

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

DESCRIPTION

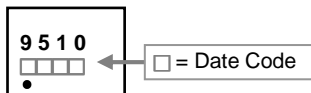
The SSDF9510 provide the designer with best combination of fast switching, low on-resistance and cost effectiveness.

The SSDF9510 meet the RoHS and Green Product requirement , 100% EAS guaranteed with full function reliability approved.

FEATURES

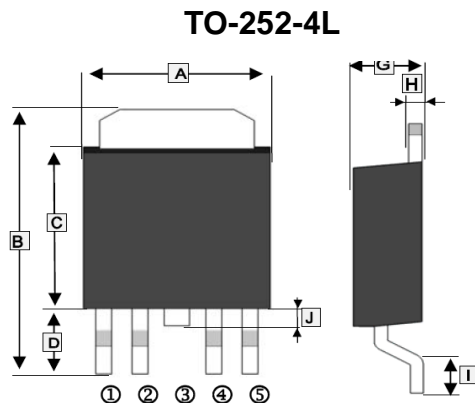
- Low Gate Charge
- Low On-resistance

MARKING CODE

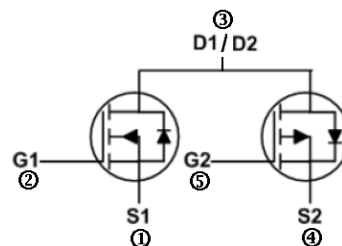


PACKAGE INFORMATION

Package	MPQ	Leader Size
TO-252-4L	2.5K	13 inch



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	6.4	6.8	F	0.4	0.6
B	9.4	10.2	G	2.2	2.4
C	5.4	5.8	H	0.45	0.55
D	2.4	3.0	I	1.4	1.8
E	1.27 REF.		J	0.8	1.2



ABSOLUTE MAXIMUM RATINGS (T_A=25°C unless otherwise specified)

Parameter	Symbol	Ratings		Unit	
		N-Channel	P-Channel		
Drain-Source Voltage	V _{DS}	100	-100	V	
Gate-Source Voltage	V _{GS}	±20	±20	V	
Continuous Drain Current @ V _{GS} =10V ¹	I _D	T _C =25°C	13	-13	A
		T _C =100°C	10.5	-10	
Pulsed Drain Current ²	I _{DM}	48	-48	A	
Single Pulse Avalanche Energy ³	E _{AS}	50	50	mJ	
Avalanche Current	I _{AS}	10	-10	A	
Power Dissipation ⁴	P _D	35.7		W	
Maximum Junction to Ambient ¹	R _{θJA}	62.5		°C / W	
Maximum Junction to Case ¹	R _{θJC}	3.5		°C / W	
Operating Junction & Storage Temperature Range	T _J , T _{STG}	-55~150		°C	

ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions		
Static								
Drain-Source Breakdown Voltage	N-Ch	BV _{DSS}	100	-	-	V	V _{GS} =0, I _D =250μA	
	P-Ch		-100	-	-		V _{GS} =0, I _D = -250μA	
Gate-Threshold Voltage	N-Ch	V _{GS(th)}	1	-	2.5	V	V _{DS} =V _{GS} , I _D =250μA	
	P-Ch		-1	-	-2.5		V _{DS} =V _{GS} , I _D = -250μA	
Gate-Source Leakage Current	N-Ch	I _{GSS}	-	-	±100	nA	V _{GS} = ±20V	
	P-Ch		-	-	±100			
Drain-Source Leakage Current	N-Ch	I _{DSS}	-	-	1	μA	V _{DS} =80V, V _{GS} =0, T _J =25°C	
	P-Ch		-	-	-1		V _{DS} = -80V, V _{GS} =0, T _J =25°C	
	N-Ch		-	-	5		V _{DS} =80V, V _{GS} =0, T _J =55°C	
	P-Ch		-	-	-5		V _{DS} = -80V, V _{GS} =0, T _J =55°C	
Drain-Source On-Resistance ²	N-Ch	R _{DS(ON)}	-	-	110	mΩ	V _{GS} =10V, I _D =8A	
	P-Ch		-	-	210		V _{GS} = -10V, I _D = -8A	
	N-Ch		-	-	120		V _{GS} =4.5V, I _D =6A	
	P-Ch		-	-	250		V _{GS} = -4.5V, I _D = -6A	
Total Gate Charge	N-Ch	Q _g	-	26.2	-	nC	N-Channel V _{DS} =80V, V _{GS} =10V, I _D =10A	
	P-Ch		-	16	-			
Gate-Source Charge	N-Ch	Q _{gs}	-	4.6	-			
	P-Ch		-	4.4	-			
Gate-Drain ("Miller") Charge	N-Ch	Q _{gd}	-	5.1	-		P-Channel V _{DS} = -80V, V _{GS} = -4.5V, I _D = -8A	
	P-Ch		-	8.7	-			
Turn-on Delay Time	N-Ch	T _{d(on)}	-	4.2	-		nS	N-Channel V _{DS} =50V, R _G =3.3Ω, R _L =5Ω V _{GS} =10V, I _D =10A
	P-Ch		-	9	-			
Rise Time	N-Ch	T _r	-	8.2	-			
	P-Ch		-	45	-			
Turn-off Delay Time	N-Ch	T _{d(off)}	-	35.6	-	P-Channel V _{DS} = -50V, R _G =3.3Ω, R _D =6.25Ω V _{GS} = -10V, I _D = -8A		
	P-Ch		-	40	-			
Fall Time	N-Ch	T _f	-	9.6	-			
	P-Ch		-	4.6	-			
Input Capacitance	N-Ch	C _{iss}	-	1535	-	pF	N-Channel V _{GS} =0, V _{DS} =15V, f=1.0MHz	
	P-Ch		-	1590	-			
Output Capacitance	N-Ch	C _{oss}	-	60	-		P-Channel V _{GS} =0, V _{DS} = -15V, f=1.0MHz	
	P-Ch		-	110	-			
Reverse Transfer Capacitance	N-Ch	C _{rss}	-	37	-			
	P-Ch		-	70	-			
Gate Resistance	N-Ch	R _g	-	2	4	Ω	V _{DS} =V _{GS} =0, f=1.0MHz	
	P-Ch		-	8	12			

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions	
Guaranteed Avalanche Characteristics							
Single Pulse Avalanche Energy ⁵	N-Ch	E_{AS}	10	-	-	mJ	$V_{DD}=50V, L=1mH, I_{AS}=5A$
	P-Ch		10	-	-		$V_{DD}= -50V, L=1mH, I_{AS} = -5A$
Source-Drain Diode							
Forward On Voltage ²	N-Ch	V_{SD}	-	-	1.2	V	$I_S=1A, V_{GS}=0, T_J=25^\circ\text{C}$
	P-Ch		-	-	-1.2		$I_S= -1A, V_{GS}=0, T_J=25^\circ\text{C}$
Continuous Source Current ^{1,6}	N-Ch	I_S	-	-	13	A	$V_D=V_G=0, \text{Force Current}$
	P-Ch		-	-	-13		
Pulsed Source Current ^{2,6}	N-Ch	I_{SM}	-	-	48	A	
	P-Ch		-	-	-48		

Notes:

- 1 Surface mounted on a 1 inch2 FR-4 board with 2OZ copper.
- 2 Pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
- 3 The EAS data shows Max. rating . The test condition is $V_{DD}=\pm 50V, V_{GS}=\pm 10V, L=1mH, I_{AS}=\pm 10A$
- 4 .The power dissipation is limited by 150 °C junction temperature
- 5 The Min. value is 100% EAS tested guarantee.
- 6 The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

CHARACTERISTICS CURVE (N-Channel)

