

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

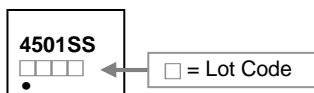
## DESCRIPTION

The SSG4501-C provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness. The SOP-8 package is universally preferred for all commercial industrial surface mount application and suited for low voltage applications such as DC/DC converters.

## FEATURES

- Simple Drive Requirement
- Lower On-resistance
- Fast Switching Performance

## MARKING



## PACKAGE INFORMATION

Package	MPQ	Leader Size
SOP-8	2.5K	13 inch

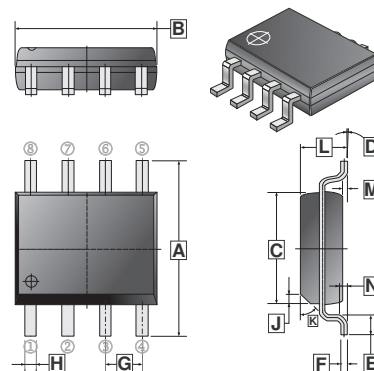
## ORDER INFORMATION

Part Number	Type
SSG4501-C	Lead (Pb)-free and Halogen-free

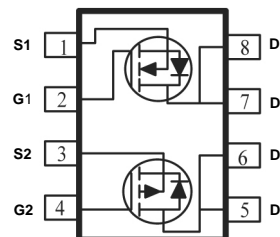
## ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Ratings		Unit	
		N-Ch	P-Ch		
Drain-Source Voltage	V <sub>DS</sub>	30	-30	V	
Gate-Source Voltage	V <sub>GS</sub>	±20	±20	V	
Continuous Drain Current <sup>3</sup>	I <sub>D</sub>	T <sub>A</sub> =25°C	7	-5.3	A
		T <sub>A</sub> =100°C	5.8	-4.7	A
Pulsed Drain Current <sup>1</sup>	I <sub>DM</sub>	20	-20	A	
Total Power Dissipation	P <sub>D</sub>	2		W	
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55~150		°C	
Thermal Data					
Thermal Resistance Junction-ambient <sup>3</sup> (Max.)	R <sub>θJA</sub>	62.5		°C / W	

## SOP-8



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	5.79	6.20	H	0.33	0.51
B	4.70	5.11	J	0.375 REF.	
C	3.80	4.00	K	45° REF.	
D	0°	8°	L	1.3	1.752
E	0.40	1.27	M	0	0.25
F	0.10	0.25	N	0.25 REF.	
G	1.27 TYP.				



**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	$V_{GS}=0, I_D=250\mu\text{A}$	
Breakdown Voltage Temp. Coefficient	$\Delta BV_{DS}/\Delta T_J$	-	0.02	-	V/ $^\circ\text{C}$	Reference to $25^\circ\text{C}$ , $I_D=1\text{mA}$	
Gate Threshold Voltage	$V_{GS(th)}$	1.0	-	3	V	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	
Forward Transfer conductance	$g_{fs}$	-	13	-	S	$V_{DS}=10\text{V}, I_D=7\text{A}$	
Gate-Source Leakage Current	$I_{GSS}$	-	-	$\pm 100$	nA	$V_{GS} = \pm 20\text{V}$	
Drain-Source Leakage Current	$I_{DSS}$	$T_J=25^\circ\text{C}$	-	-	1	uA	$V_{DS}=30\text{V}, V_{GS}=0$
		$T_J=75^\circ\text{C}$	-	-	25		$V_{DS}=24\text{V}, V_{GS}=0$
Static Drain-Source On-Resistance <sup>2</sup>	$R_{DS(ON)}$	-	-	28	m $\Omega$	$V_{GS}=10\text{V}, I_D=7\text{A}$	
		-	-	42		$V_{GS}=4.5\text{V}, I_D=5\text{A}$	
Total Gate Charge	$Q_g$	-	8.4	-	nC	$I_D=7\text{A}$ $V_{DS}=24\text{V}$ $V_{GS}=4.5\text{V}$	
Gate-Source Charge	$Q_{gs}$	-	2.1	-			
Gate-Drain ("Miller") Charge	$Q_{gd}$	-	4.7	-			
Turn-on Delay Time <sup>2</sup>	$T_{d(on)}$	-	6	-	nS	$V_{DD}=15\text{V}$ $V_{GS}=10\text{V}$ $I_D=1\text{A}$ $R_G=3.3\Omega$ $R_D=15\Omega$	
Rise Time	$T_r$	-	5.2	-			
Turn-off Delay Time	$T_{d(off)}$	-	18.8	-			
Fall Time	$T_f$	-	4.4	-			
Input Capacitance	$C_{iss}$	-	645	-	pF	$V_{GS}=0$ $V_{DS}=25\text{V}$ $f=1.0\text{MHz}$	
Output Capacitance	$C_{oss}$	-	150	-			
Reverse Transfer Capacitance	$C_{rss}$	-	95	-			
<b>Source-Drain Diode</b>							
Forward On Voltage <sup>2</sup>	$V_{SD}$	-	-	1.2	V	$I_S=7\text{A}, V_{GS}=0, T_J=25^\circ\text{C}$	
Continuous Source Current (Body Diode)	$I_S$	-	-	1.67	A	$V_D=V_G=0\text{V}, V_S=1.2\text{V}$	

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 inch<sup>2</sup> copper pad of FR4 board; 135  $^\circ\text{C}/\text{W}$  when mounted on min. copper pad.

