



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

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Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



V_{DSS}	650V
$R_{DS(on)}$ (Typ.)	120mΩ
I_D	21A
P_D	103W

●Features

- 1) Low on-resistance
- 2) Fast switching speed
- 3) Fast reverse recovery
- 4) Easy to parallel
- 5) Simple to drive
- 6) Pb-free lead plating ; RoHS compliant

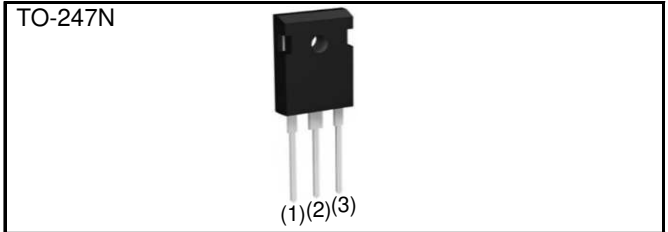
●Application

- Solar inverters
- DC/DC converters
- Switch mode power supplies
- Induction heating
- Motor drives

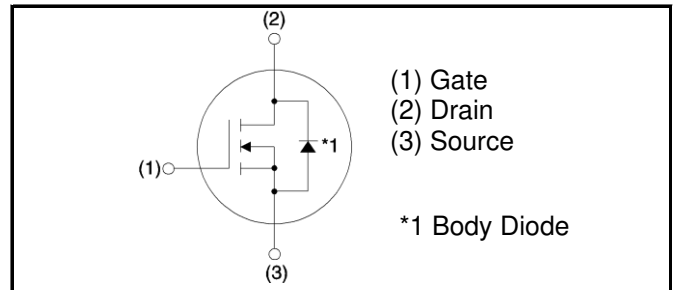
●Absolute maximum ratings ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Value	Unit
Drain - Source voltage	V_{DSS}	650	V
Continuous drain current	$T_c = 25^\circ\text{C}$	I_D^{*1} 21	A
	$T_c = 100^\circ\text{C}$	I_D^{*1} 15	A
Pulsed drain current	$I_{D,pulse}^{*2}$	52	A
Gate - Source voltage (DC)	V_{GSS}	-4 to +22	V
Gate-Source Surge Voltage ($t_{surge} < 300\text{nsec}$)	$V_{GSS,surge}^{*3}$	-4 to +26	V
Recommended Drive Voltage	$V_{GS,op}^{*4}$	0 / +18	V
Junction temperature	T_j	175	°C
Range of storage temperature	T_{stg}	-55 to +175	°C

●Outline



●Inner circuit



●Packaging specifications

Type	Packing	Tube
	Reel size (mm)	-
	Tape width (mm)	-
	Basic ordering unit (pcs)	30
	Taping code	C11
	Marking	SCT3120AL

● Thermal resistance

Parameter	Symbol	Values			Unit
		Min.	Typ.	Max.	
Thermal resistance, junction - case	R_{thJC}	-	1.12	1.46	°C/W

● Electrical characteristics ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Drain - Source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 1mA$	650	-	-	V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 650V, V_{GS} = 0V$ $T_j = 25^\circ\text{C}$	-	1	10	μA
		$T_j = 150^\circ\text{C}$	-	2	-	
Gate - Source leakage current	I_{GSS+}	$V_{GS} = +22V, V_{DS} = 0V$	-	-	100	nA
Gate - Source leakage current	I_{GSS-}	$V_{GS} = -4V, V_{DS} = 0V$	-	-	-100	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = 10V, I_D = 3.33mA$	2.7	-	5.6	V
Static drain - source on - state resistance	$R_{DS(on)}^{*5}$	$V_{GS} = 18V, I_D = 6.7A$ $T_j = 25^\circ\text{C}$	-	120	156	$m\Omega$
		$T_j = 125^\circ\text{C}$	-	158.4	-	
Gate input resistance	R_G	$f = 1MHz, \text{open drain}$	-	18	-	Ω