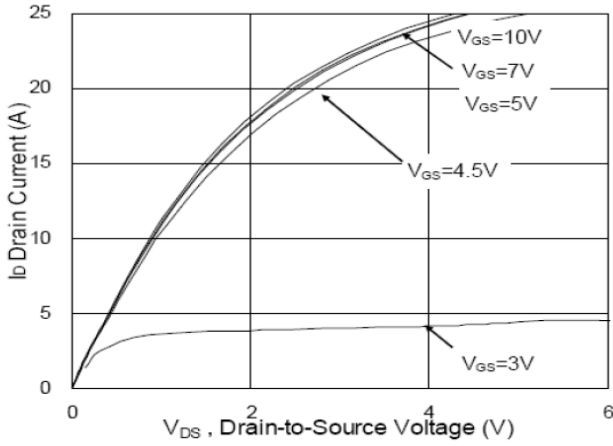


Fig 1. Typical Output Characteristics

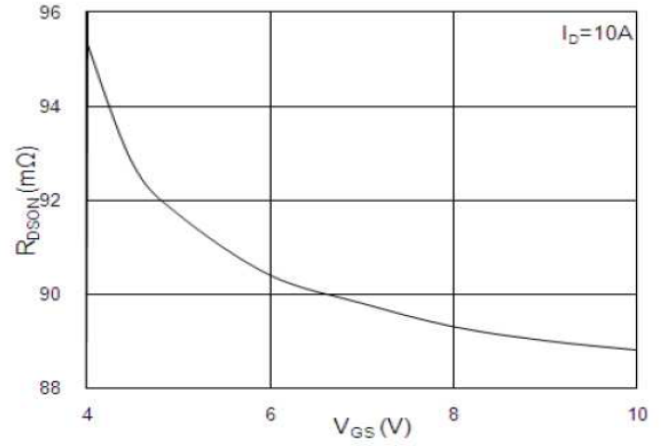


Fig 2. On-Resistance vs. Gate-Source

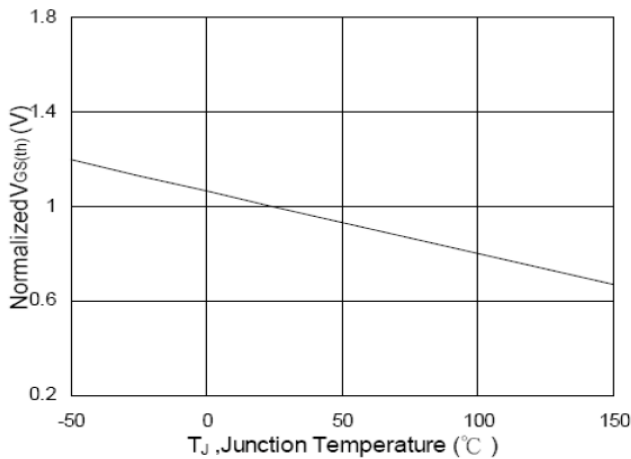


Fig 3. Gate Threshold Voltage vs. Junction Temperature

