

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

## DESCRIPTION

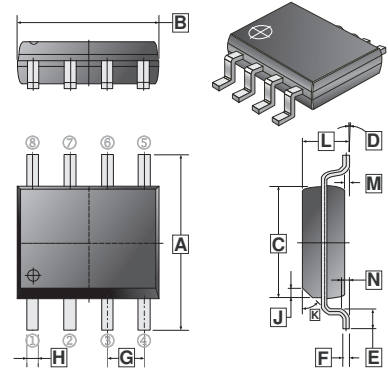
The SSG4510 provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.

The SOP-8 package is universally preferred for all commercial-industrial surface mount applications and suited for low voltage applications such as DC/DC converters.

## FEATURES

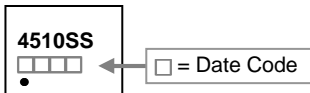
- Simple Drive Requirement
- Lower On-resistance
- Fast Switching Performance

## SOP-8



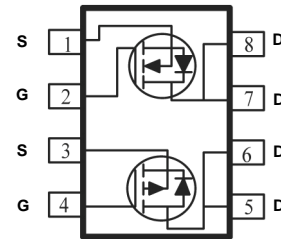
REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	5.80	6.20	H	0.35	0.49
B	4.80	5.00	J	0.375 REF.	
C	3.80	4.00	K	45°	
D	0°	8°	L	1.35	1.75
E	0.40	0.90	M	0.10	0.25
F	0.19	0.25	N	0.25 REF.	
G	1.27 TYP.				

## MARKING



## PACKAGE INFORMATION

Package	MPQ	Leader Size
SOP-8	2.5K	13 inch



## ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Ratings		Unit
		N-Ch	P-Ch	
Drain-Source Voltage	$V_{DS}$	100	-100	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	$\pm 20$	V
Continuous Drain Current <sup>3</sup>	$T_A=25^\circ\text{C}$	2.5	-2.5	A
	$T_A=70^\circ\text{C}$	2	-2	A
Pulsed Drain Current <sup>1</sup>	$I_{DM}$	10	-10	A
Total Power Dissipation	$T_A=25^\circ\text{C}$	2		W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55~150		$^\circ\text{C}$
<b>Thermal Data</b>				
Thermal Resistance Junction-ambient <sup>3</sup>	$R_{\theta JA}$	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	$BV_{DSS}$	100	-	-	V	$V_{GS}=0, I_D=250\mu\text{A}$	
Gate Threshold Voltage	$V_{GS(th)}$	1.0	-	2.5	V	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	
Forward Transconductance	$g_{fs}$	-	20	-	S	$V_{DS}=5\text{V}, I_D=2\text{A}$	
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	$\mu\text{A}$	$V_{DS}=80\text{V}, V_{GS}=0$
		$T_J=55^\circ\text{C}$	-	-	5		
Static Drain-Source On-Resistance <sup>2</sup>	$R_{DS(ON)}$	-	-	112	m $\Omega$	$V_{GS}=10\text{V}, I_D=2\text{A}$	
		-	-	120		$V_{GS}=4.5\text{V}, I_D=1\text{A}$	
Total Gate Charge <sup>2</sup>	$Q_g$	-	26.2	-	nC	$I_D=2\text{A}$ $V_{DS}=80\text{V}$ $V_{GS}=10\text{V}$	
Gate-Source Charge	$Q_{gs}$	-	3.8	-			
Gate-Drain ("Miller") Charge	$Q_{gd}$	-	4.8	-			
Turn-on Delay Time <sup>2</sup>	$T_{d(on)}$	-	4.2	-	nS	$V_{DS}=50\text{V}$ $V_{GS}=10\text{V}$ $I_D=2\text{A}$ $R_G=3.3\Omega$ $R_D=15\Omega$	
Rise Time	$T_r$	-	7.6	-			
Turn-off Delay Time	$T_{d(off)}$	-	41	-			
Fall Time	$T_f$	-	14	-			
Input Capacitance	$C_{iss}$	-	1535	-	pF	$V_{GS}=0$ $V_{DS}=15\text{V}$ $f=1.0\text{MHz}$	
Output Capacitance	$C_{oss}$	-	60	-			
Reverse Transfer Capacitance	$C_{rss}$	-	37	-			
<b>Source-Drain Diode</b>							
Forward On Voltage <sup>2</sup>	$V_{SD}$	-	-	1.2	V	$I_S=1\text{A}, V_{GS}=0$	
Continuous Source Current(Body Diode)	$I_S$	-	-	2.5	A	$V_D=V_G=0, V_S=1.2\text{V}$	
Pulsed Source Current(Body Diode) <sup>1</sup>	$I_{SM}$	-	-	10	A		

