

RoHS Compliant Product
A suffix of "-C" specifies halogen & lead-free

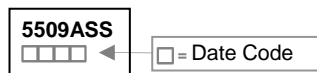
DESCRIPTION

The SSG5509A uses advanced trench technology to provide excellent on-resistance extremely efficient and cost-effectiveness device. The SOP-8 package is universally preferred for all commercial-industrial surface mount applications and suited for low voltage applications such as DC/DC converters.

FEATURES

- Lower Gate Charge
- RoHS Compliant

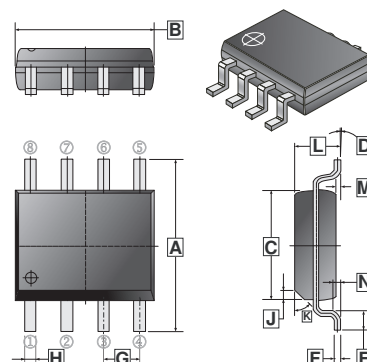
MARKING CODE



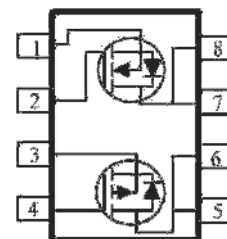
PACKAGE INFORMATION

Package	MPQ	Leader Size
SOP-8	3K	13 inch

SOP-8



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	5.80	6.20	H	0.35	0.49
B	4.80	5.00	J	0.375 REF.	
C	3.80	4.00	K	45°	
D	0°	8°	L	1.35	1.75
E	0.40	0.90	M	0.10	0.25
F	0.19	0.25	N	0.25 REF.	
G	1.27 TYP.				



MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Ratings		Unit	
		N-Ch	P-Ch		
Drain-Source Voltage	V_{DS}	30	-30	V	
Gate-Source Voltage	V_{GS}	± 12	± 12	V	
Continuous Drain Current ³	I_D	$T_A=25^\circ\text{C}$	6.1	-4.8	A
		$T_A=70^\circ\text{C}$	4.9	-3.8	A
Pulsed Drain Current ¹	I_{DM}	30	-30	A	
Total Power Dissipation	P_D	2		W	
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55~150		$^\circ\text{C}$	
Linear Derating Factor		0.016		W / $^\circ\text{C}$	
Thermal Resistance Ratings					
Maximum Thermal Resistance Junction-ambient ³	$R_{\theta JA}$	62.5		$^\circ\text{C} / \text{W}$	

N-CHANNEL ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Drain-Source Breakdown Voltage	BV_{DSS}	30	-	-	V	$V_{GS}=0, I_D=250\mu\text{A}$
Gate Threshold Voltage	$V_{GS(th)}$	0.5	-	1.2	V	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$
Forward Transconductance	g_{fs}	-	15	-	S	$V_{DS}=5\text{V}, I_D=5\text{A}$
Gate-Source Leakage Current	I_{GSS}	-	-	± 100	nA	$V_{GS} = \pm 12\text{V}$
Drain-Source Leakage Current($T_J = 25^\circ\text{C}$)	I_{DSS}	-	-	1	μA	$V_{DS}=24\text{V}, V_{GS}=0$
Drain-Source Leakage Current($T_J = 70^\circ\text{C}$)		-	-	25	μA	$V_{DS}=24\text{V}, V_{GS}=0$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	-	-	30	m Ω	$V_{GS}=10\text{V}, I_D=5.8\text{A}$
		-	-	35		$V_{GS}=4.5\text{V}, I_D=5\text{A}$
		-	-	55		$V_{GS}=2.5\text{V}, I_D=4\text{A}$
Total Gate Charge ²	Q_g	-	9.7	-	nC	$I_D=5.8\text{A}$ $V_{DS}=15\text{V}$ $V_{GS}=4.5\text{V}$
Gate-Source Charge	Q_{gs}	-	1.6	-		
Gate-Drain ("Miller") Charge	Q_{gd}	-	3.1	-		
Turn-on Delay Time ²	$T_{d(on)}$	-	3.3	-	nS	$V_{DS}=15\text{V}$ $V_{GS}=10\text{V}$ $R_G=3\Omega$ $R_L=2.7\Omega$
Rise Time	T_r	-	4.8	-		
Turn-off Delay Time	$T_{d(off)}$	-	26.3	-		
Fall Time	T_f	-	4.1	-		
Input Capacitance	C_{iss}	-	823	-	pF	$V_{GS}=0$ $V_{DS}=15\text{V}$ $f=1.0\text{MHz}$
Output Capacitance	C_{oss}	-	99	-		
Reverse Transfer Capacitance	C_{rss}	-	77	-		
Source -Drain Diode						
Forward On Voltage ²	V_{SD}	-	-	1.0	V	$I_S=1\text{A}, V_{GS}=0$
Reverse Recovery Time ²	T_{rr}	-	16	-	nS	$I_S=5\text{A}, V_{GS}=0,$ $di/dt = 100\text{A}/\mu\text{s}$
Reverse Recovery Charge	Q_{rr}	-	8.9	-	nC	
Continuous Source Current (Body Diode)	I_S	-	-	2.5	A	$V_D=V_G=0, V_S=1.0\text{V}$