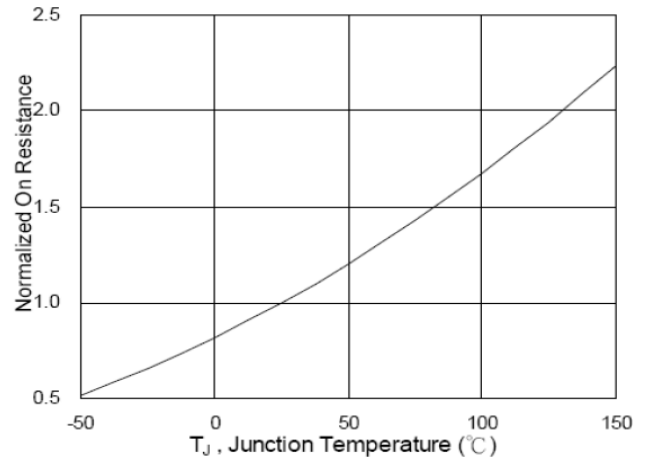


Fig 4. On-Resistance vs. Junction Temperature

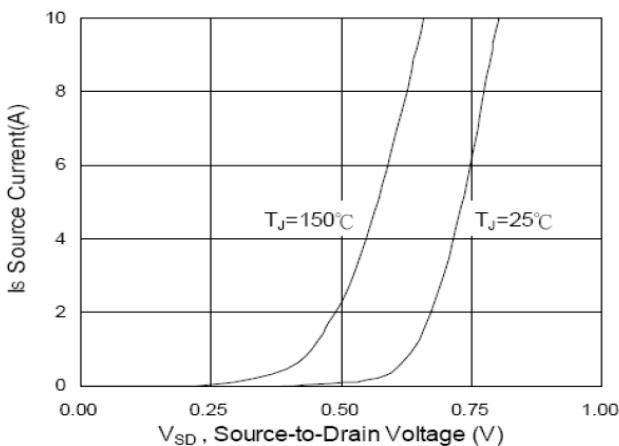


Fig 5. Forward Characteristics of Reverse Diode

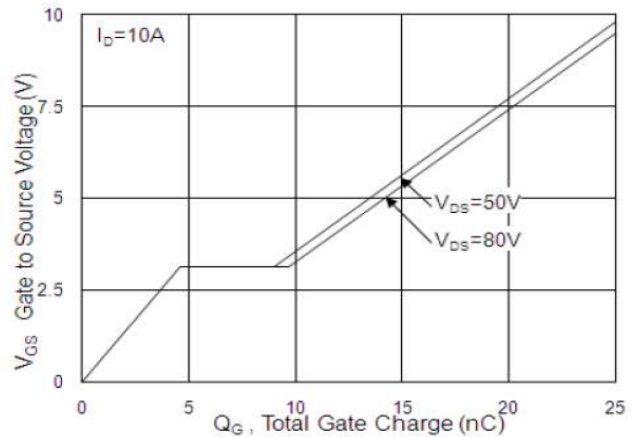


Fig 6. Gate Charge Characteristics

CHARACTERISTICS CURVE (N-Channel)