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 $^\circ\text{C}/\text{W}$  when mounted on Min. copper pad.

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

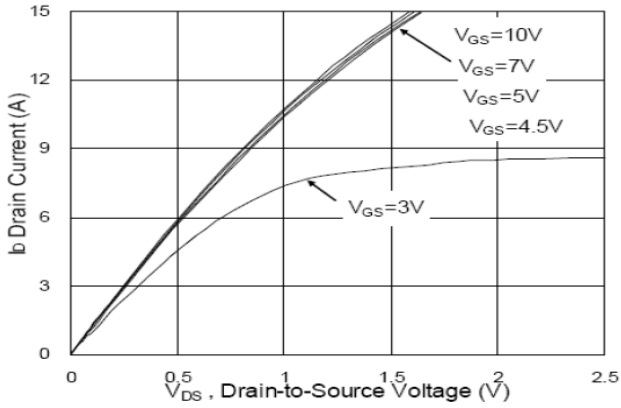
Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions	
Drain-Source Breakdown Voltage	$BV_{DSS}$	-100	-	-	V	$V_{GS}=0, I_D = -250\mu\text{A}$	
Gate Threshold Voltage	$V_{GS(th)}$	-1	-	-2.5	V	$V_{DS}=V_{GS}, I_D = -250\mu\text{A}$	
Forward Transconductance	$g_{fs}$	-	7	-	S	$V_{DS} = -5\text{V}, I_D = -2\text{A}$	
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	$\mu\text{A}$	$V_{DS} = -80\text{V}, V_{GS}=0$
		$T_J=55^\circ\text{C}$	-	-	-5		
Static Drain-Source On-Resistance <sup>2</sup>	$R_{DS(ON)}$	-	-	180	m $\Omega$	$V_{GS} = -10\text{V}, I_D = -2\text{A}$	
		-	-	210		$V_{GS} = -4.5\text{V}, I_D = -1\text{A}$	
Total Gate Charge <sup>2</sup>	$Q_g$	-	31	-	nC	$I_D = -1.5\text{A}$ $V_{DS} = -80\text{V}$ $V_{GS} = -10\text{V}$	
Gate-Source Charge	$Q_{gs}$	-	6.3	-			
Gate-Drain ("Miller") Charge	$Q_{gd}$	-	4.5	-			
Turn-on Delay Time <sup>2</sup>	$T_{d(on)}$	-	12	-	nS	$V_{DS} = -50\text{V}$ $V_{GS} = -10\text{V}$ $I_D = -1\text{A}$ $R_G=3.3\Omega$ $R_D=15\Omega$	
Rise Time	$T_r$	-	55	-			
Turn-off Delay Time	$T_{d(off)}$	-	40	-			
Fall Time	$T_f$	-	40	-			
Input Capacitance	$C_{iss}$	-	1066	-	pF	$V_{GS}=0$ $V_{DS} = -20\text{V}$ $f=1.0\text{MHz}$	
Output Capacitance	$C_{oss}$	-	365	-			
Reverse Transfer Capacitance	$C_{rss}$	-	55	-			
<b>Source-Drain Diode</b>							
Forward On Voltage <sup>2</sup>	$V_{SD}$	-	-	-1.2	V	$I_S = -1\text{A}, V_{GS}=0\text{V}$	
Continuous Source Current(Body Diode)	$I_S$	-	-	-2.5	A	$V_D = V_G=0\text{V}, V_S = -1.2\text{V}$	
Pulsed Source Current(Body Diode) <sup>1</sup>	$I_{SM}$	-	-	-10	A		