Notes:

1. Pulse width limited by Max. junction temperature.
2. Pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
3. Surface mounted on 1 in² copper pad of FR4 board; 135 °C/W when mounted on Min. copper pad.

P-CHANNEL ELECTRICAL CHARACTERISTICS ($T_J=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Drain-Source Breakdown Voltage	BV_{DSS}	-30	-	-	V	$V_{GS}=0, I_D = -250\mu\text{A}$
Gate Threshold Voltage	$V_{GS(th)}$	-0.5	-	-1.2	V	$V_{DS}=V_{GS}, I_D = -250\mu\text{A}$
Forward Transconductance	g_{fs}	-	11	-	S	$V_{DS} = -5\text{V}, I_D = -5\text{A}$
Gate-Source Leakage Current	I_{GSS}	-	-	± 100	nA	$V_{GS} = \pm 12\text{V}$
Drain-Source Leakage Current($T_J = 25^\circ\text{C}$)	I_{DSS}	-	-	-1	μA	$V_{DS} = -24\text{V}, V_{GS} = 0$
Drain-Source Leakage Current($T_J = 70^\circ\text{C}$)		-	-	-25	μA	$V_{DS} = -24\text{V}, V_{GS} = 0$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	-	-	55	m Ω	$V_{GS} = -10\text{V}, I_D = -4.2\text{A}$
		-	-	70		$V_{GS} = -4.5\text{V}, I_D = -4\text{A}$
		-	-	120		$V_{GS} = -2.5\text{V}, I_D = -1\text{A}$
Total Gate Charge ²	Q_g	-	9.4	-	nC	$I_D = -4\text{A}$ $V_{DS} = -15\text{V}$ $V_{GS} = -4.5\text{V}$
Gate-Source Charge	Q_{gs}	-	2	-		
Gate-Drain ("Miller") Charge	Q_{gd}	-	3	-		
Turn-on Delay Time ²	$T_{d(on)}$	-	6.3	-	nS	$V_{DS} = -15\text{V}$ $V_{GS} = -10\text{V}$ $R_G = 6\Omega$ $R_L = 3.6\Omega$
Rise Time	T_r	-	3.2	-		
Turn-off Delay Time	$T_{d(off)}$	-	38.2	-		
Fall Time	T_f	-	12	-		
Input Capacitance	C_{iss}	-	954	-	pF	$V_{GS} = 0$ $V_{DS} = -15\text{V}$ $f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	-	115	-		
Reverse Transfer Capacitance	C_{rss}	-	77	-		
Source -Drain Diode						
Forward On Voltage ²	V_{SD}	-	-	-1.0	V	$I_S = -1\text{A}, V_{GS} = 0$
Reverse Recovery Time ²	T_{rr}	-	20.2	-	nS	$I_S = -4\text{A}, V_{GS} = 0,$ $di/dt = 100\text{A}/\mu\text{s}$
Reverse Recovery Charge	Q_{rr}	-	11.2	-	nC	
Continuous Source Current (Body Diode)	I_S	-	-	-2.2	A	$V_D = V_G = 0, V_S = -1\text{V}$

Notes:

1. Pulse width limited by Max. junction temperature.
2. Pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
3. Surface mounted on 1 in² copper pad of FR4 board; 135 °C/W when mounted on Min. copper pad.