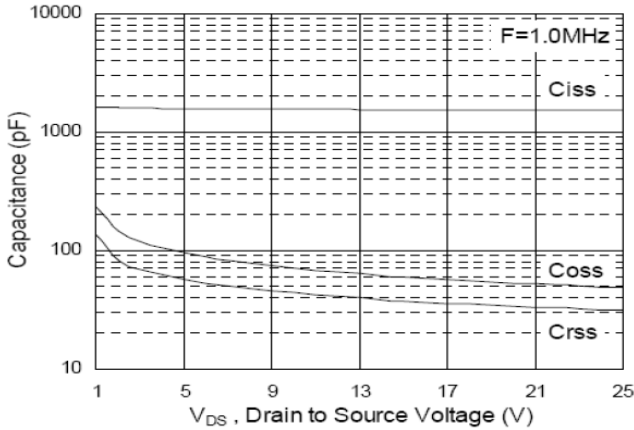


Fig 7. Typical Capacitance Characteristics

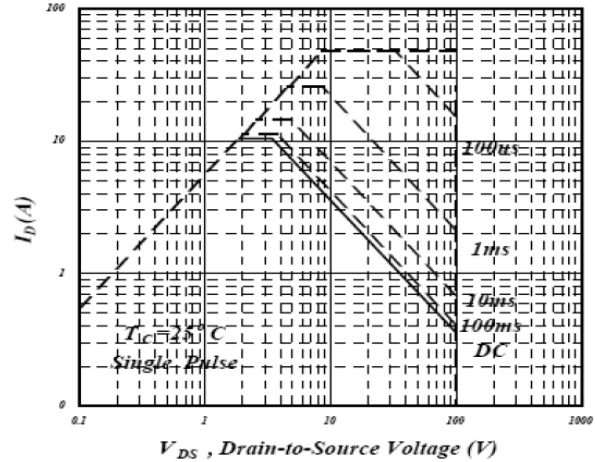


Fig 8. Maximum Safe Operating Area

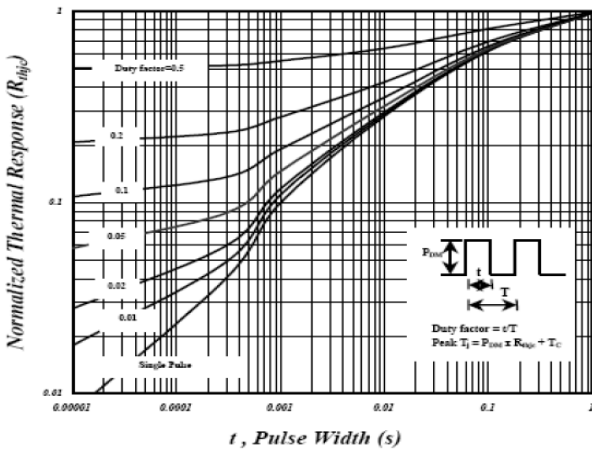


Fig 9. Normalized Transient Thermal Resistance vs. Pulse Width

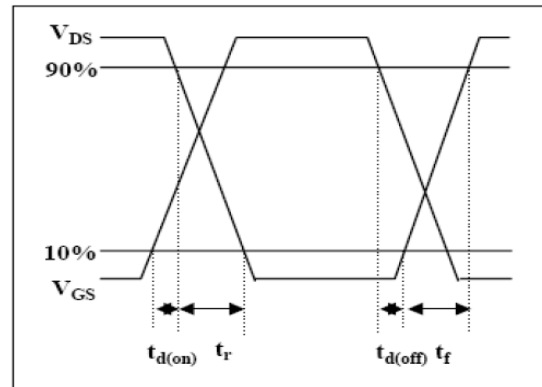


Fig 10. Switching Time Waveform

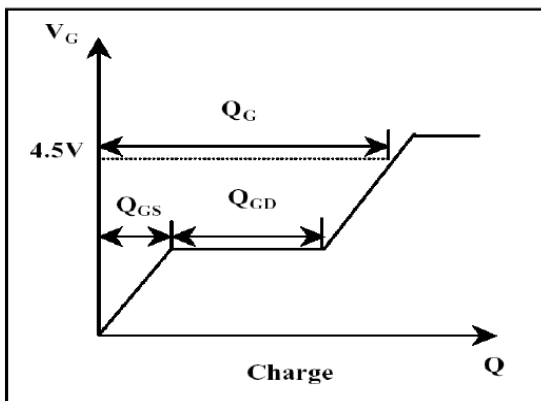


Fig 11. Gate Charge Waveform

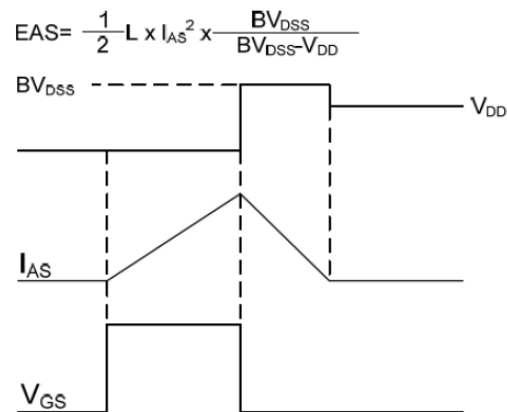


Fig 12. Unclamped Inductive Switching Waveform

CHARACTERISTICS CURVE (P-Channel)

