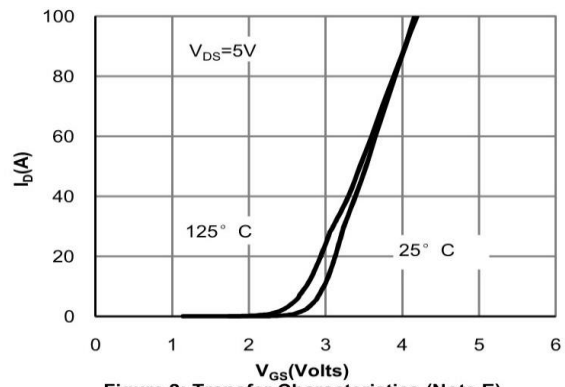


Figure 2: Transfer Characteristics (Note E)

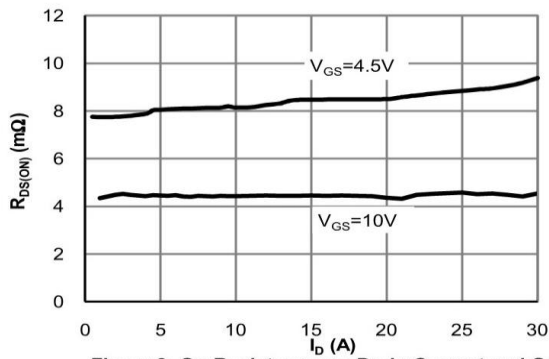


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

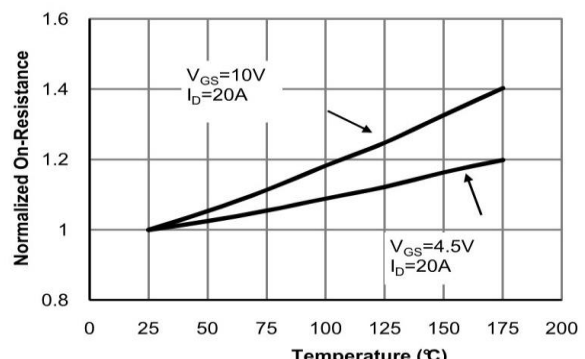


Figure 4: On-Resistance vs. Junction Temperature (Note E)