CHARACTERISTIC CURVE (N-Ch)

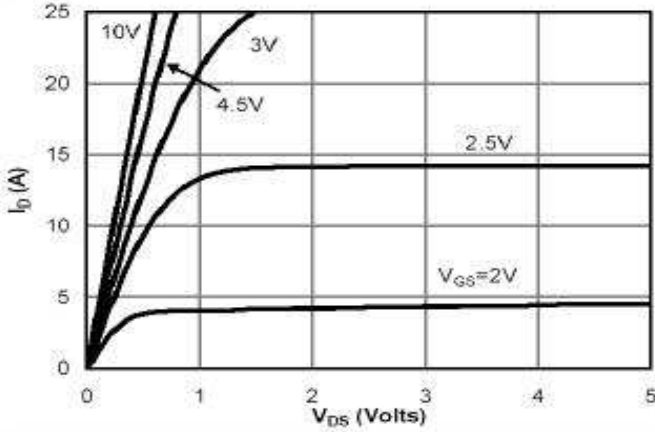


Fig 1. Typical Output Characteristics

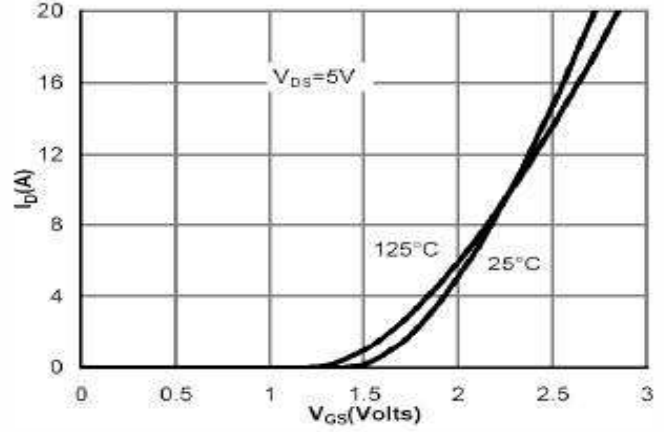


Fig 2. Transfer Characteristics

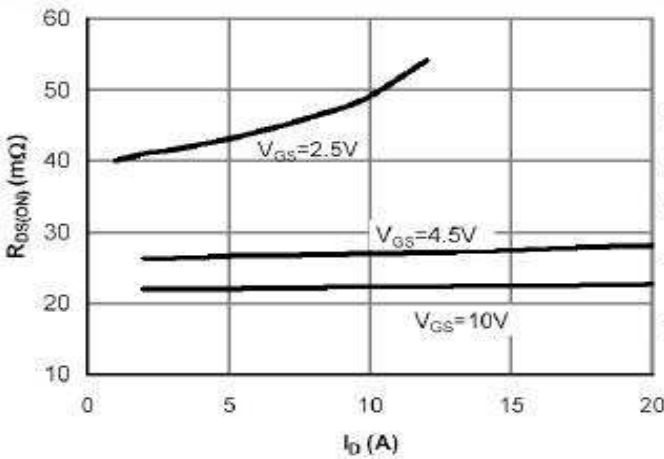


Fig 3. On-Resistance vs. Drain Current and Gate Voltage

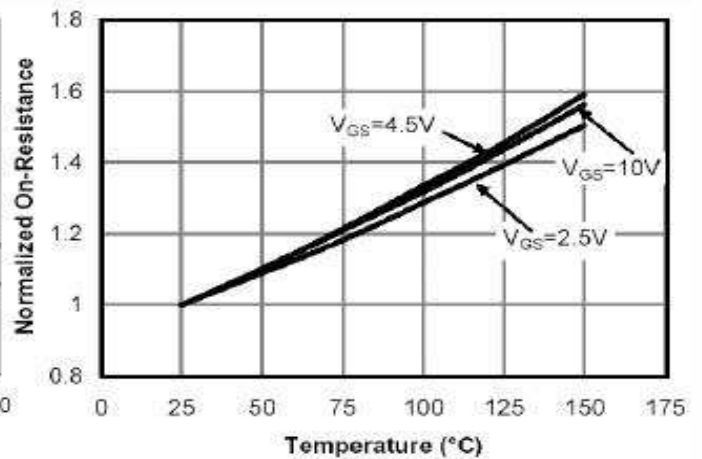


Fig 4. On-Resistance vs. Junction Temperature

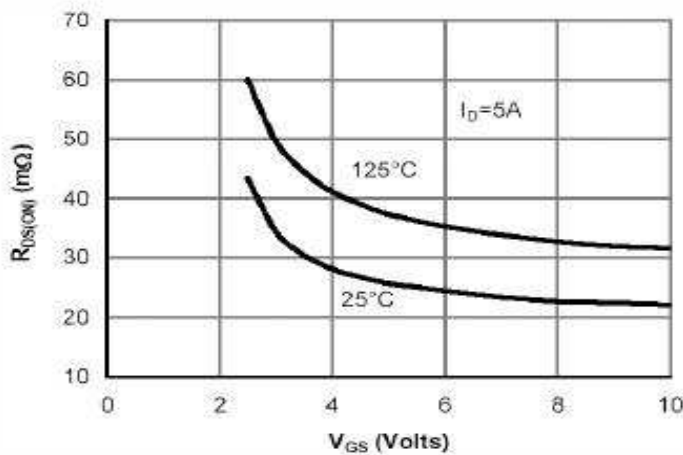


Fig 5. On-Resistance vs. Gate-Source Voltage

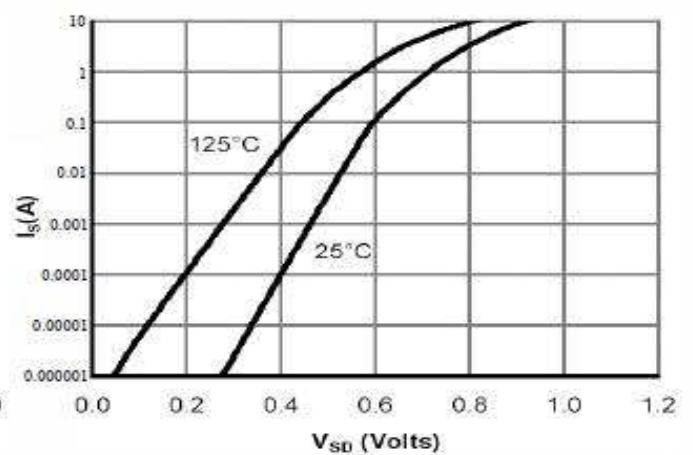


Fig 6. Body Diode Characteristics

CHARACTERISTIC CURVE (N-Ch)