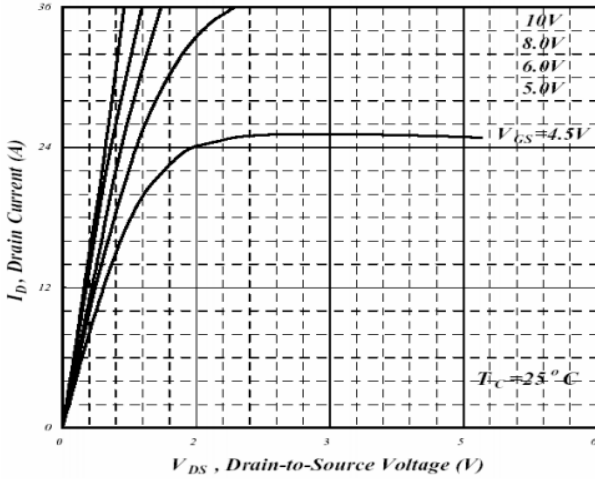
**P-CHANNEL ELECTRICAL CHARACTERISTICS** ( $T_J=25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions	
Drain-Source Breakdown Voltage	$BV_{DSS}$	-30	-	-	V	$V_{GS}=0, I_D = -250\mu\text{A}$	
Breakdown Voltage Temp. Coefficient	$\Delta BV_{DS}/\Delta T_J$	-	-0.028	-	V/ $^\circ\text{C}$	Reference to $25^\circ\text{C}$ , $I_D = -1\text{mA}$	
Gate Threshold Voltage	$V_{GS(th)}$	-1	-	-3	V	$V_{DS}=V_{GS}, I_D = -250\mu\text{A}$	
Forward Transfer conductance	$g_{fs}$	-	8.5	-	S	$V_{DS} = -10\text{V}, I_D = -5.3\text{A}$	
Gate-Source Leakage Current	$I_{GSS}$	-	-	$\pm 100$	nA	$V_{GS}=\pm 20\text{V}$	
Drain-Source Leakage Current	$I_{DSS}$	$T_J=25^\circ\text{C}$	-	-	-1	$\mu\text{A}$	$V_{DS} = -30\text{V}, V_{GS}=0$
		$T_J=75^\circ\text{C}$	-	-	-25		$V_{DS} = -24\text{V}, V_{GS}=0$
Static Drain-Source On-Resistance <sup>2</sup>	$R_{DS(ON)}$	-	-	50	m $\Omega$	$V_{GS} = -10\text{V}, I_D = -5.3\text{A}$	
		-	-	90		$V_{GS} = -4.5\text{V}, I_D = -4.2\text{A}$	
Total Gate Charge	$Q_g$	-	20	-	nC	$I_D = -5.3\text{A}$ $V_{DS} = -15\text{V}$ $V_{GS} = -10\text{V}$	
Gate-Source Charge	$Q_{gs}$	-	3.5	-			
Gate-Drain ("Miller") Charge	$Q_{gd}$	-	2	-			
Turn-on Delay Time	$T_{d(on)}$	-	12	-	nS	$V_{DS} = -15\text{V}$ $V_{GS} = -10\text{V}$ $I_D = -1\text{A}$ $R_G=6\Omega$ $R_D=15\Omega$	
Rise Time	$T_r$	-	20	-			
Turn-off Delay Time	$T_{d(off)}$	-	45	-			
Fall Time	$T_f$	-	27	-			
Input Capacitance	$C_{iss}$	-	790	-	pF	$V_{GS}=0$ $V_{DS} = -15\text{V}$ $f=1.0\text{MHz}$	
Output Capacitance	$C_{oss}$	-	440	-			
Reverse Transfer Capacitance	$C_{rss}$	-	120	-			
<b>Source-Drain Diode</b>							
Forward On Voltage <sup>2</sup>	$V_{SD}$	-	-	-1.2	V	$I_S = -2.6\text{A}, V_{GS}=0\text{V}, T_J=25^\circ\text{C}$	
Continuous Source Current (Body Diode)	$I_S$	-	-	-1.67	A	$V_D=V_G=0\text{V}, V_S = -1.2\text{V}$	

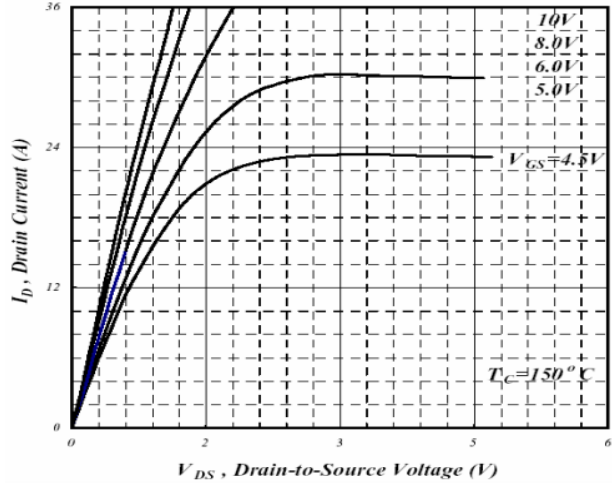
Notes:

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2. Pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$
3. Surface mounted on 1 inch<sup>2</sup> copper pad of FR4 board; 135  $^\circ\text{C}/\text{W}$  when mounted on min. copper pad.

