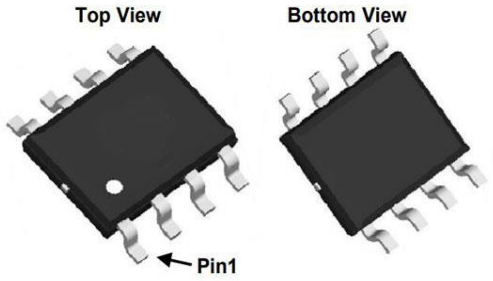
General Description

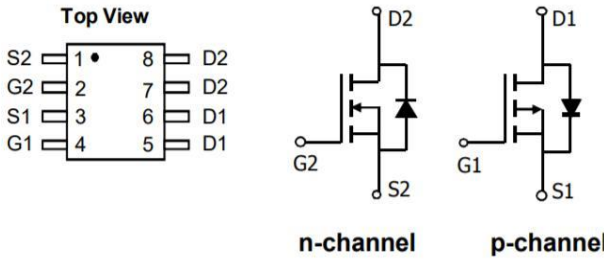
N+P Complementary Power MOSFET

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

Pb-free lead plating; RoHS compliant

	N channel	P channel	
V_{DS}	30	-30	V
$R_{DS(on),TYP@VGS=10V}$	14.0	23.0	mΩ
$R_{DS(on),TYP@VGS=4.5}$	18.0	23.0	mΩ
I_D	10	-8	A





Part ID	Package Type	Marking	Tape and reel infomation
AC4616	SOP8	9N03C	3000

100% UIS Tested

Parameter		Symbol	Max N-channel	Max P-channel	Units
Drain-Source Voltage		V_{DS}	30	-30	V
Gate-Source Voltage		V_{GS}	20	20	±V
Continuous Drain Current A	T_A=25°C	I_D	10	-8	A
	T_A=70°C		8	-6	
Pulsed Drain Current B		I_{DM}	16	-12.8	
Avalanche Current G		I_{AR}	3.2	-2.6	
Repetitive avalanche energy L=0.1mH G		E_{AR}	7.36	-5.9	mJ
Power Dissipation A	T_A=25°C	P_D	2	2	W
	T_A=70°C		1.3	1.3	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	-55 to 150	°C

Thermal Characteristics

Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient A	t ≤ 10s	$R_{\theta JA}$	70	105	°C/W
Maximum Junction-to-Ambient A	Steady State		140	168	°C/W
Maximum Junction-to-Lead C	Steady State	$R_{\theta JL}$	42	67	°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	1.2	1.8	2.4	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	#REF!		14.0	20.0	mΩ
		VGS=4.5V, ID=8.5A		18.0	23.4	
g_{FS}	Forward Transconductance	VDS=5V, ID=8.5A		46		S
V_{SD}	Diode Forward Voltage	IS=1A,VGS=41V		0.72	1	V
I_S	Maximum Body-Diode Continuous Current				8.5	A

DYNAMIC PARAMETERS

Symbol	Parameter	Conditions	Min	Typ	Max	Units
C_{iss}	Input Capacitance	VGS=0V, VDS=15V, f=1MHz		740	902	pF
C_{oss}	Output Capacitance			110	135	pF
C_{rss}	Reverse Transfer Capacitance			82	97	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=8.5A		7.5		nC
Q_g 4.5V)	Total Gate Charge			3.75		
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		4		ns
t_r	Turn-On Rise Time			3.2		
$t_{D(off)}$	Turn-Off DelayTime			11.2		
t_f	Turn-Off Fall Time			3.6		
t_{rr}	Body Diode Reverse Recovery Time	I_F=-8A, dI/dt=500A/μs		8		ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=18A, dI/dt=500A/μs		18		nC