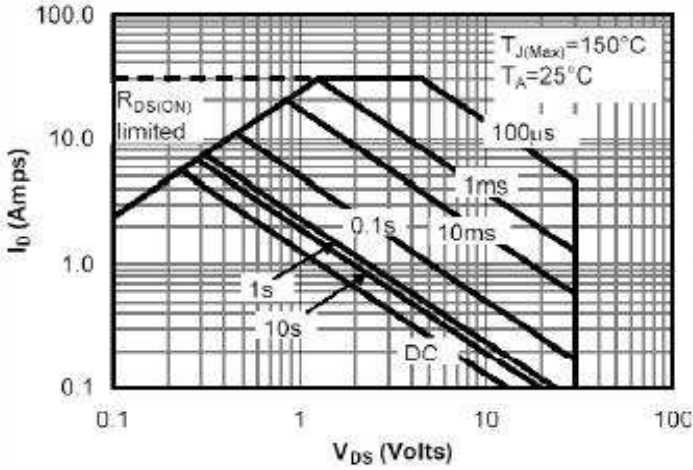


Fig 7. Maximum Safe Operating Area

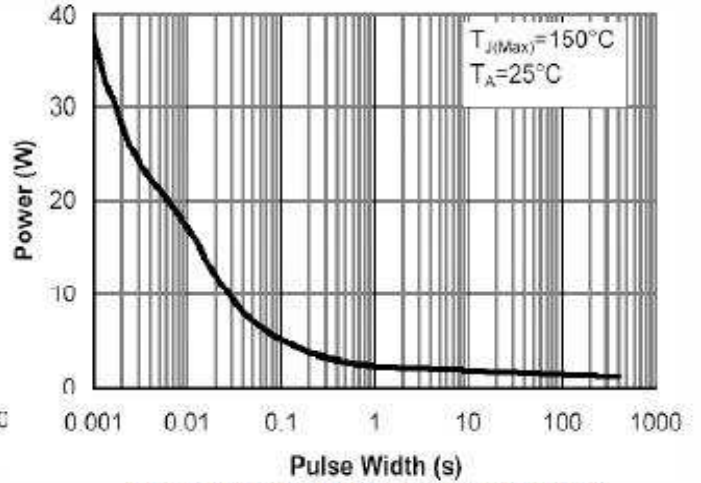


Fig 8. Single Pulse Power Rating Junction-to-Ambient

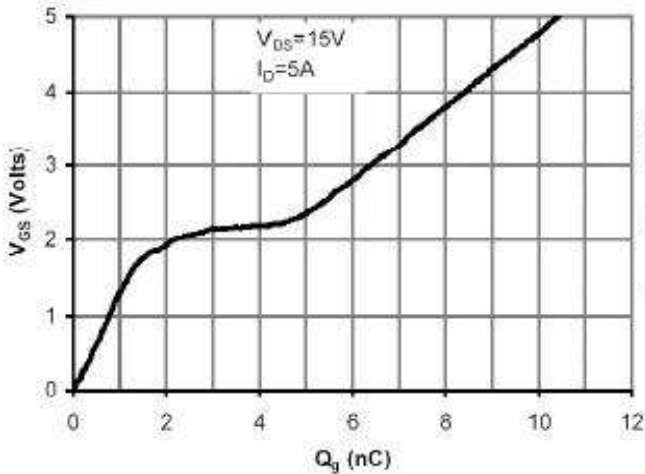