●Electrical characteristics ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Transconductance	g_{fs}^{*5}	$V_{DS} = 10\text{V}, I_D = 6.7\text{A}$	-	2.7	-	S
Input capacitance	C_{iss}	$V_{GS} = 0\text{V}$	-	460	-	pF
Output capacitance	C_{oss}	$V_{DS} = 500\text{V}$	-	35	-	
Reverse transfer capacitance	C_{rss}	$f = 1\text{MHz}$	-	16	-	
Effective output capacitance, energy related	$C_{o(er)}$	$V_{GS} = 0\text{V}$ $V_{DS} = 0\text{V to } 300\text{V}$	-	70	-	pF
Turn - on delay time	$t_{d(on)}^{*5}$	$V_{DD} = 300\text{V}, I_D = 6.7\text{A}$	-	14	-	ns
Rise time	t_r^{*5}	$V_{GS} = 18\text{V}/0\text{V}$	-	21	-	
Turn - off delay time	$t_{d(off)}^{*5}$	$R_L = 45\Omega$	-	23	-	
Fall time	t_f^{*5}	$R_G = 0\Omega$	-	14	-	
Turn - on switching loss	E_{on}^{*5}	$V_{DD} = 300\text{V}, I_D = 6.7\text{A}$ $V_{GS} = 18\text{V}/0\text{V}$	-	29	-	μJ
Turn - off switching loss	E_{off}^{*5}	$R_G = 0\Omega, L = 500\mu\text{H}$ * E_{on} includes diode reverse recovery	-	3	-	

●Gate Charge characteristics ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Total gate charge	Q_g^{*5}	$V_{DD} = 300\text{V}$	-	38	-	nC
Gate - Source charge	Q_{gs}^{*5}	$I_D = 6.7\text{A}$	-	11	-	
Gate - Drain charge	Q_{gd}^{*5}	$V_{GS} = 18\text{V}$	-	13	-	
Gate plateau voltage	$V_{(plateau)}$	$V_{DD} = 300\text{V}, I_D = 6.7\text{A}$	-	9.6	-	V

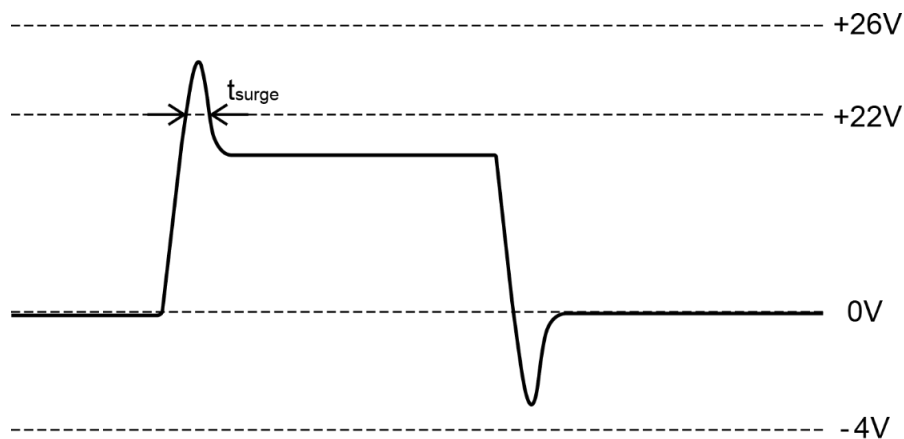
●Body diode electrical characteristics (Source-Drain) ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Inverse diode continuous, forward current	I_S^{*1}	$T_c = 25^\circ\text{C}$	-	-	21	A
Inverse diode direct current, pulsed	I_{SM}^{*2}		-	-	52	A
Forward voltage	V_{SD}^{*5}	$V_{GS} = 0\text{V}, I_S = 6.7\text{A}$	-	3.2	-	V
Reverse recovery time	t_{rr}^{*5}	$I_F = 6.7\text{A}, V_R = 300\text{V}$ $di/dt = 1100\text{A}/\mu\text{s}$	-	13	-	ns
Reverse recovery charge	Q_{rr}^{*5}		-	35	-	nC
Peak reverse recovery current	I_{rrm}^{*5}		-	6	-	A

*1 Limited only by maximum temperature allowed.

*2 $PW \leq 10\mu\text{s}$, Duty cycle $\leq 1\%$

*3 Example of acceptable V_{gs} waveform



*4 Please be advised not to use SiC-MOSFETs with V_{gs} below 13V as doing so may cause thermal runaway.