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

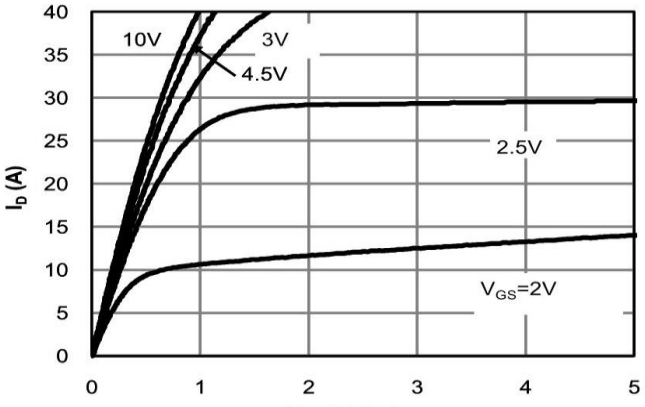


Fig 1: On-Region Characteristics (Note E)

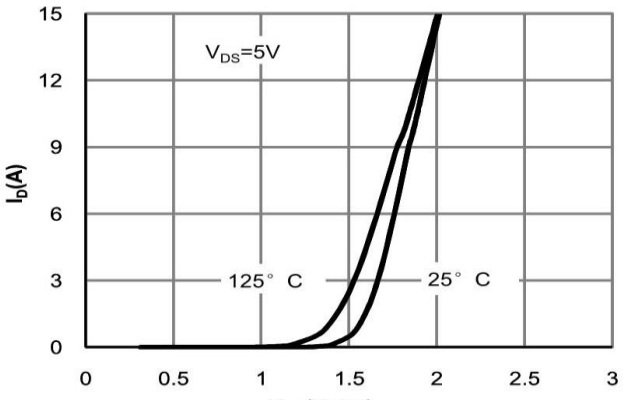


Figure 2: Transfer Characteristics (Note E)

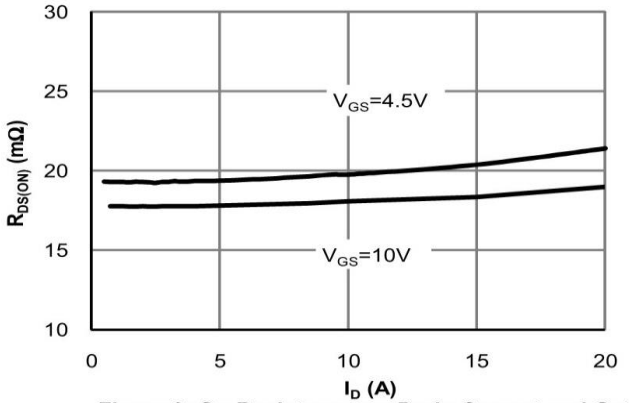


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

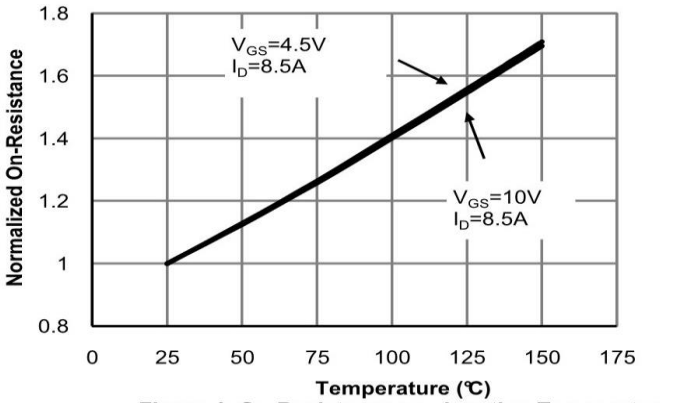


Figure 4: On-Resistance vs. Junction Temperature (Note E)