Fig 9. Gate Charge Characteristics

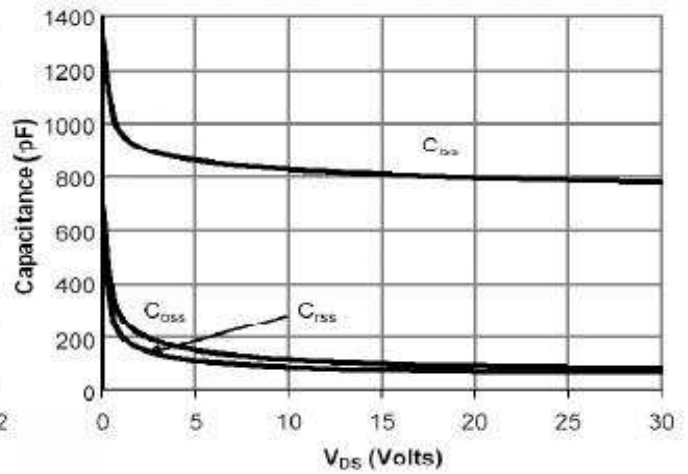


Fig 10. Typical Capacitance Characteristics

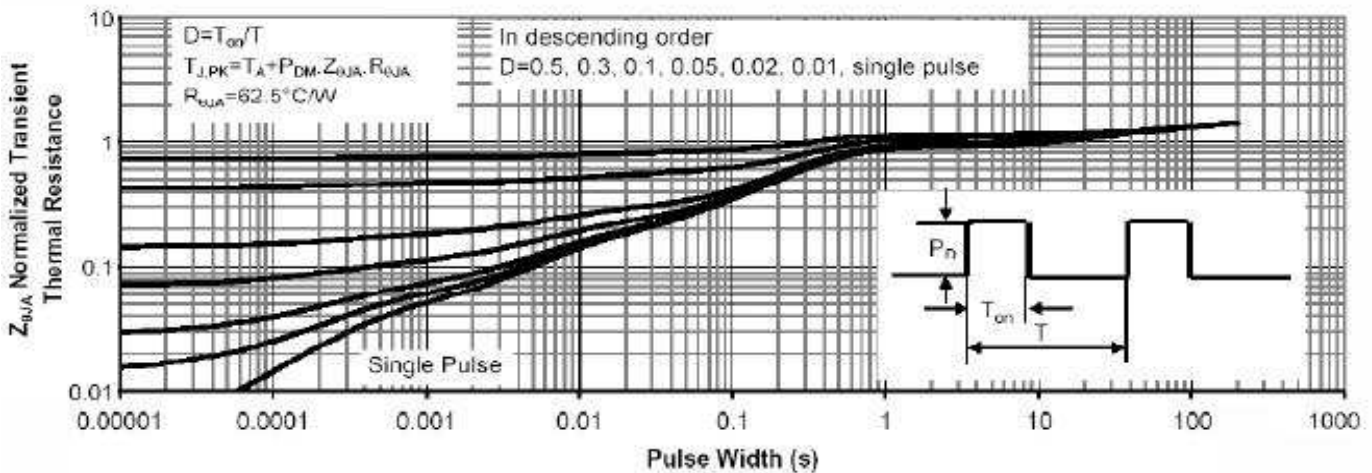


Fig 11. Normalized Maximum Transient Thermal Impedance

CHARACTERISTIC CURVE (P-Ch)