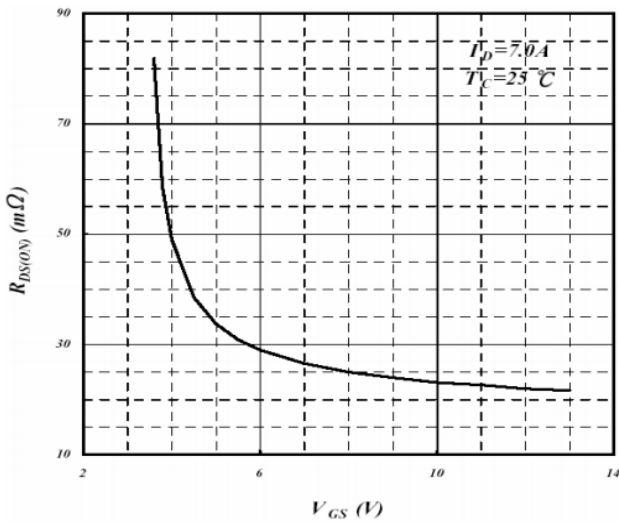
**CHARACTERISTIC CURVE (N-Ch)**



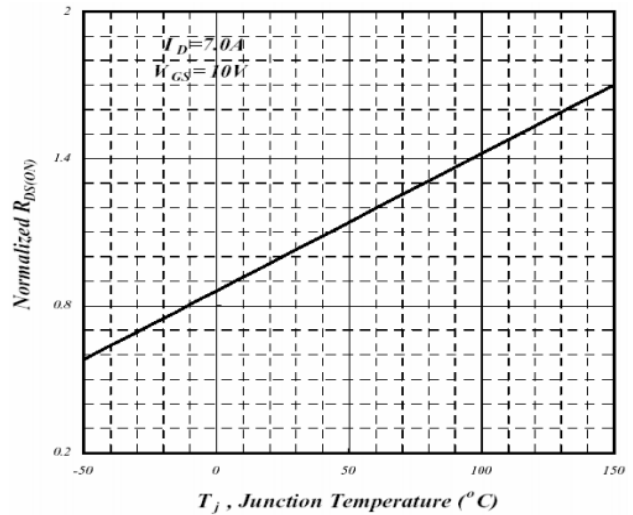
**Fig 1. Typical Output Characteristics**



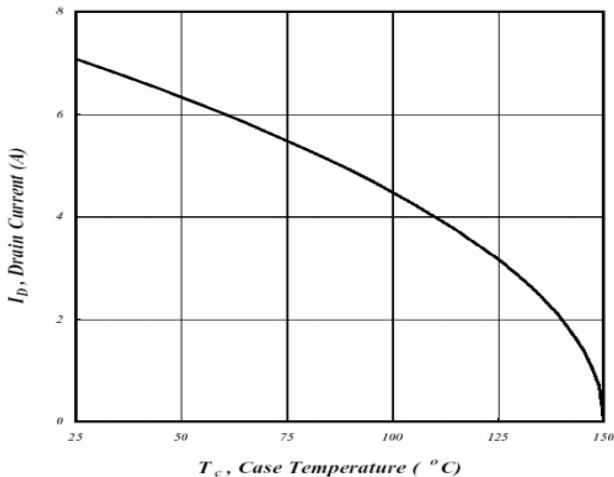
**Fig 2. Typical Output Characteristics**



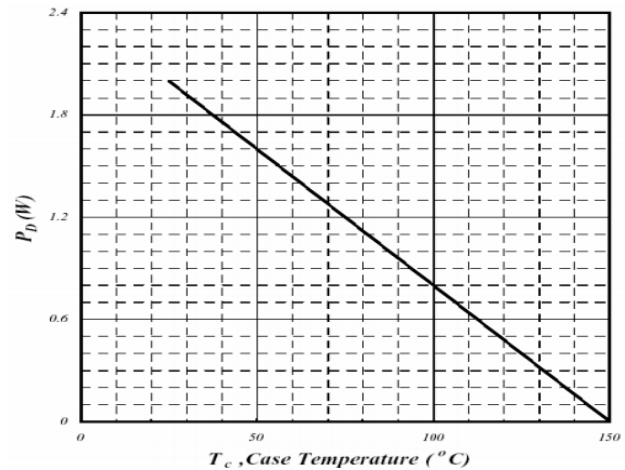
**Fig 3. On-Resistance v.s. Gate Voltage**