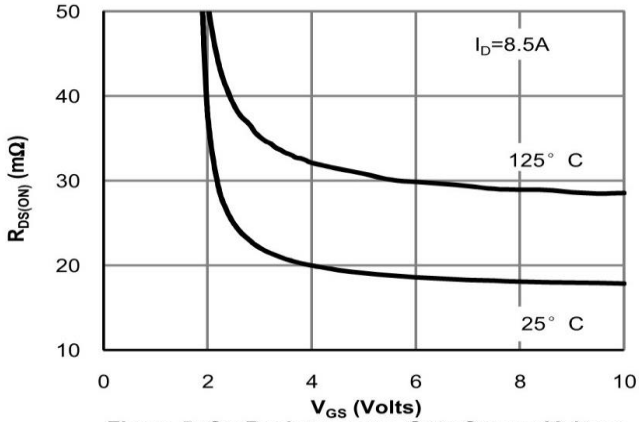


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

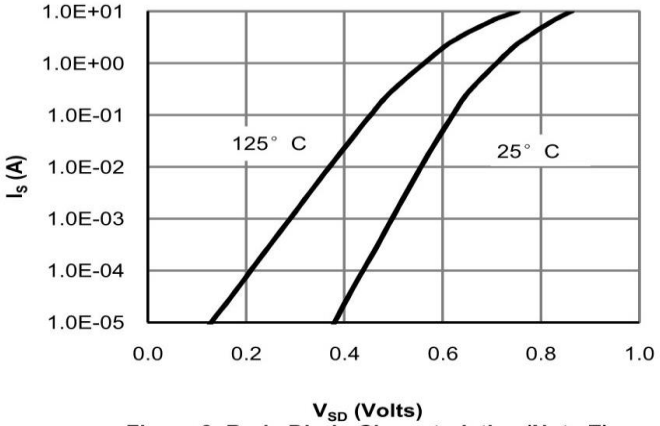


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

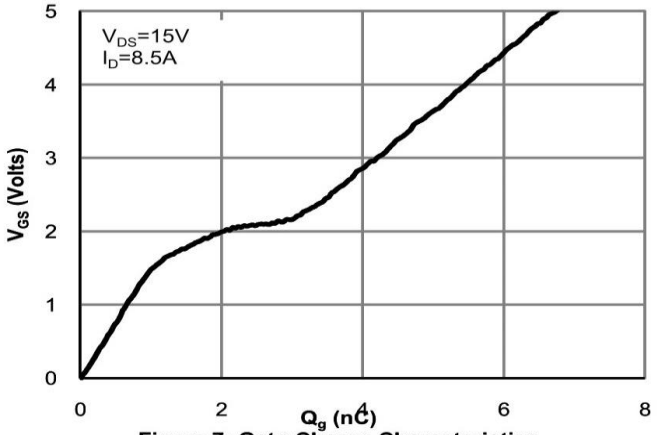


Figure 7: Gate-Charge Characteristics

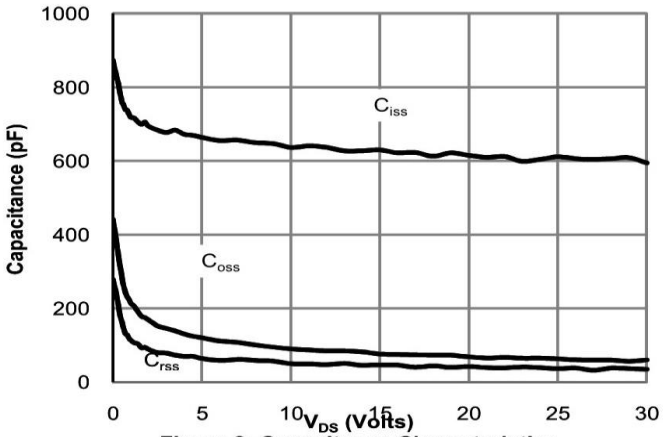


Figure 8: Capacitance Characteristics

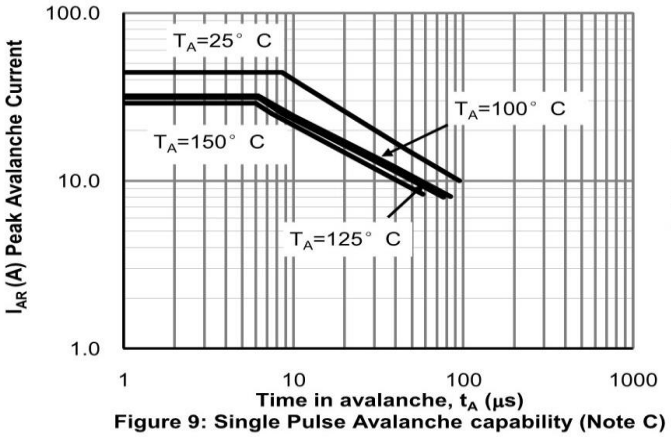


Figure 9: Single Pulse Avalanche capability (Note C)