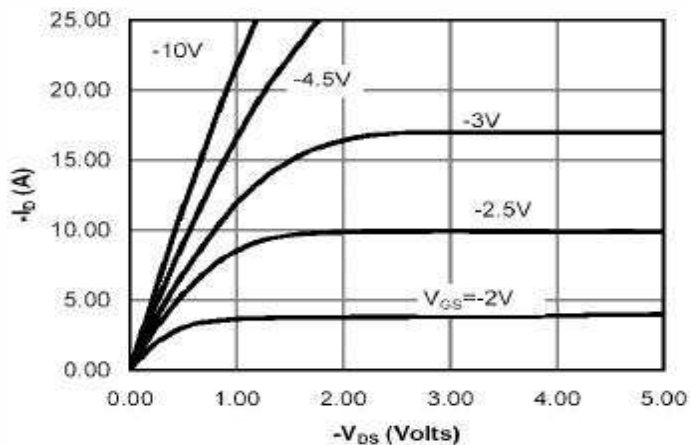


Fig 1. Typical Output Characteristics

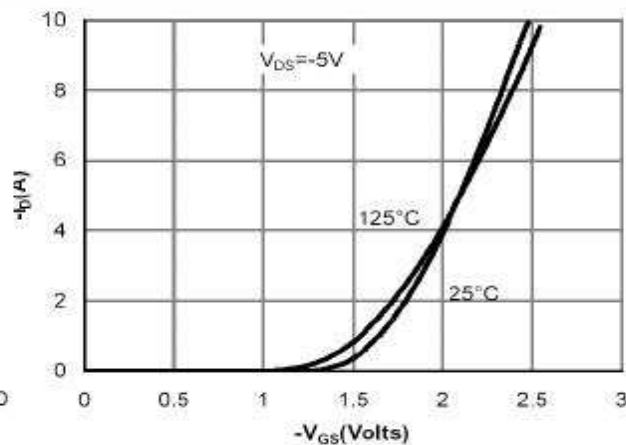


Fig 2. Transfer Characteristics

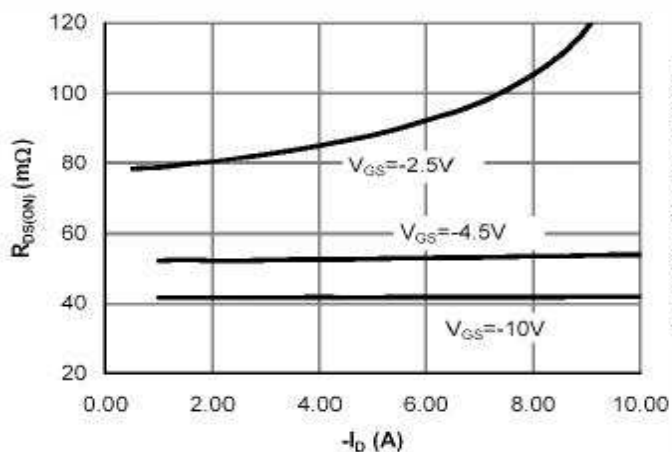


Fig 3. On-Resistance vs. Drain Current and Gate Voltage

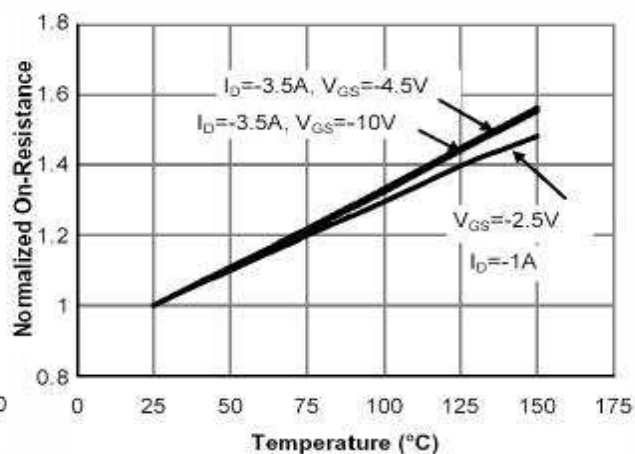


Fig 4. On-Resistance vs. Junction Temperature

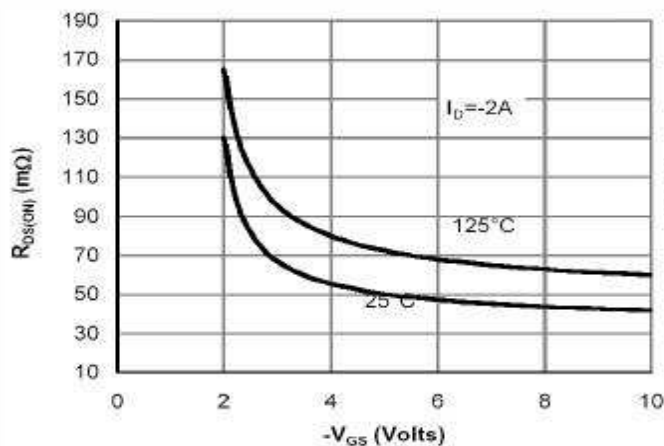


Fig 5. On-Resistance vs. Gate-Source Voltage

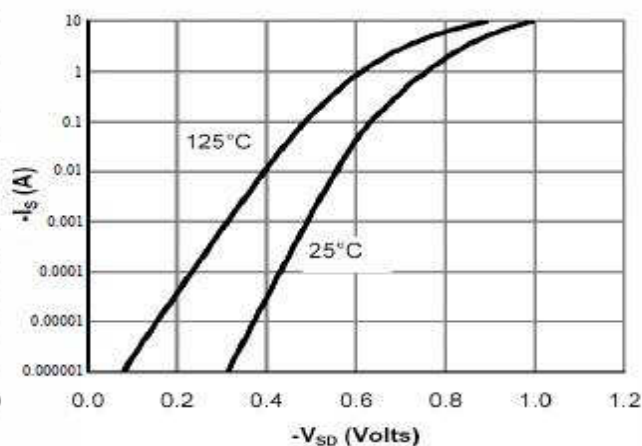


Fig 6. Body Diode Characteristics

CHARACTERISTIC CURVE (P-Ch)

