40V /30A Single N Power MOSFET

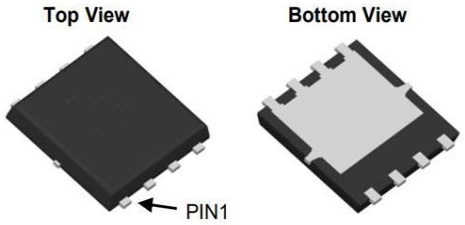
General Description

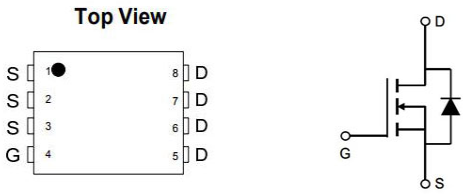
40V /30A Single N Power MOSFET

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

Pb-free lead plating; RoHS compliant

V_{DS}	40	V
$R_{DS(on),TYP@VGS=10V}$	9.0	mΩ
$R_{DS(on),TYP@VGS=4.5}$	12.0	mΩ
I_D	30	A





Part ID	Package Type	Marking	Tape and reel infomation
SM66406D1RL	DFN5x6	6406	3000

100% UIS Tested
100% Rg 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°C	I_D	30.0	A
	T_A=70°C		30.0	
Pulsed Drain Current B		I_{DM}	48.0	
Avalanche Current G		I_{AR}	9.6	
Repetitive avalanche energy L=0.1mH G		E_{AR}	22.1	mJ
Power Dissipation A	T_A=25°C	P_D	36.5	W
	T_A=70°C		14.5	
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	$R_{\theta JA}$	23	35	°C/W
Maximum Junction-to-Ambient A	Steady State		47	56	°C/W
Maximum Junction-to-Lead C	Steady State	$R_{\theta JL}$	14	22	°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	VDS=40V, 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=20A		9.0	11.0	mΩ
		VGS=4.5V, ID=20A		12.0	15.6	
g_{FS}	Forward Transconductance	VDS=5V, ID=20A		59		S
V_{SD}	Diode Forward Voltage	IS=1A,VGS=114V		0.72	1	V
I_S	Maximum Body-Diode Continuous Current				30	A

DYNAMIC PARAMETERS

Symbol	Parameter	Conditions	Min	Typ	Max	Units
C_{iss}	Input Capacitance	VGS=0V, VDS=15V, f=1MHz		1480	1805	pF
C_{oss}	Output Capacitance			245	301	pF
C_{rss}	Reverse Transfer Capacitance			13	15	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=20A		8.5		nC
Q_g 4.5V)	Total Gate Charge			4.25		
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		5.5		ns
t_r	Turn-On Rise Time			4.4		
$t_{D(off)}$	Turn-Off DelayTime			15.4		
t_f	Turn-Off Fall Time			4.95		
t_{rr}	Body Diode Reverse Recovery Time	I_F=-8A, dI/dt=500A/μs		11		ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=18A, dI/dt=500A/μs		21		nC

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

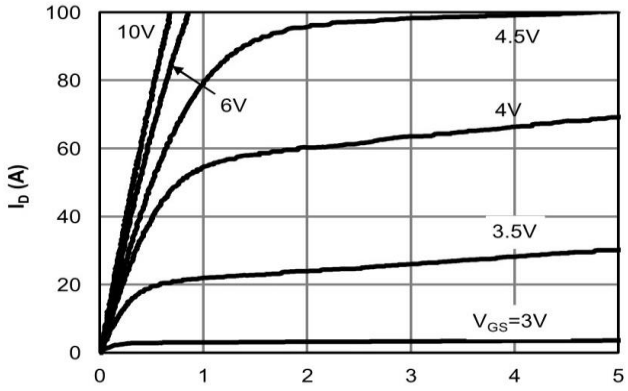


Figure 1: On-Region Characteristics (Note E)

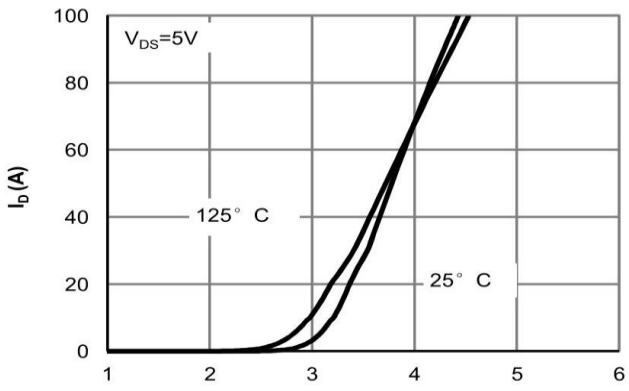


Figure 2: Transfer Characteristics (Note E)