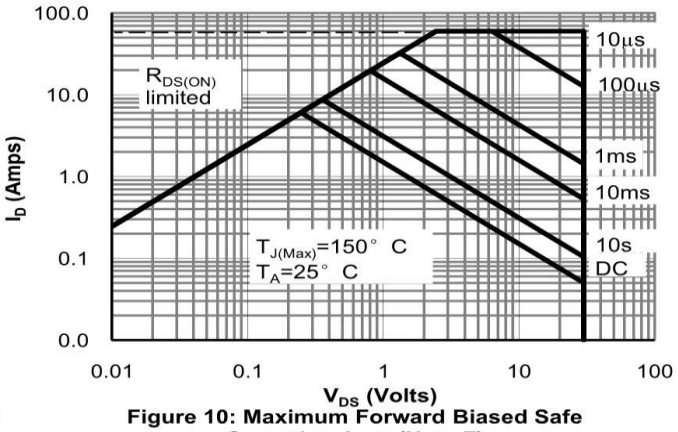


Figure 10: Maximum Forward Biased Safe Operating Area (Note F)

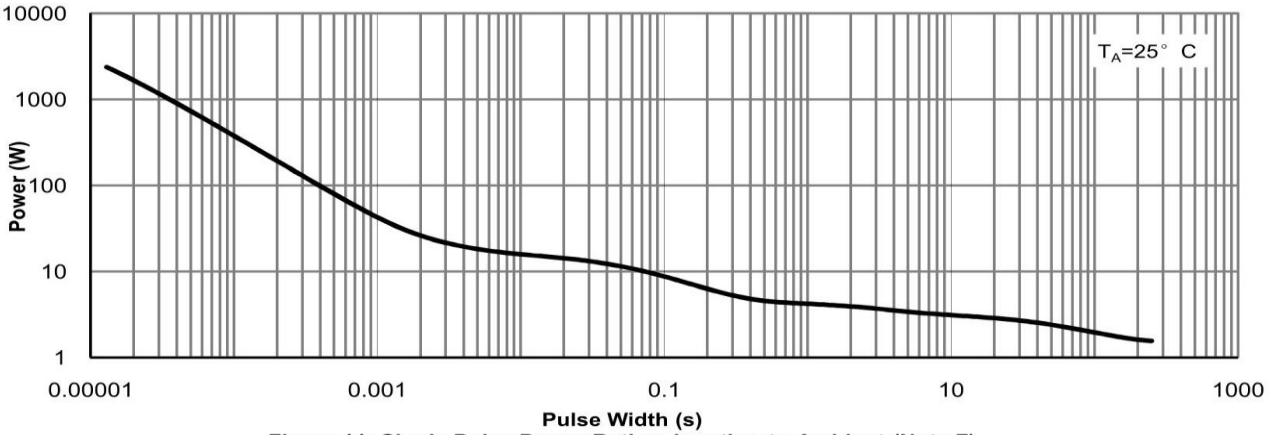


Figure 11: Single Pulse Power Rating Junction-to-Ambient (Note F)

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=-7A		30.0	30.0	mΩ
		VGS=-4.5V, ID=-7A		33.0	42.9	
g_{FS}	Forward Transconductance	VDS=-5V, ID=-7A		42		S
V_{SD}	Diode Forward Voltage	IS=-1A,VGS=0V		-0.72	-1	V
I_S	Maximum Body-Diode Continuous Current				-7	A

DYNAMIC PARAMETERS

Symbol	Parameter	Conditions	Min	Typ	Max	Units
C_{iss}	Input Capacitance	VGS=0V, VDS=-15V, f=1MHz		1040	1268	pF
C_{oss}	Output Capacitance			180	221	pF
C_{rss}	Reverse Transfer Capacitance			125	148	pF
R_g	Gate resistance	VGS=0V, VDS=0V, f=1MHz			2.3	Ω