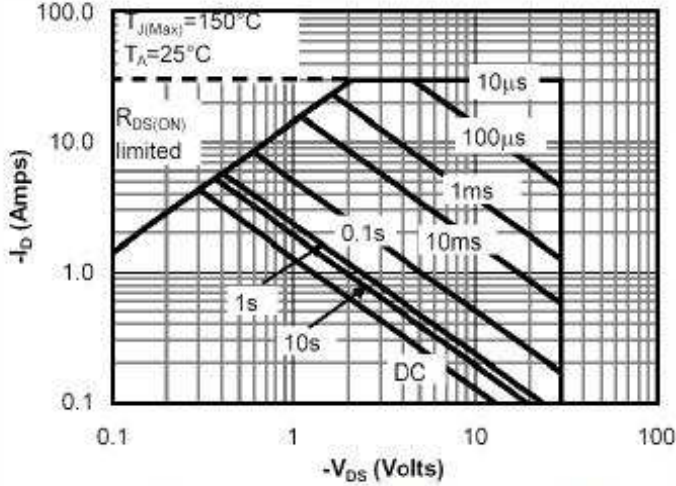


Fig 7. Maximum Safe Operating Area

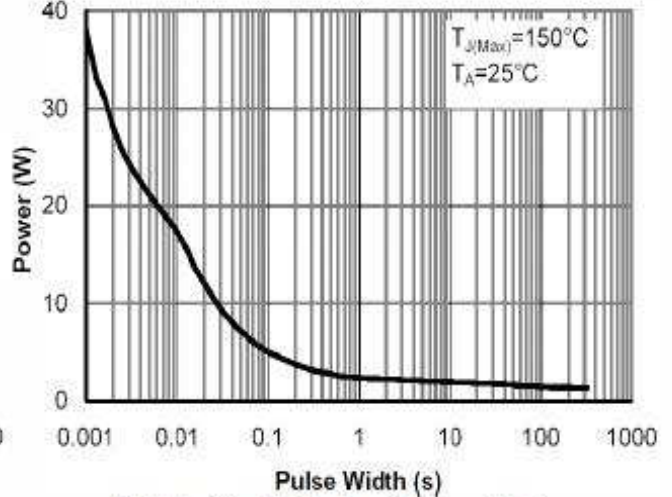


Fig 8. Single Pulse Power Rating Junction-to-Ambient

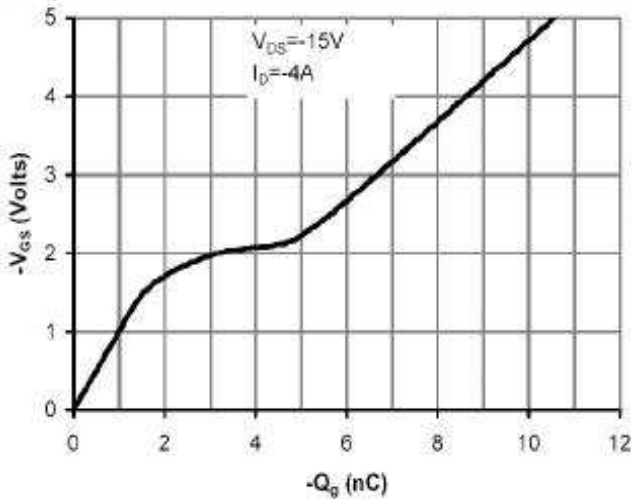