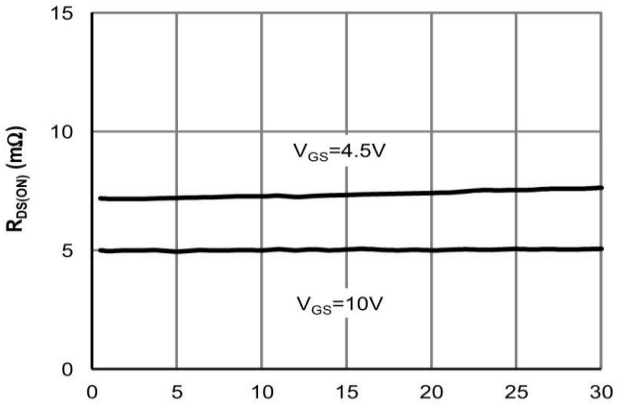


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

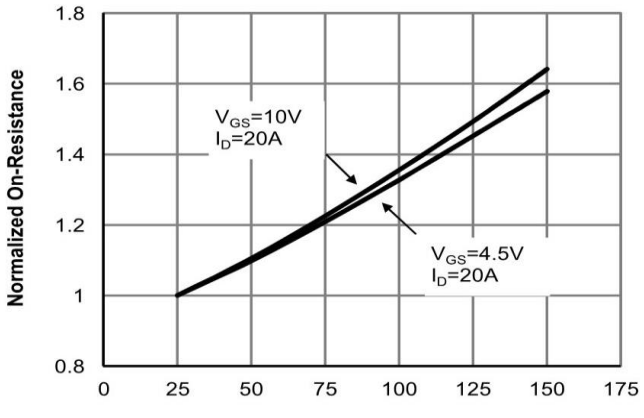


Figure 4: On-Resistance vs. Junction Temperature (Note E)