SWITCHING PARAMETERS

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Q_g (10V)	Total Gate Charge	VGS=-10V, VDS=-15V, ID=-7A		9.6		nC
Q_g 4.5V)	Total Gate Charge			4.8		
Q_{gs}	Gate Source Charge			3.22		
Q_{gd}	Gate Drain Charge			4.6		
$t_{D(on)}$	Turn-On DelayTime	VGS=-10V, VDS=-15V,RL=0.75Ω, RGEN=3Ω		5.75		ns
t_r	Turn-On Rise Time			4.6		
$t_{D(off)}$	Turn-Off DelayTime			16.1		
t_f	Turn-Off Fall Time			5.175		
t_{rr}	Body Diode Reverse Recovery Time	I_F=-8A, dI/dt=500A/μs		11.5		ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=18A, dI/dt=500A/μs		25		nC

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

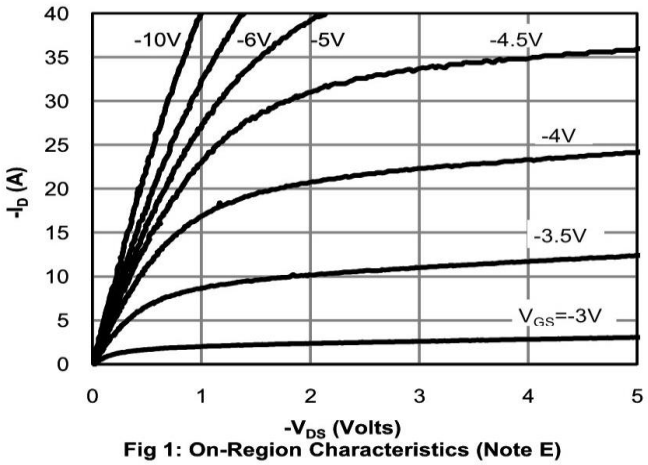


Fig 1: On-Region Characteristics (Note E)

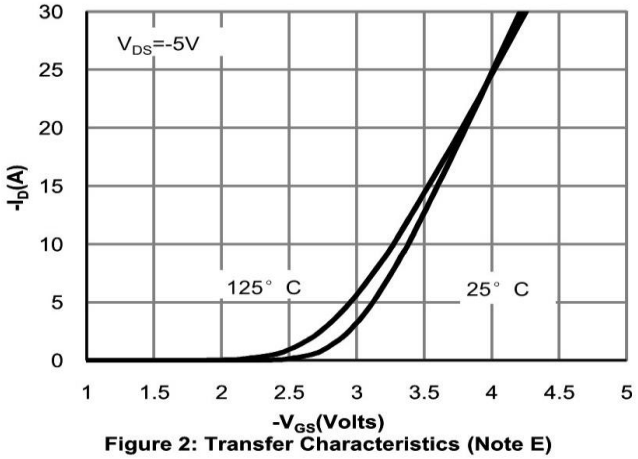


Figure 2: Transfer Characteristics (Note E)

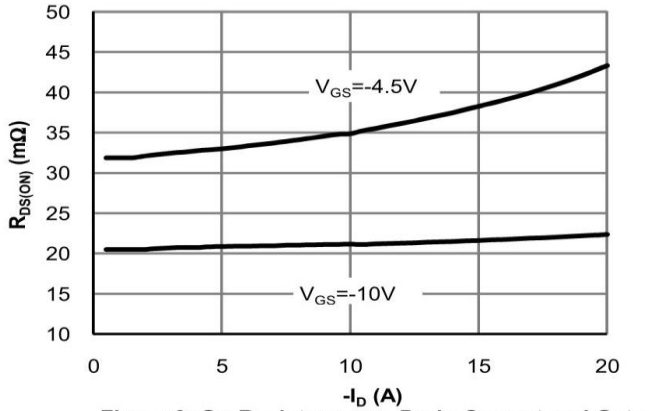


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

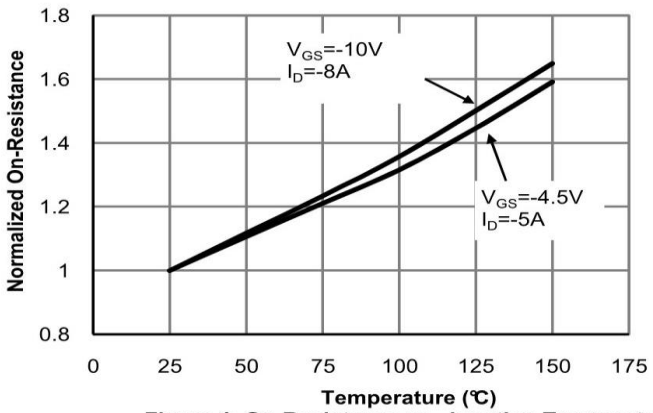


Figure 4: On-Resistance vs. Junction Temperature (Note E)