Notes:

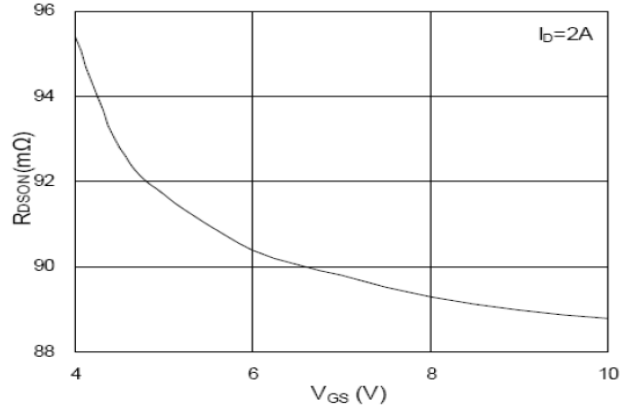
1. Pulse width limited by Max. junction temperature.
2. Pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$ .
3. Surface mounted on 1 in<sup>2</sup> copper pad of FR4 board; 135 $^\circ\text{C}/\text{W}$  when mounted on Min. copper pad.

**CHARACTERISTIC CURVE (N-Ch)**

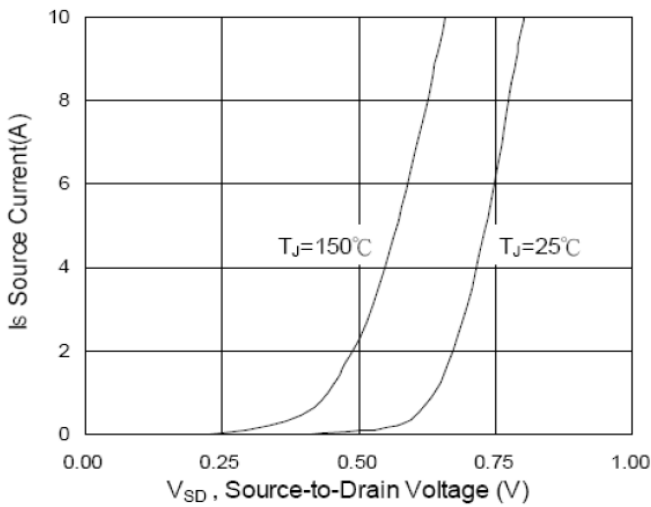
Typical Output characteristics