Fig 9. Gate Charge Characteristics

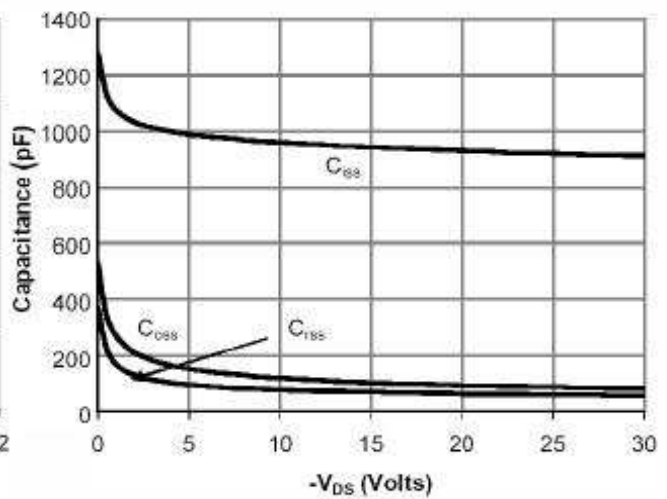


Fig 10. Typical Capacitance Characteristics

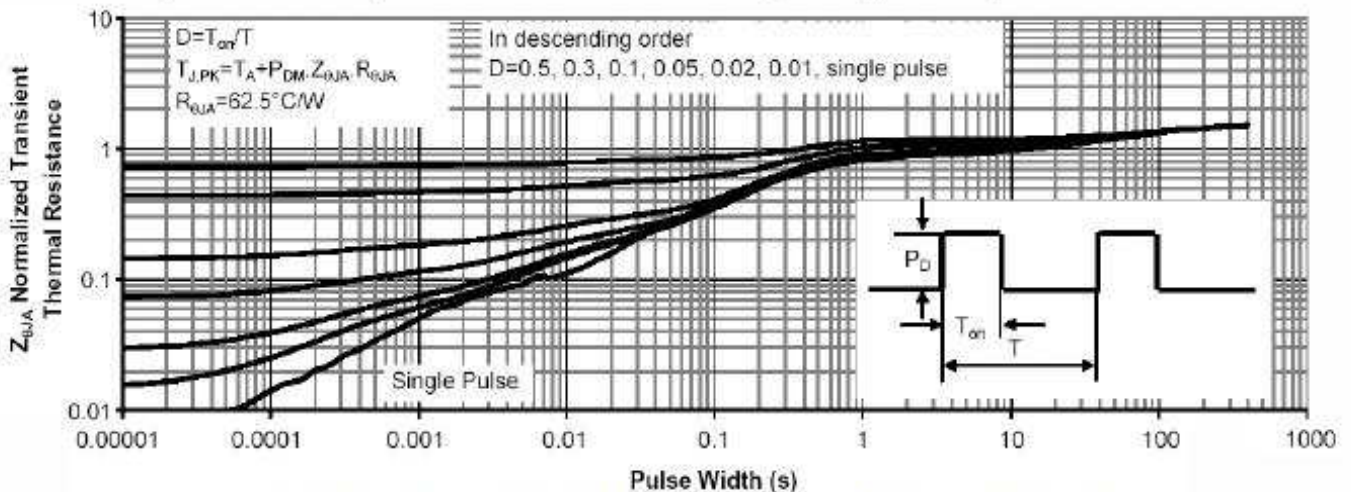


Fig 11. Normalized Maximum Transient Thermal Impedance