**Fig 4. Normalized On-Resistance v.s. Junction Temperature**

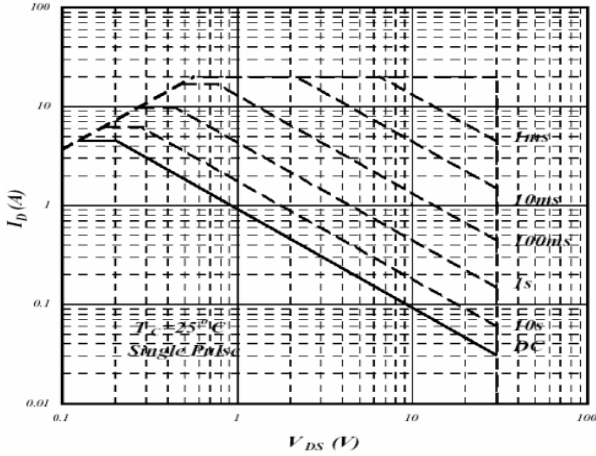


**Fig 5. Maximum Drain Current v.s. Case Temperature**

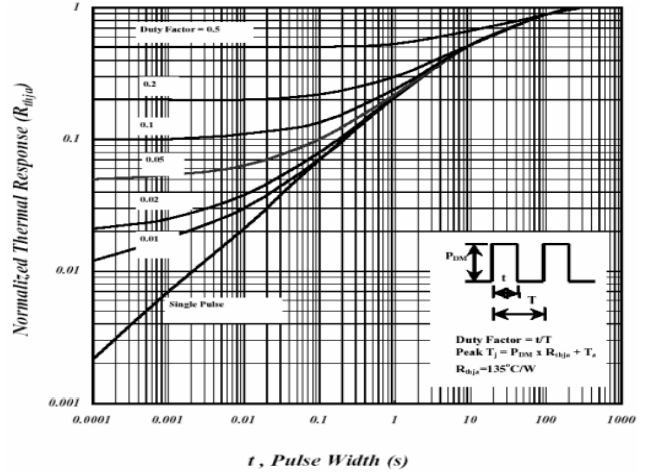


**Fig 6. Type Power Dissipation**

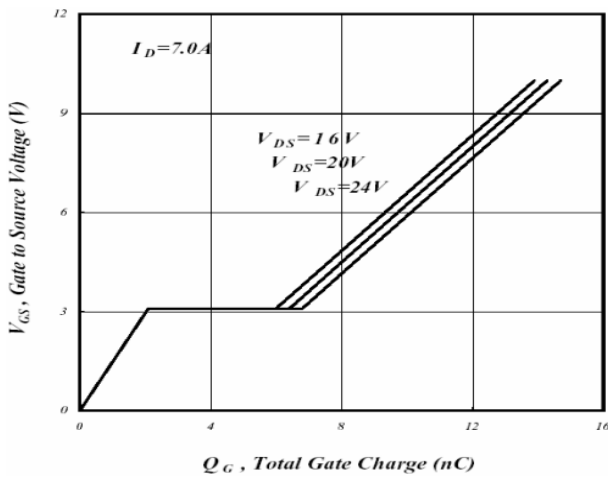
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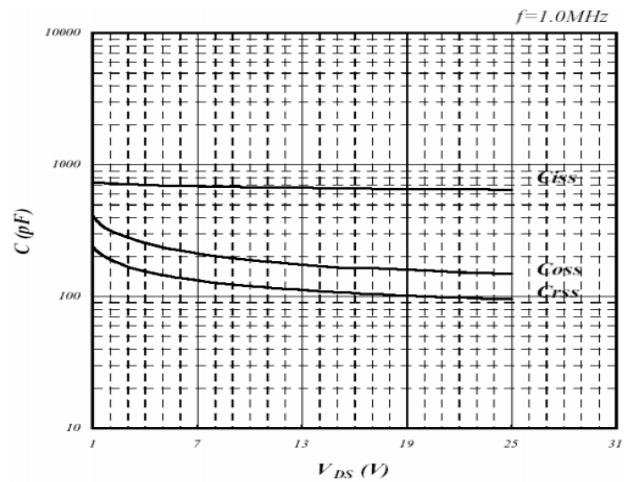
**Fig 7. Maximum Safe Operating Area**



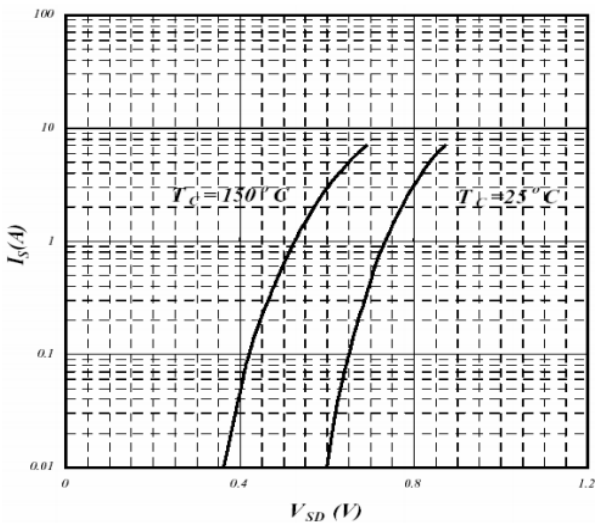
**Fig 8. Effective Transient Thermal Impedance**