*5 Pulsed

●Electrical characteristic curves

Fig.1 Power Dissipation Derating Curve

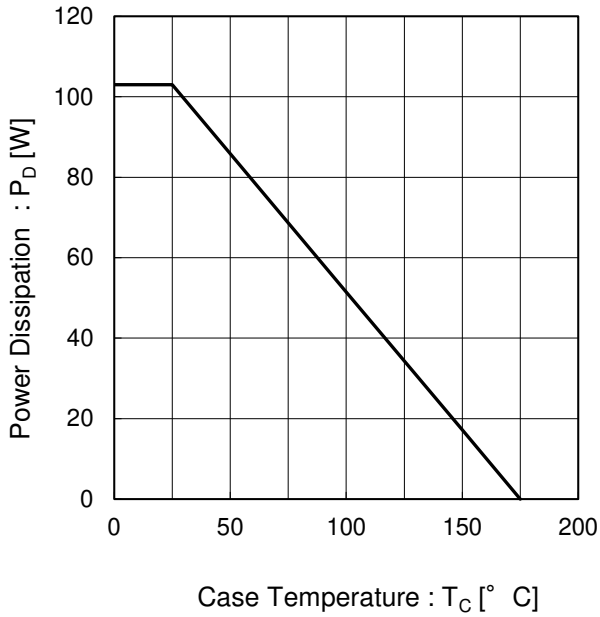


Fig.2 Maximum Safe Operating Area

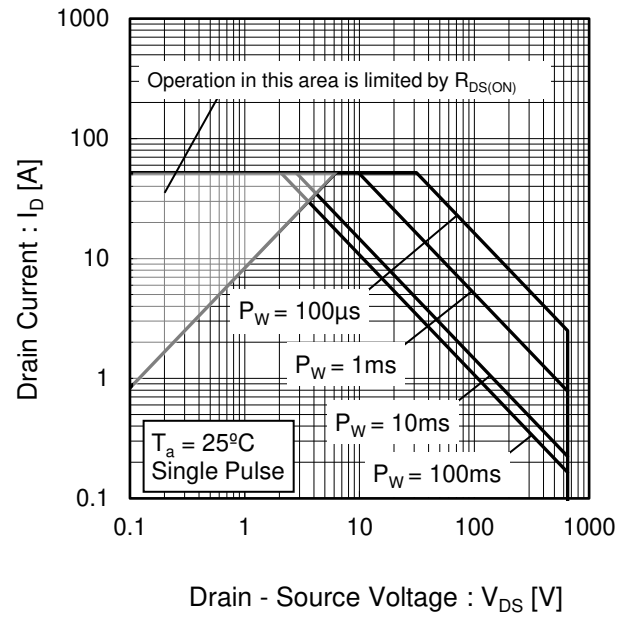
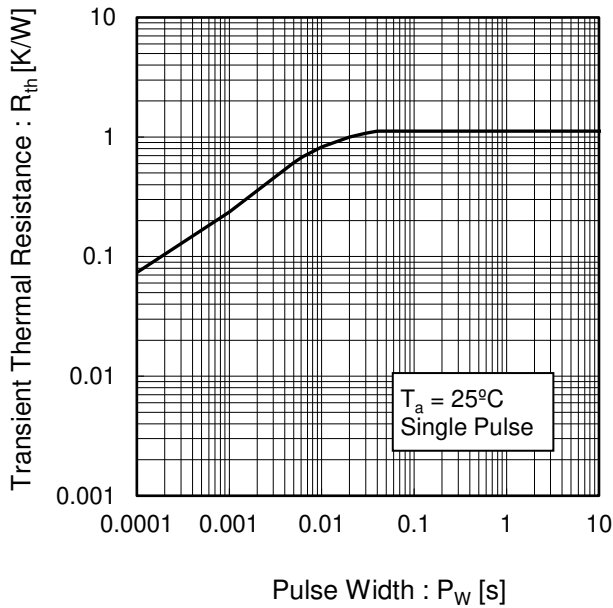


Fig.3 Typical Transient Thermal Resistance vs. Pulse Width



●Electrical characteristic curves

Fig.4 Typical Output Characteristics(I)