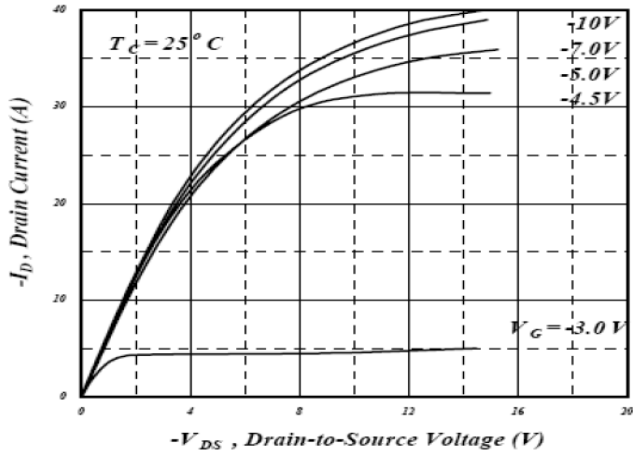


Fig 1. Typical Output Characteristics

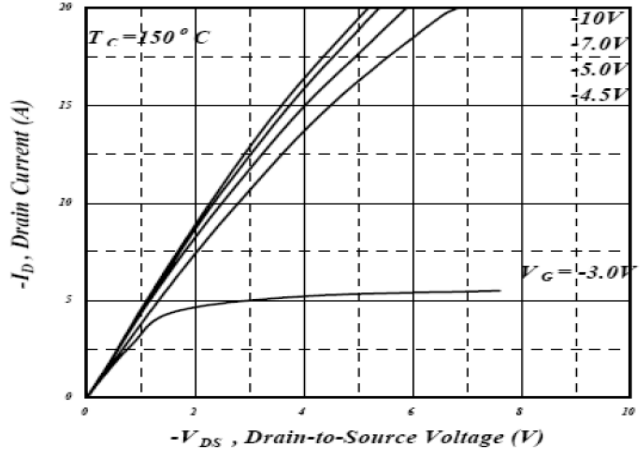


Fig 2. Typical Output Characteristics

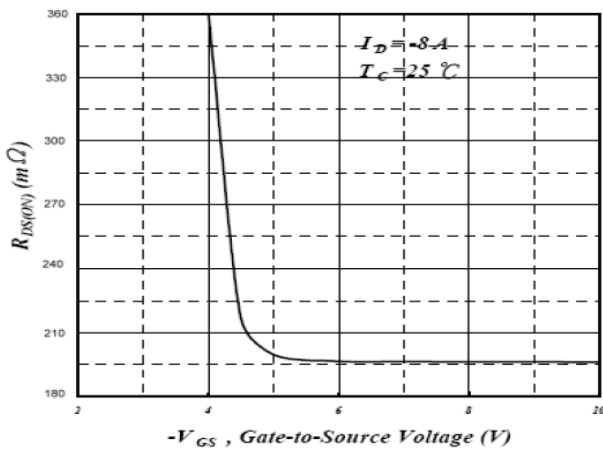


Fig 3. On-Resistance v.s. Gate Voltage

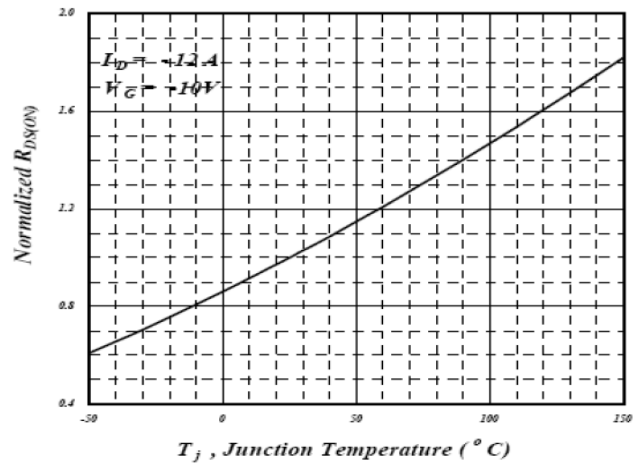