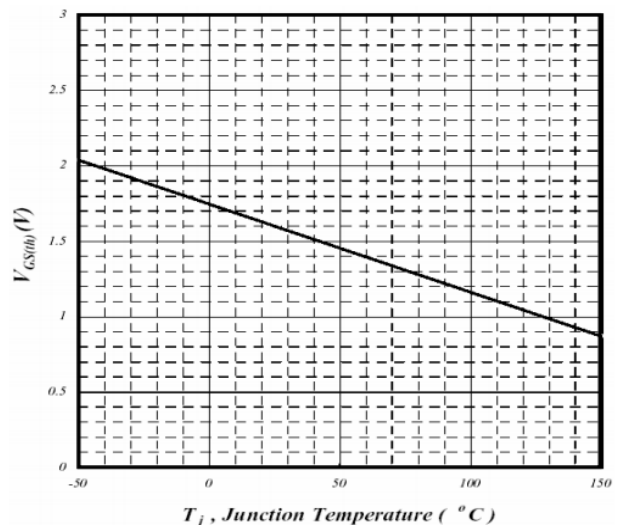
**Fig 9. Gate Charge Characteristics**



**Fig 10. Typical Capacitance Characteristics**

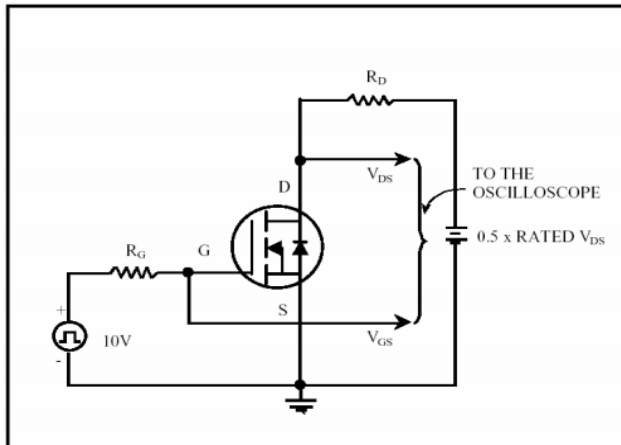


**Fig 11. Forward Characteristics of Reverse Diode**

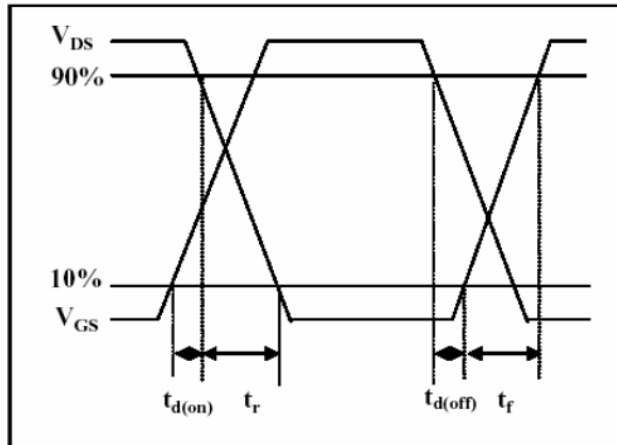


**Fig 12. Gate Threshold Voltage v.s. Junction Temperature**

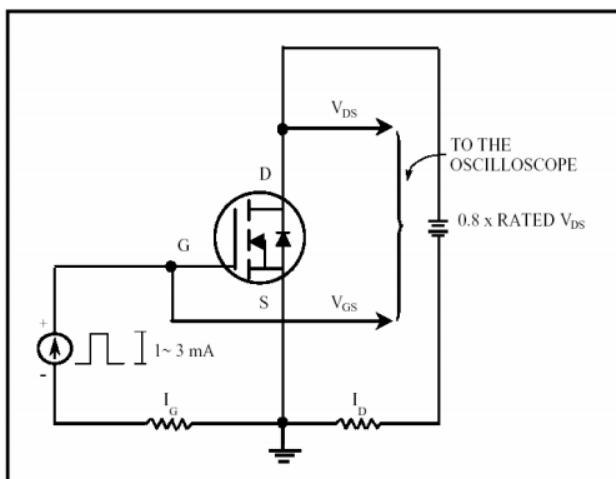
**CHARACTERISTIC CURVE (N-Ch)**



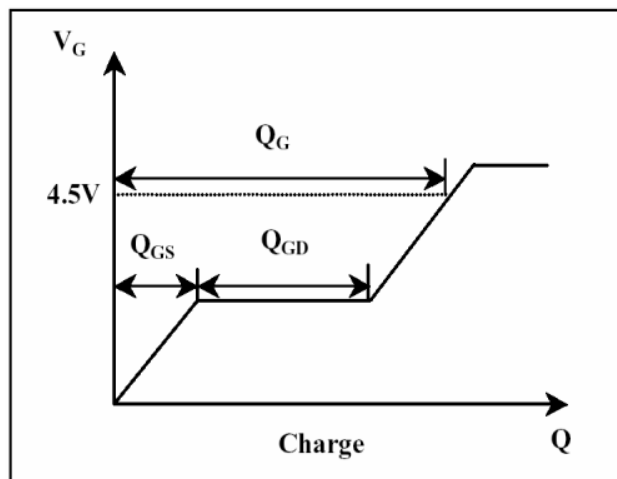