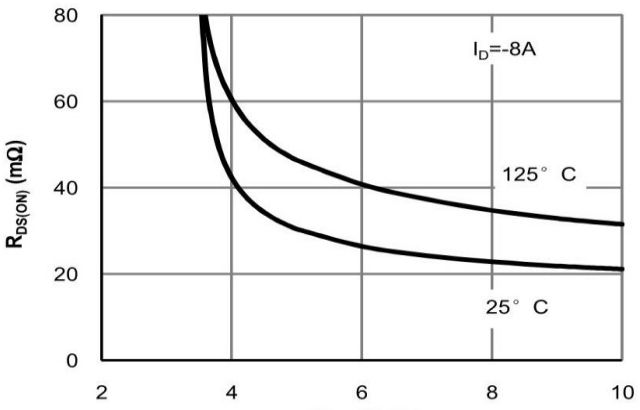


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

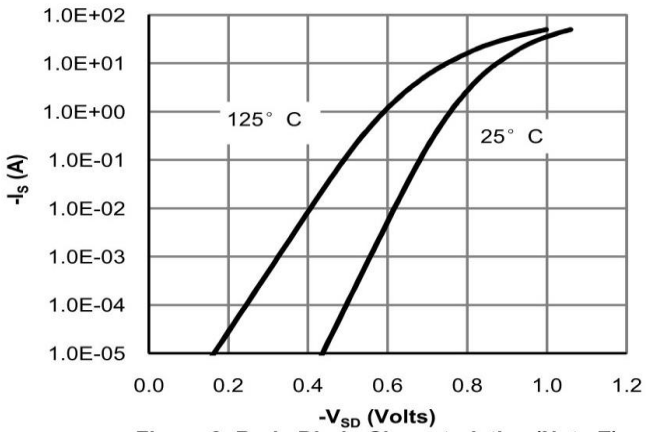


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

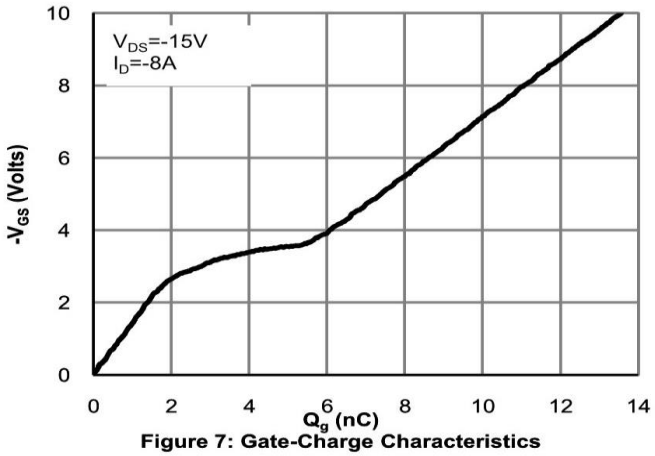


Figure 7: Gate-Charge Characteristics

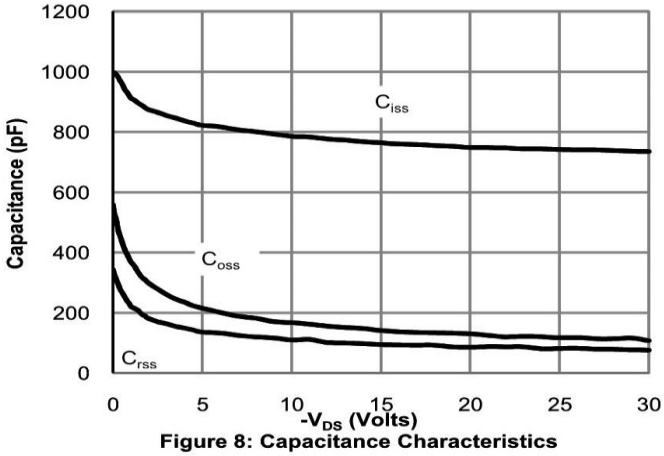