Fig 4. Normalized On-Resistance v.s. Junction Temperature

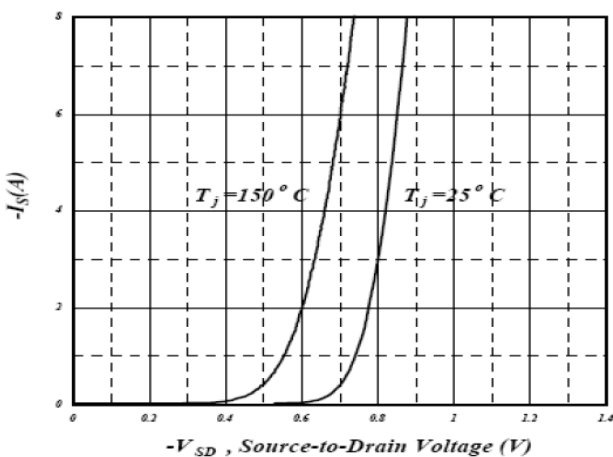


Fig 5. Forward Characteristic of Reverse Diode

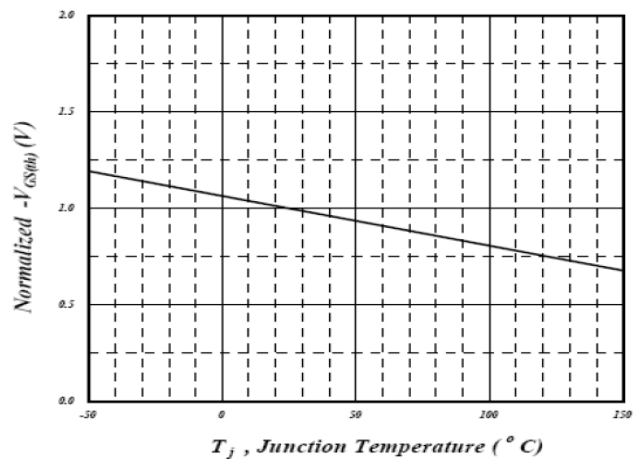


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

CHARACTERISTICS CURVE (P-Channel)