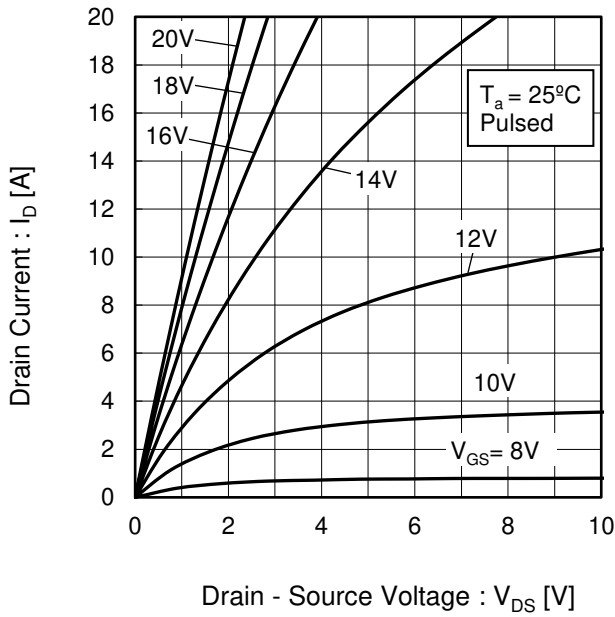


Fig.5 Typical Output Characteristics(II)

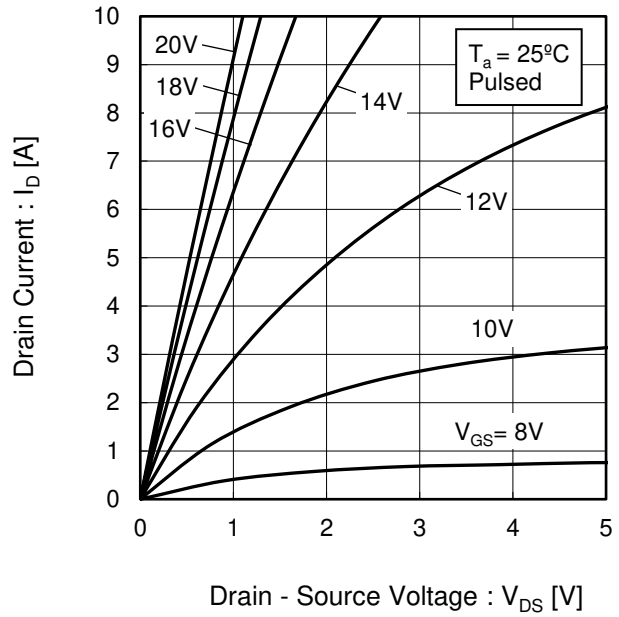


Fig.6 $T_j = 150^\circ\text{C}$ Typical Output Characteristics(I)

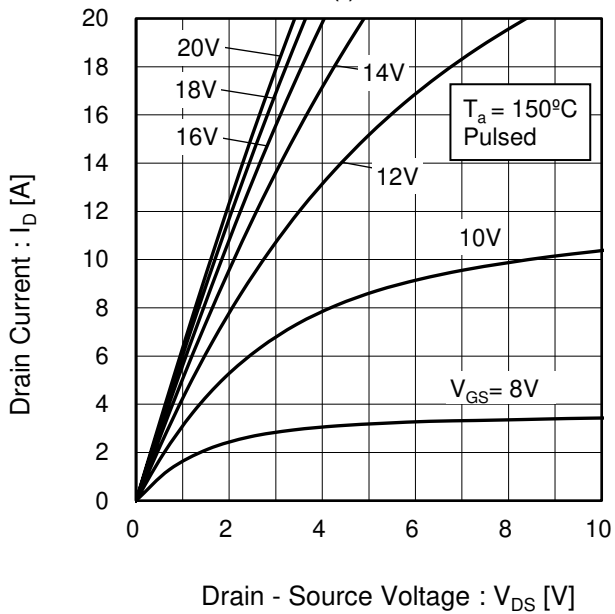
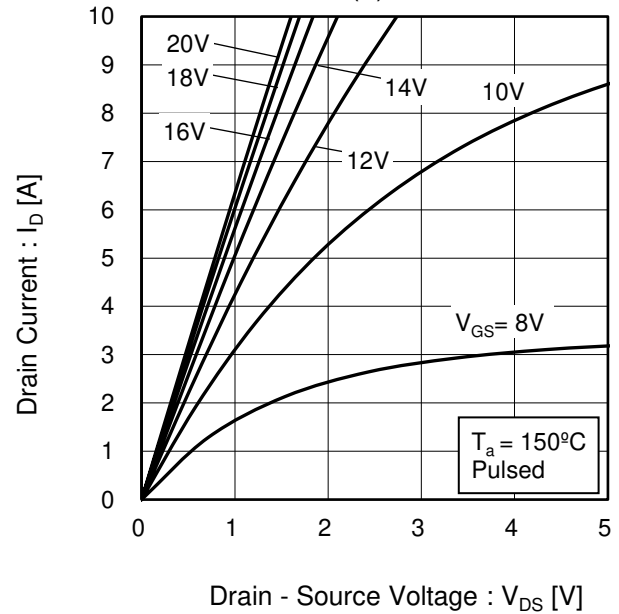