**Fig 13. Switching Time Circuit**



**Fig 14. Switching Time Waveform**



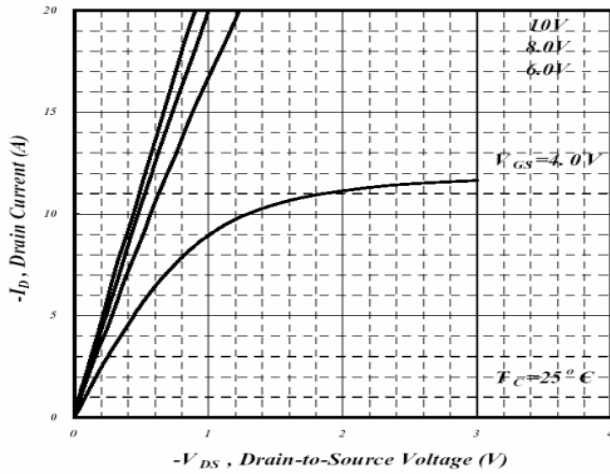
**Fig 15. Gate Charge Circuit**



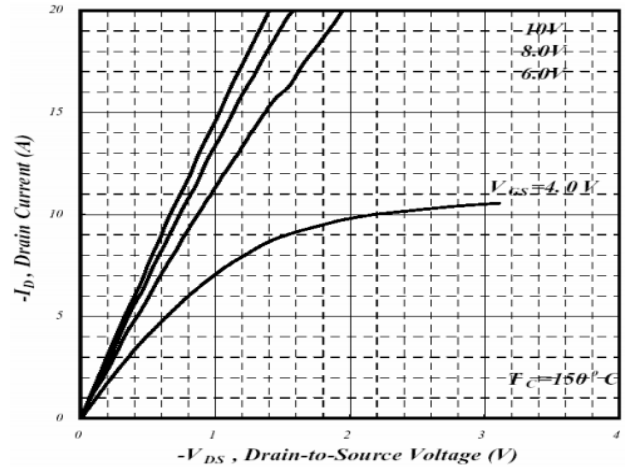
**Fig 16. Gate Charge Waveform**



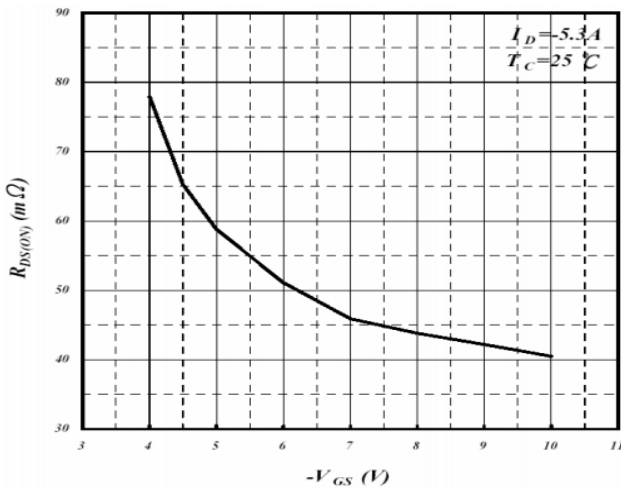
**CHARACTERISTIC CURVE (P-Ch)**



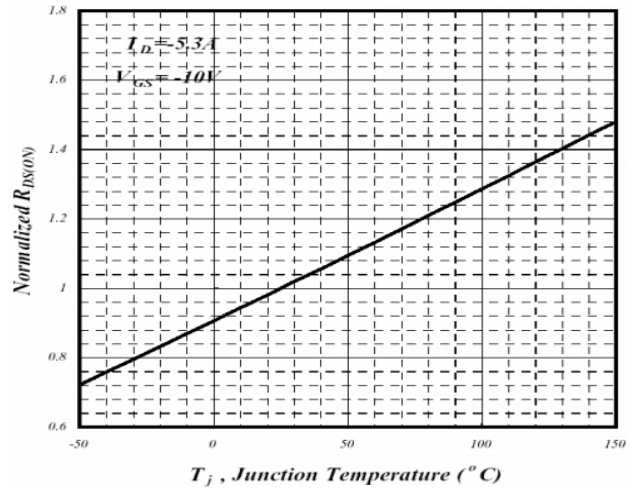
**Fig 1. Typical Output Characteristics**



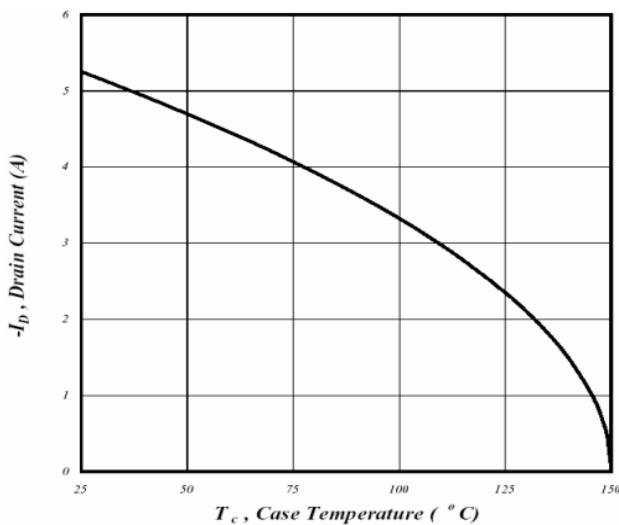
**Fig 2. Typical Output Characteristics**



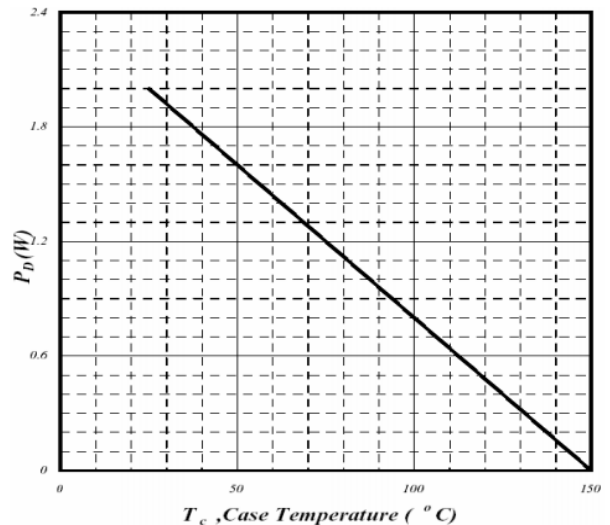
**Fig 3. On-Resistance v.s. Gate Voltage**