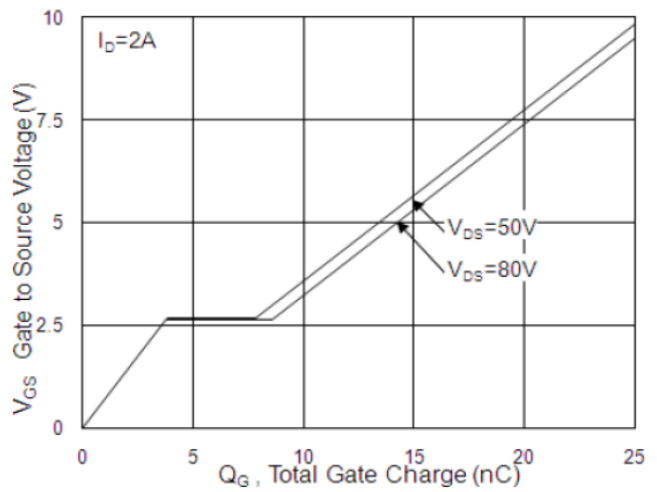
On-Resistance VS. Gate-Source



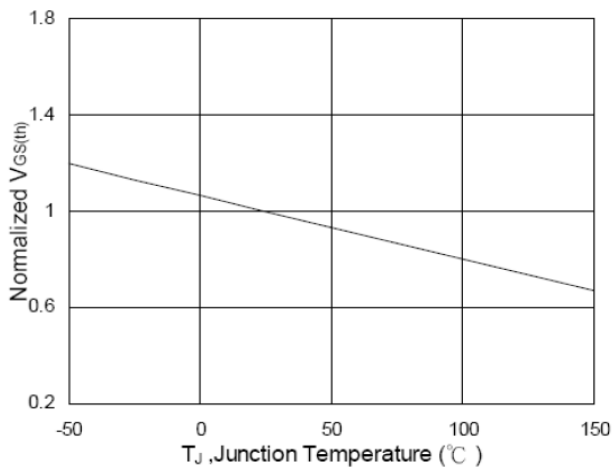
Forward Characteristics Of Reverse



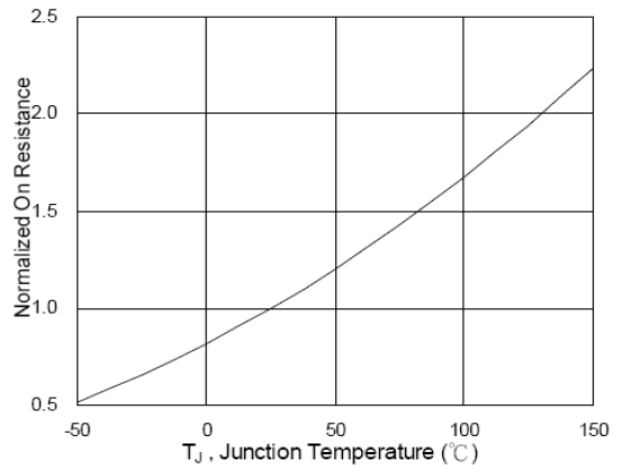
Gate-Charge Characteristics



Normalized  $V_{GS(th)}$  VS.  $T_J$

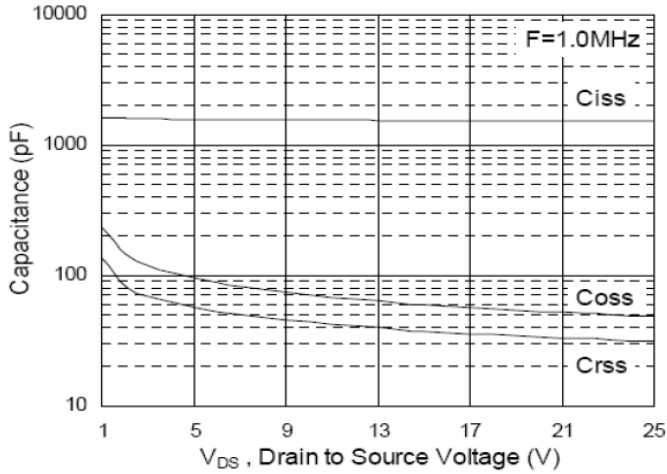


Normalized  $R_{DS(ON)}$  VS.  $T_J$

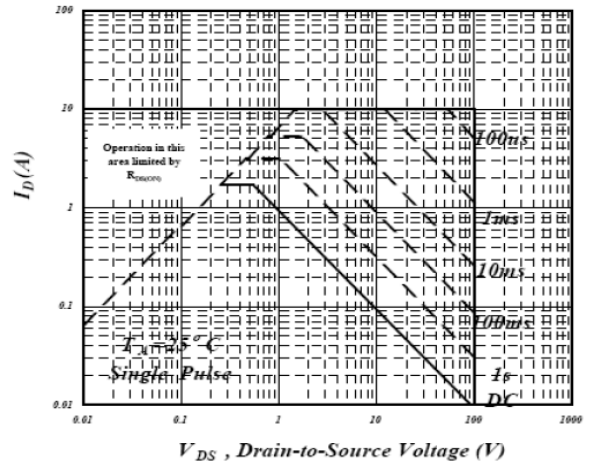