Fig.7 $T_j = 150^\circ\text{C}$ Typical Output Characteristics(II)



●Electrical characteristic curves

Fig.8 Typical Transfer Characteristics (I)

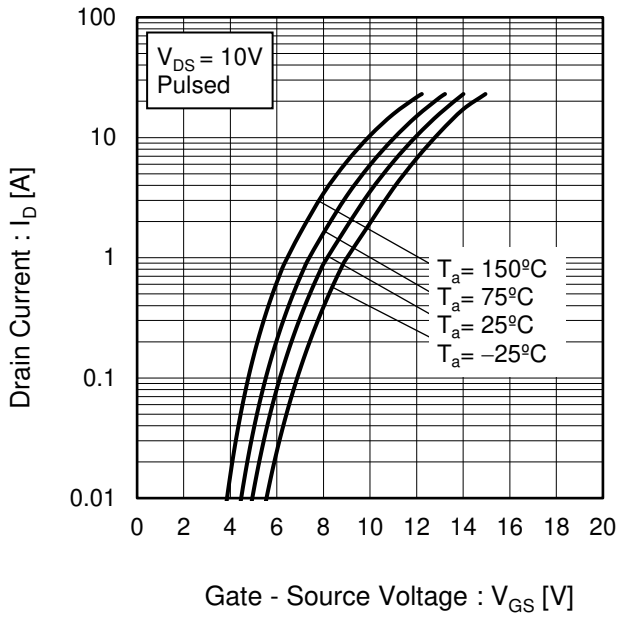


Fig.9 Typical Transfer Characteristics (II)