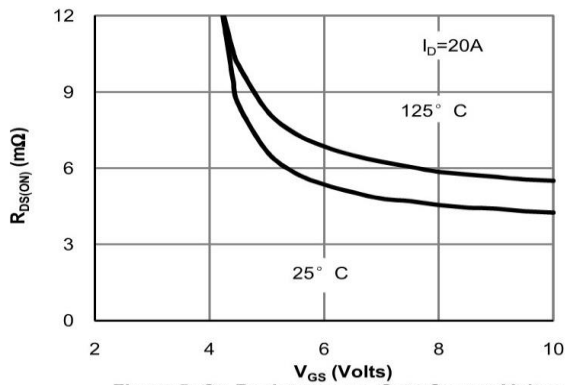


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

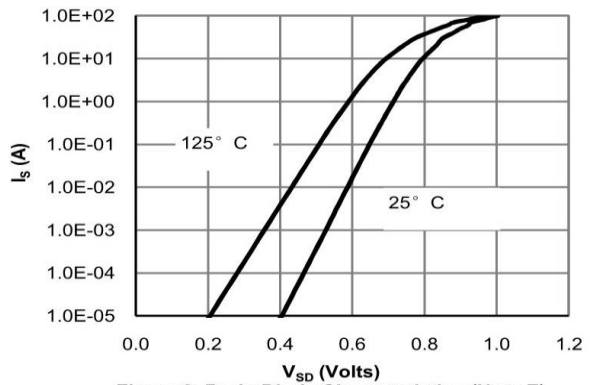


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

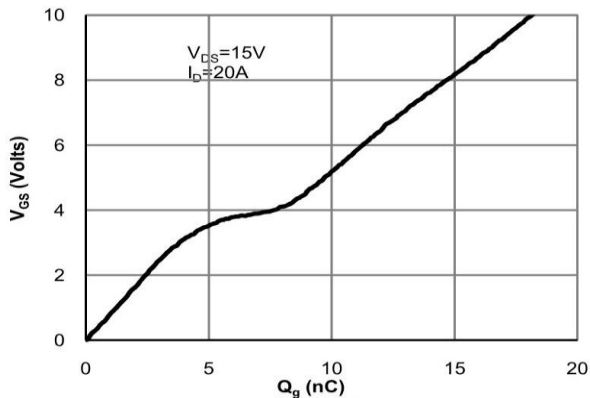


Figure 7: Gate-Charge Characteristics

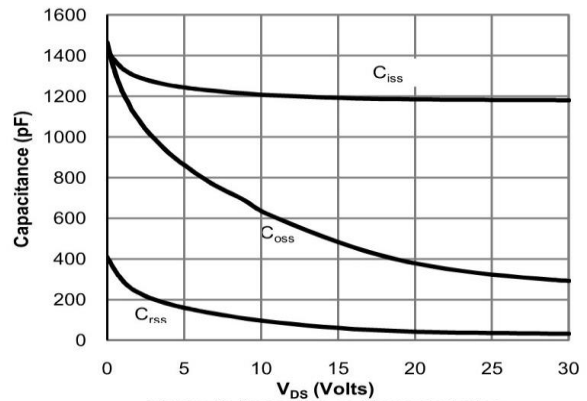


Figure 8: Capacitance Characteristics

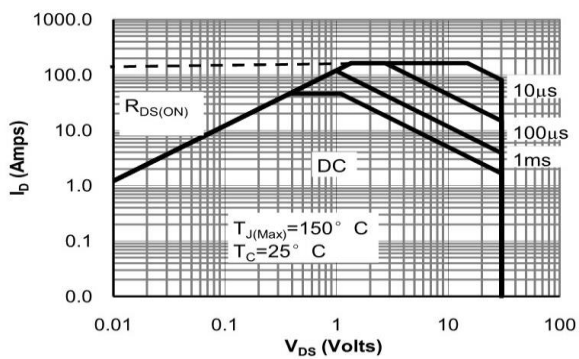


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

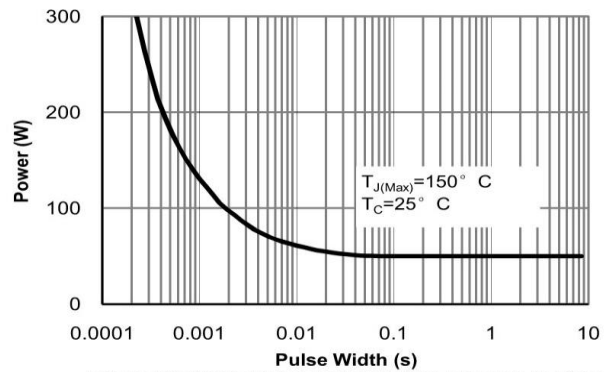


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

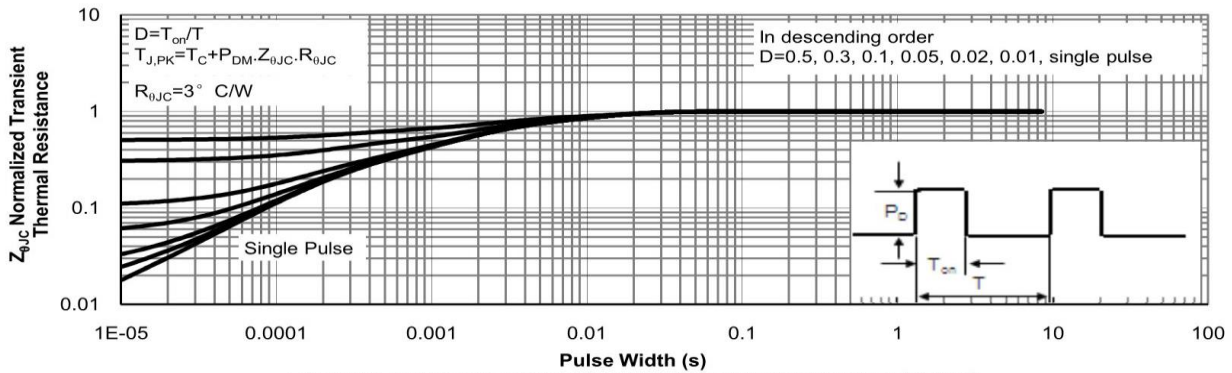


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)