## CHARACTERISTIC CURVE (N-Ch)

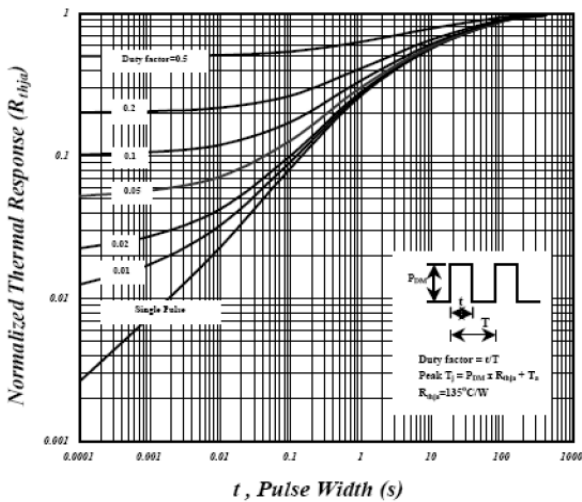
Capacitance



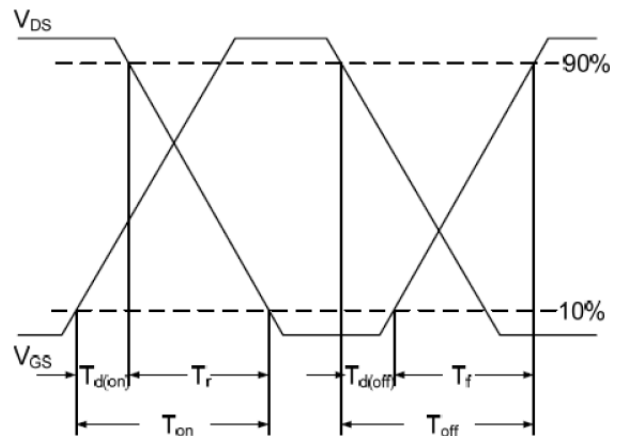
Safe Operating Area



Normalized Maximum Transient Thermal Impedance

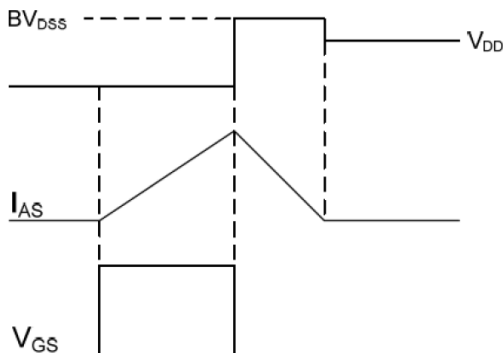


Switching Time Waveform



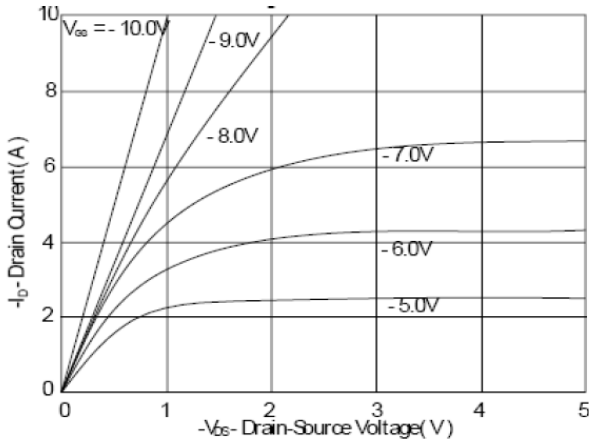
Unclamped Inductive Switching Waveform