**Fig 4. Normalized On-Resistance v.s. Junction Temperature**

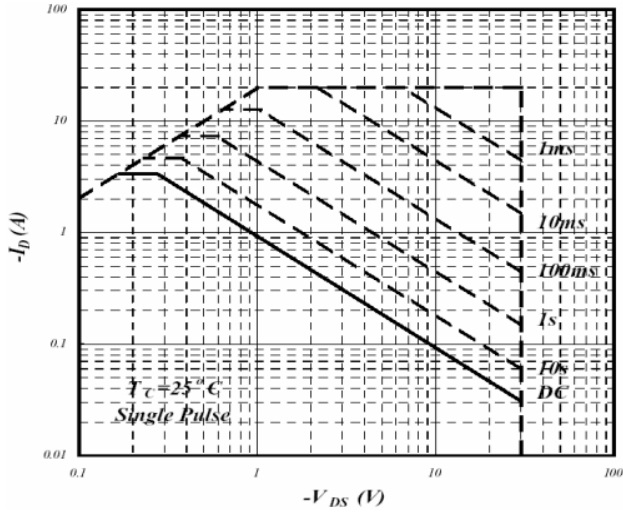


**Fig 5. Maximum Drain Current v.s. Case Temperature**

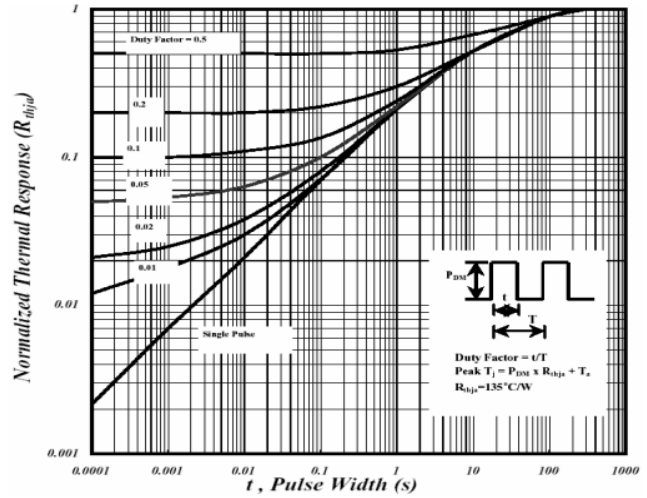


**Fig 6. Type Power Dissipation**

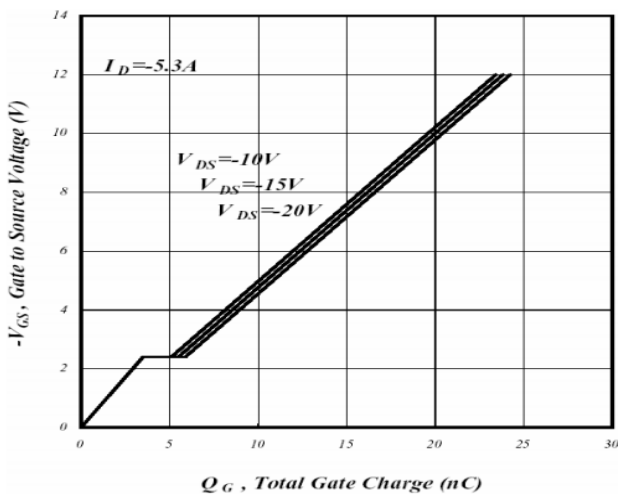
**CHARACTERISTIC CURVE (P-Ch)**



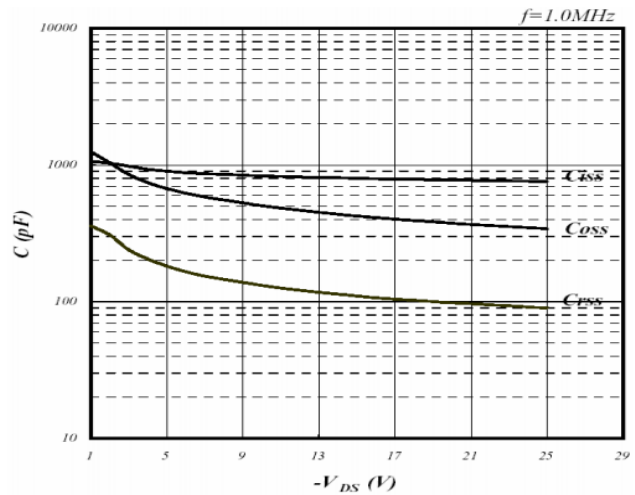
**Fig 7. Maximum Safe Operating Area**



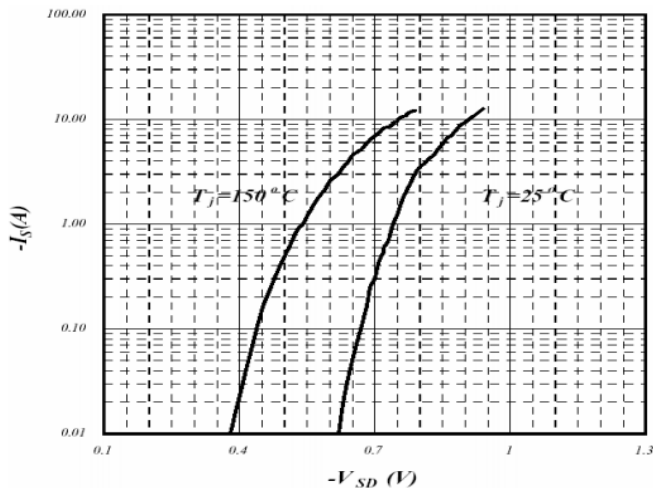
**Fig 8. Effective Transient Thermal Impedance**