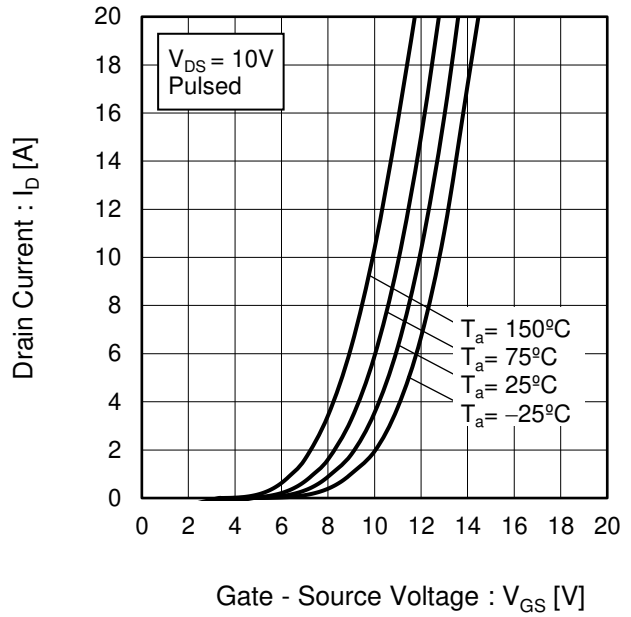


Fig.10 Gate Threshold Voltage vs. Junction Temperature

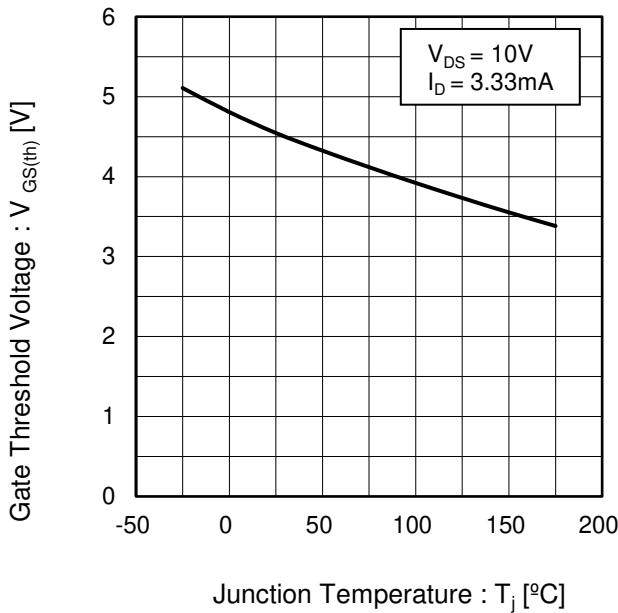
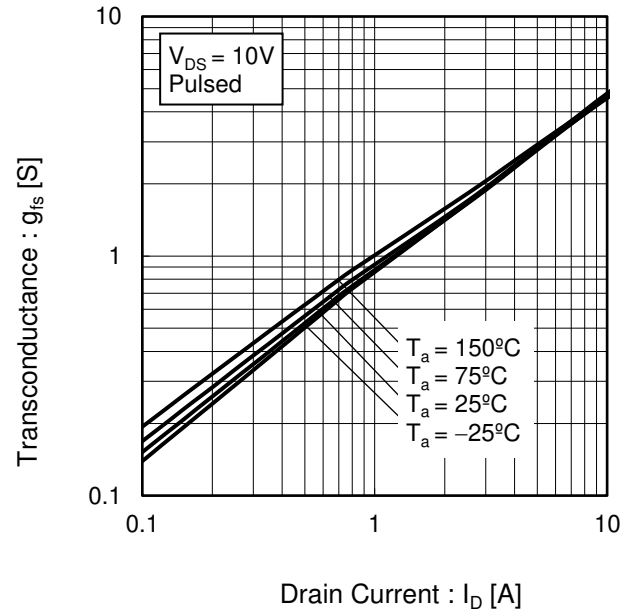