$$EAS = \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$

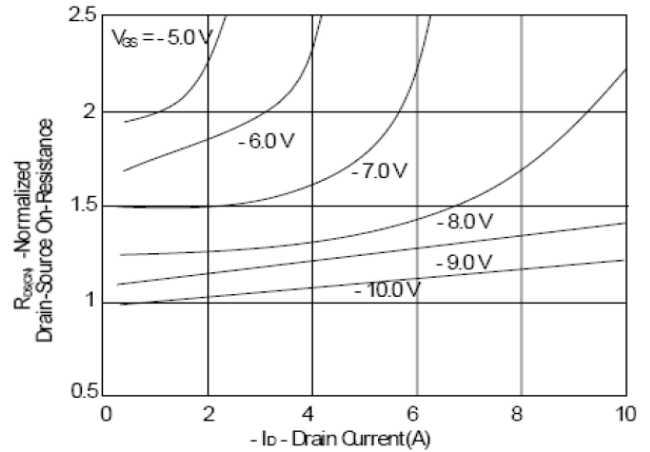


**CHARACTERISTIC CURVE (P-Ch)**

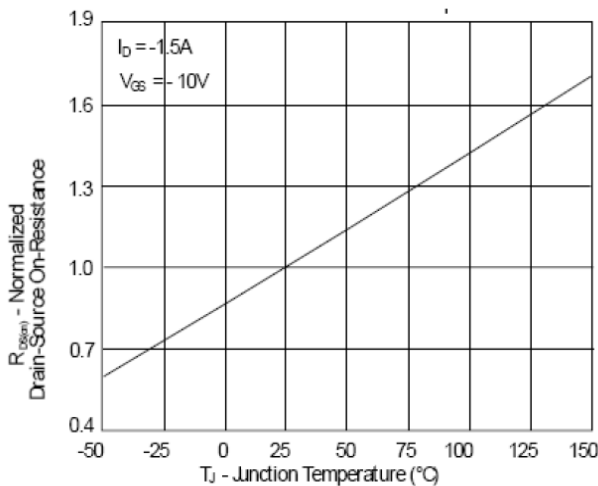
On-Region Characteristics



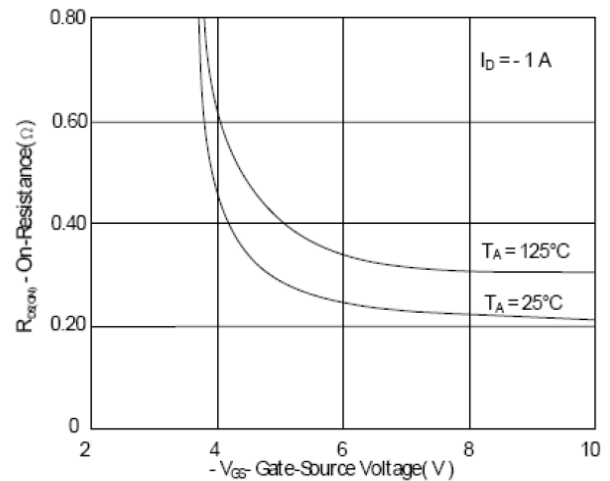
On-Resistance Variation with Drain Current and Gate Voltage



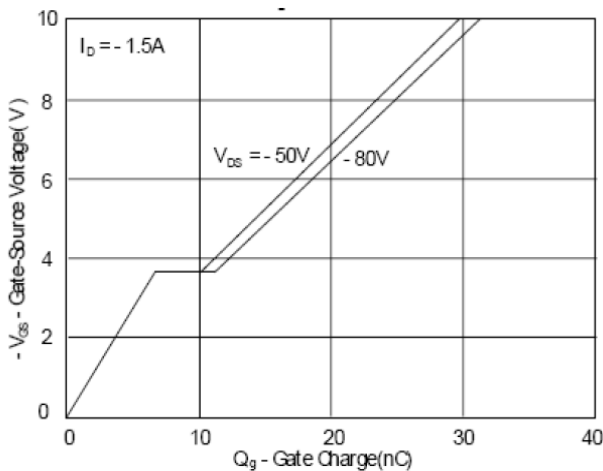
On-Resistance Variation with Temperature