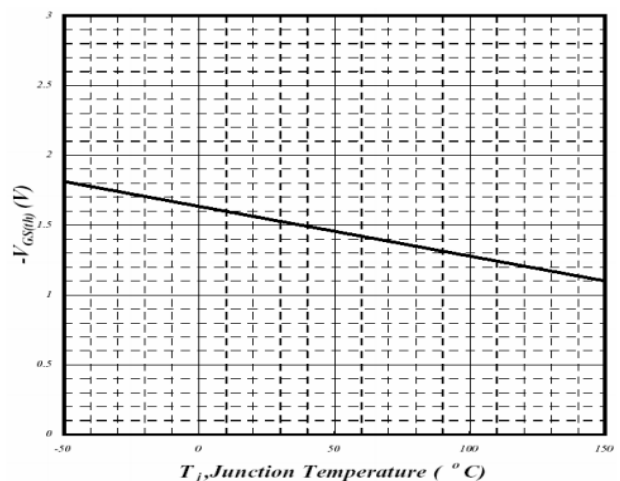
**Fig 9. Gate Charge Characteristics**



**Fig 10. Typical Capacitance Characteristics**



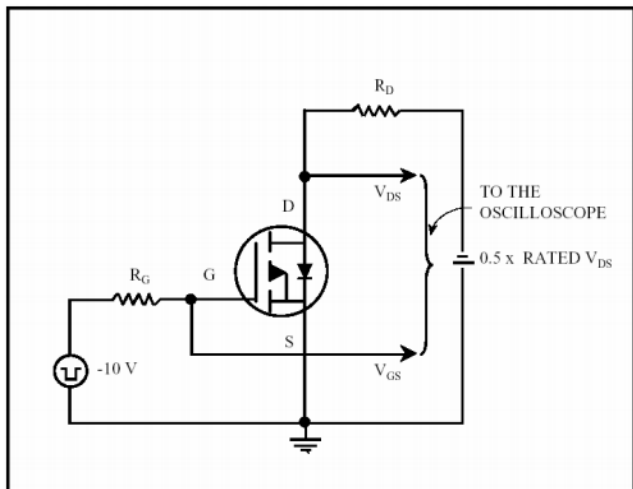
**Fig 11. Forward Characteristics of Reverse Diode**



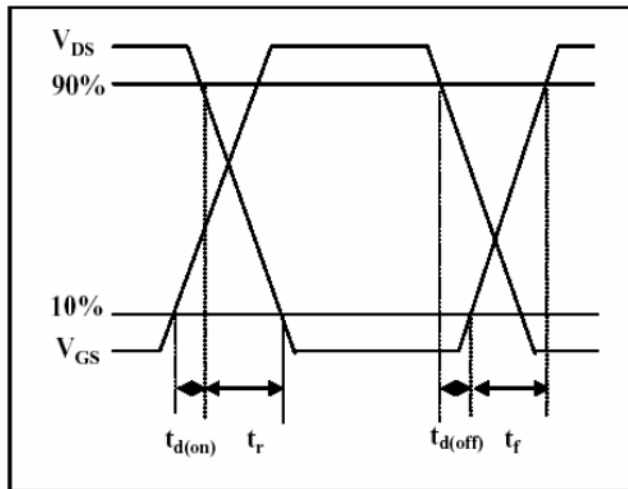
**Fig 12. Gate Threshold Voltage v.s. Junction Temperature**



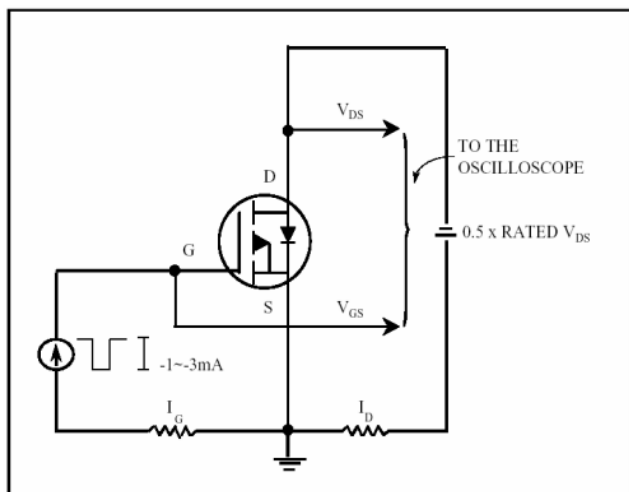
**CHARACTERISTIC CURVE (P-Ch)**



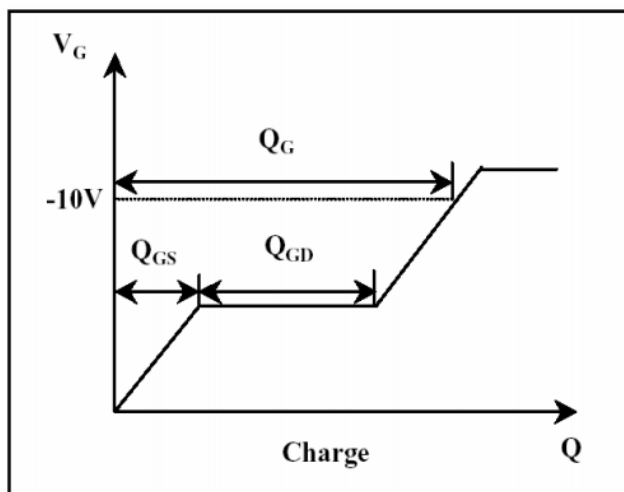
**Fig 13. Switching Time Circuit**



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