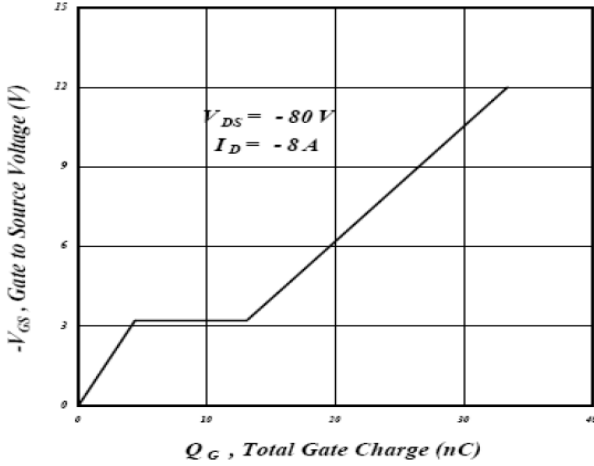


Fig 7. Gate Charge Characteristics

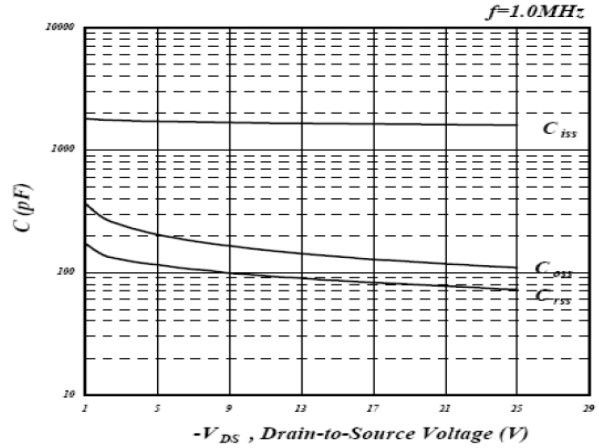


Fig 8. Typical Capacitance Characteristics

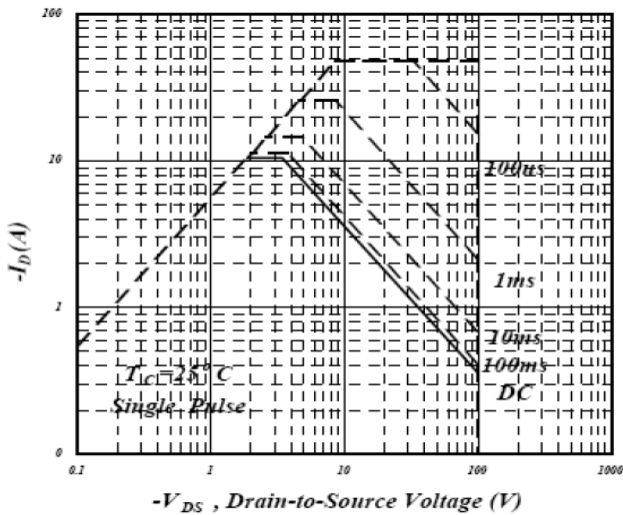


Fig 9. Maximum Safe Operating Area

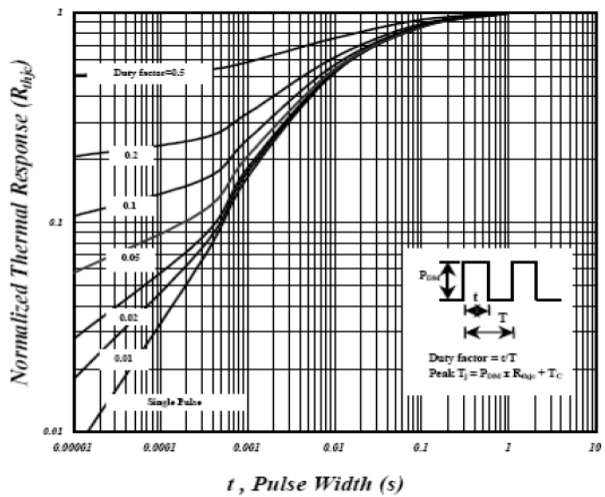


Fig 10. Effective Transient Thermal Impedance

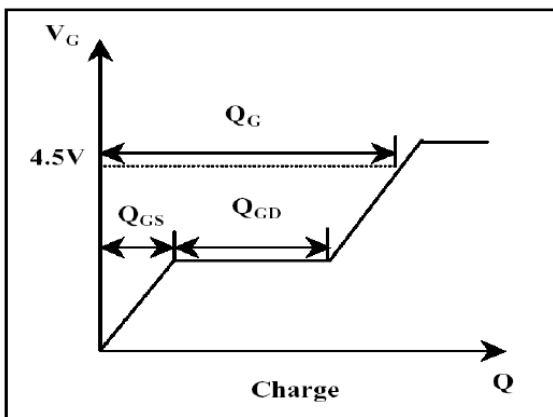


Fig 11. Gate Charge Waveform

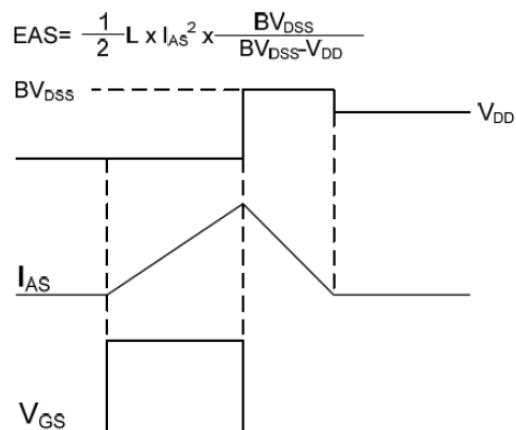


Fig 12. Unclamped Inductive Switching Waveform

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