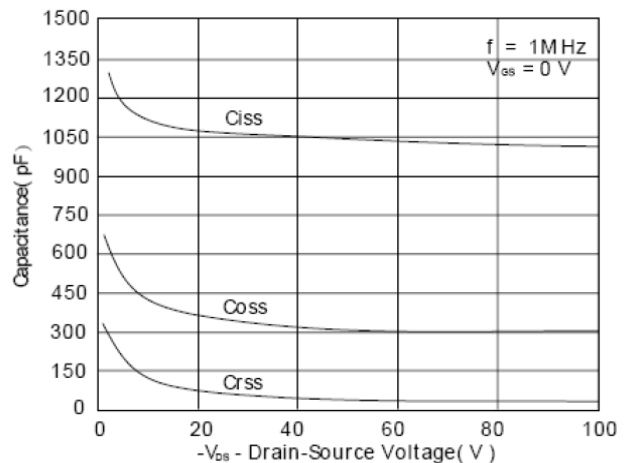
On-Resistance Variation with Gate-Source Voltage



Gate Charge Characteristics

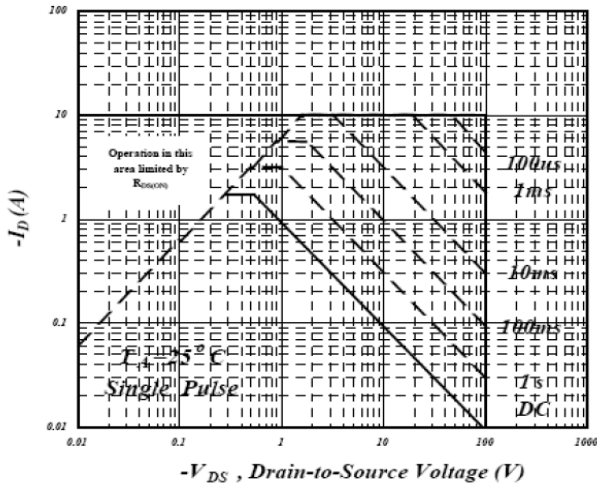


Capacitance Characteristics

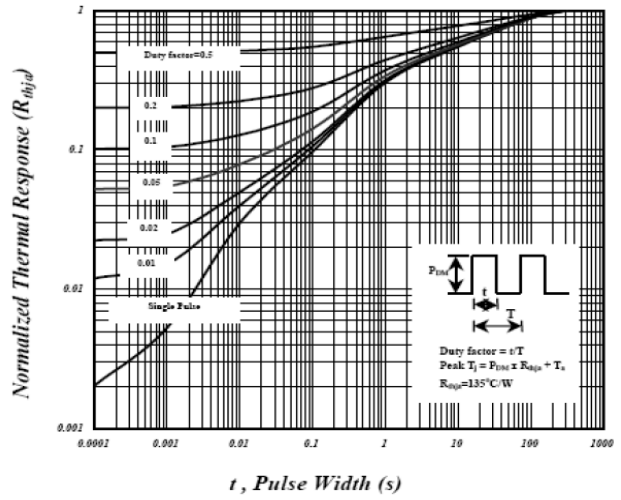


**CHARACTERISTIC CURVE (P-Ch)**

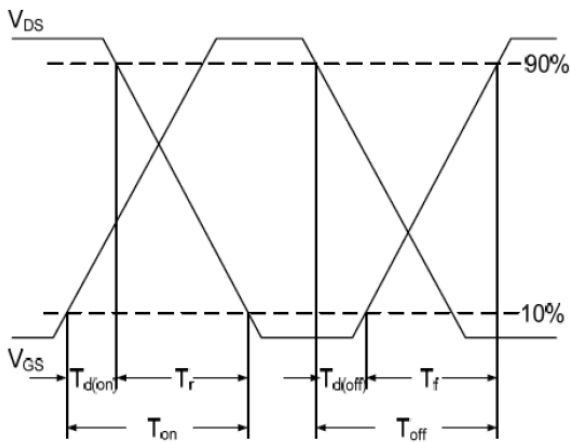
Maximum Safe Operating Area



Transient Thermal Response Curve



Switching Time Waveform



Unclamped Inductive Switching Waveform

$$EAS = \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$