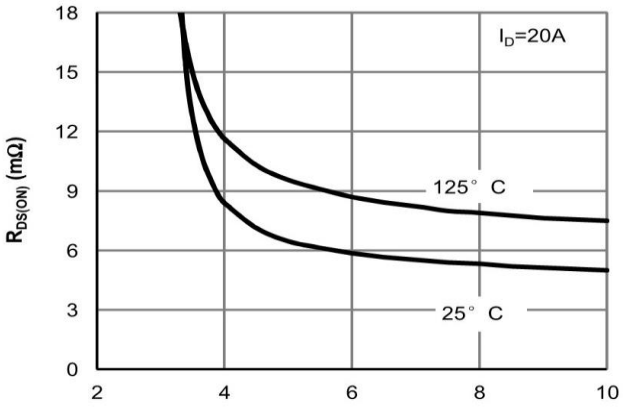


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

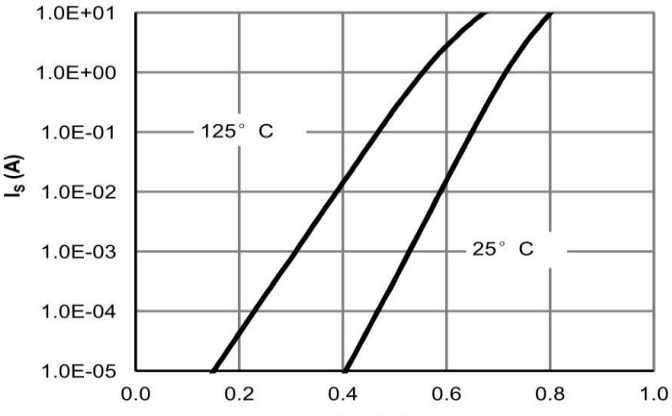


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

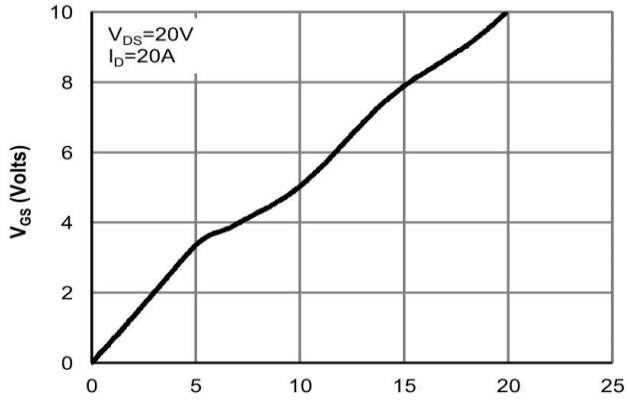


Figure 7: Gate-Charge Characteristics

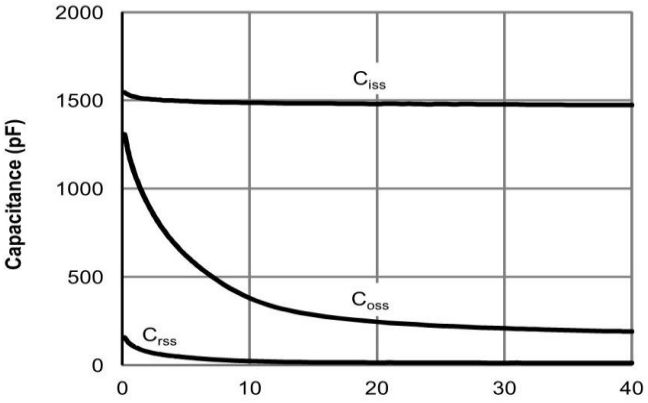


Figure 8: Capacitance Characteristics

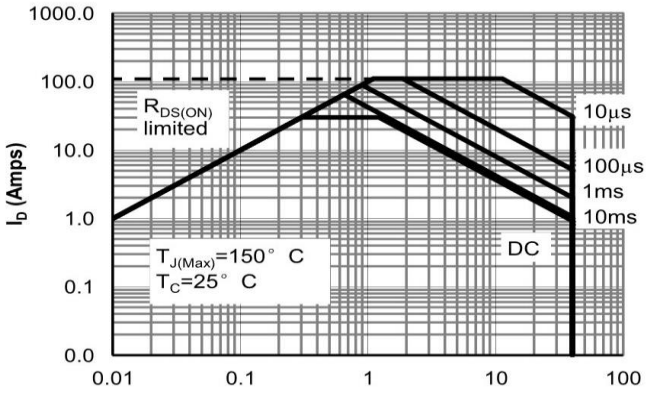


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

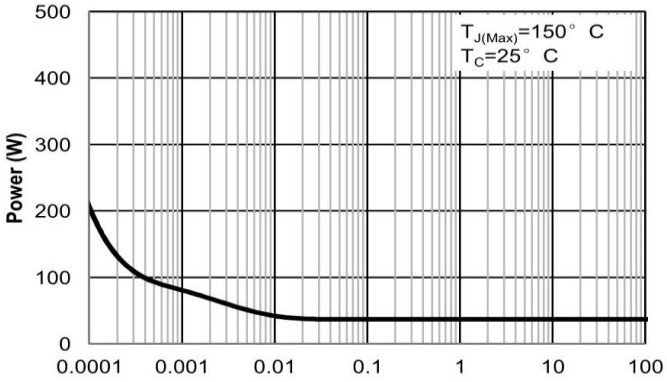


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

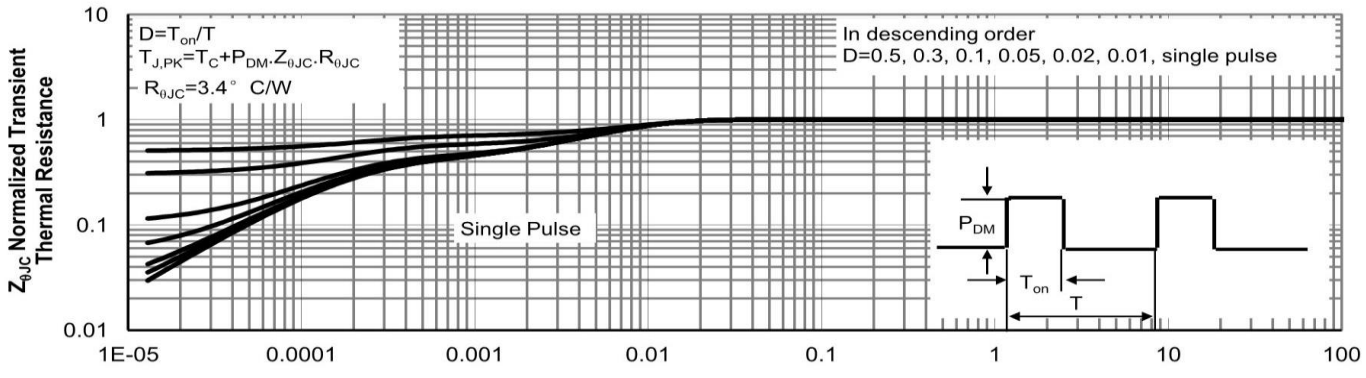


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)