Figure 8: Capacitance Characteristics

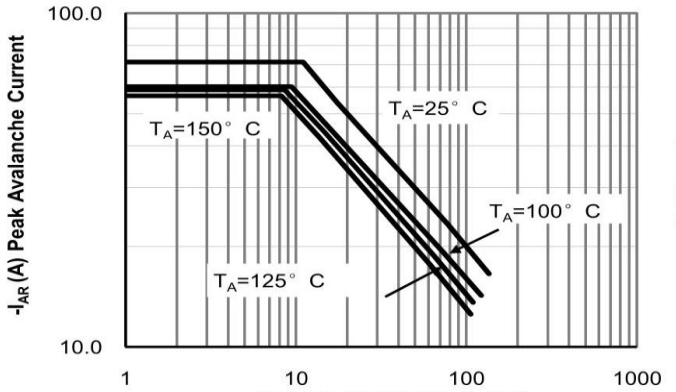
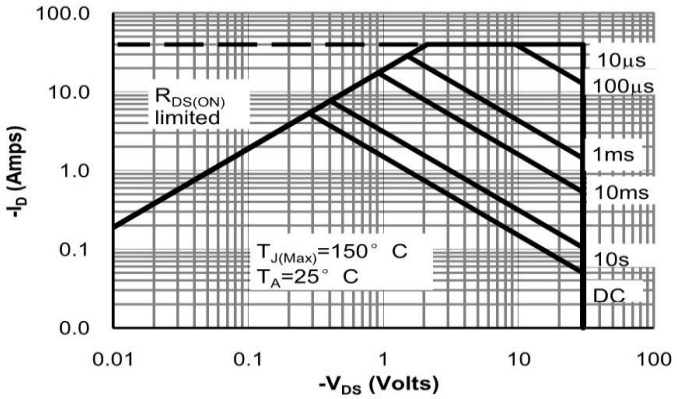


Figure 9: Single Pulse Avalanche capability (Note C)



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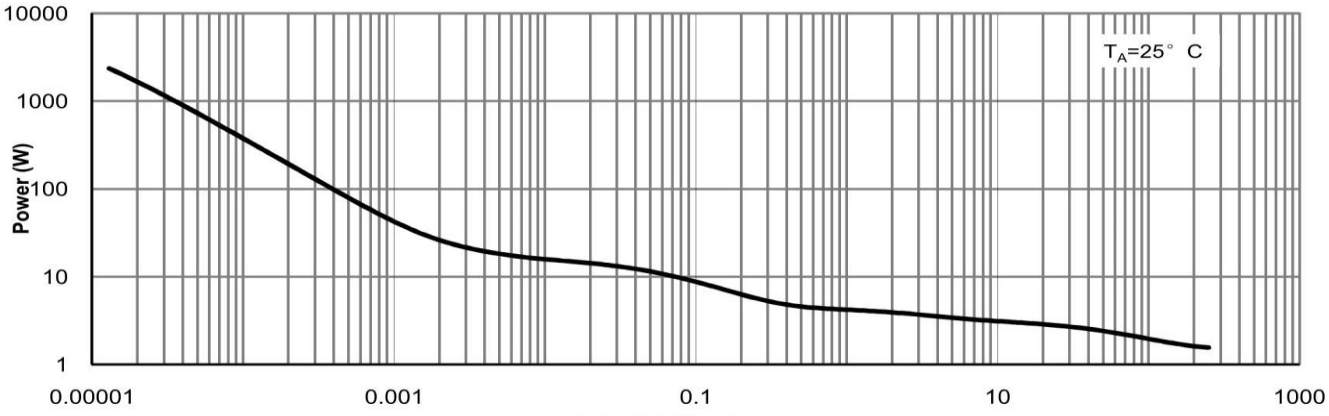

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