Fig.11 Transconductance vs. Drain Current



●Electrical characteristic curves

Fig.12 Static Drain - Source On - State Resistance vs. Gate - Source Voltage

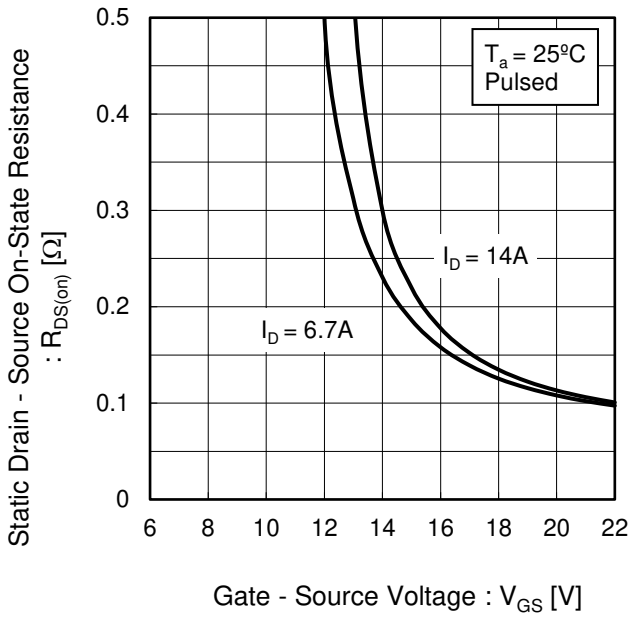


Fig.13 Static Drain - Source On - State Resistance vs. Junction Temperature

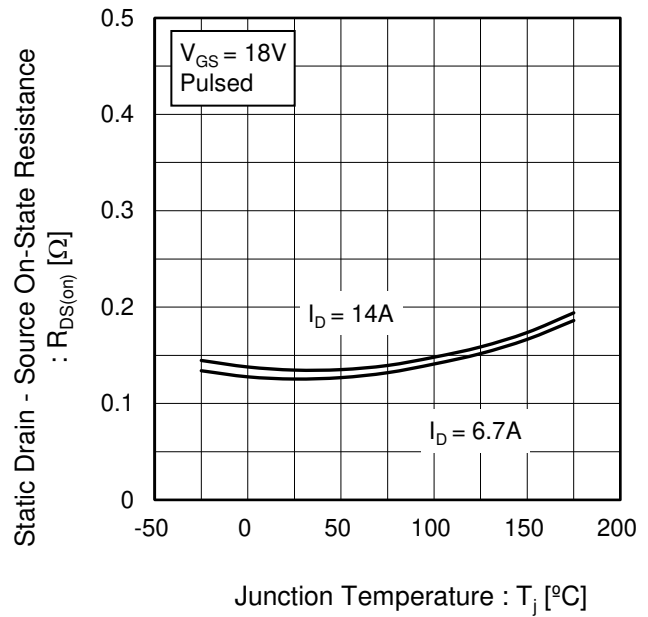
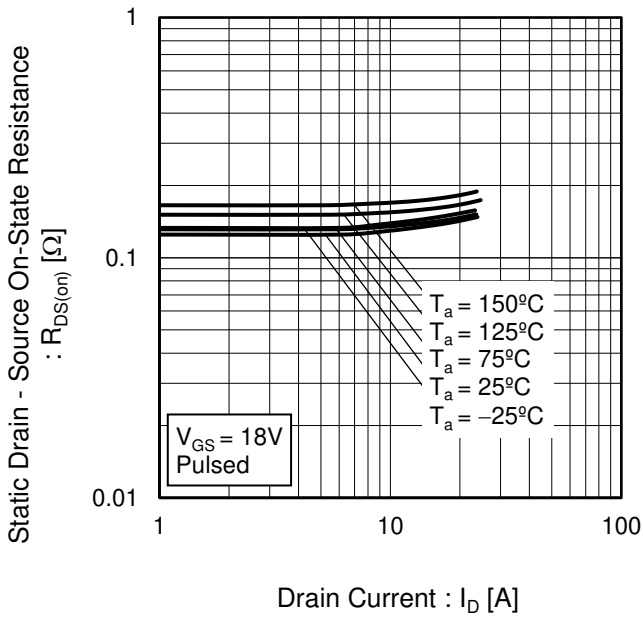


Fig.14 Static Drain - Source On - State Resistance vs. Drain Current



●Electrical characteristic curves

Fig.15 Typical Capacitance vs. Drain - Source Voltage

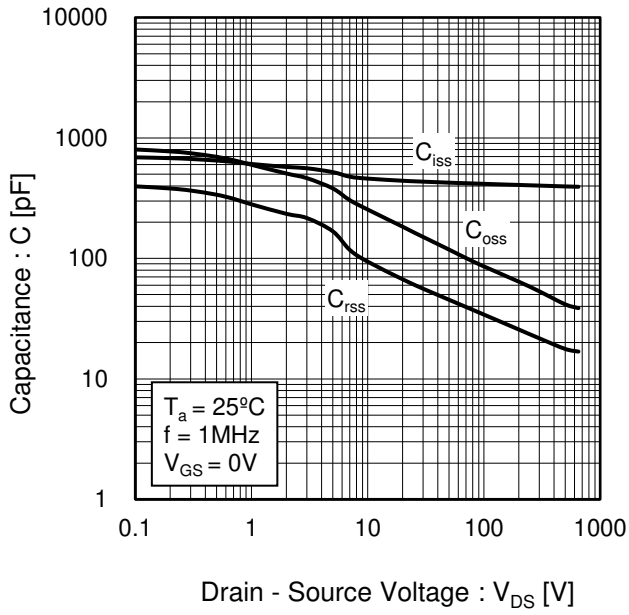


Fig.16 Coss Stored Energy

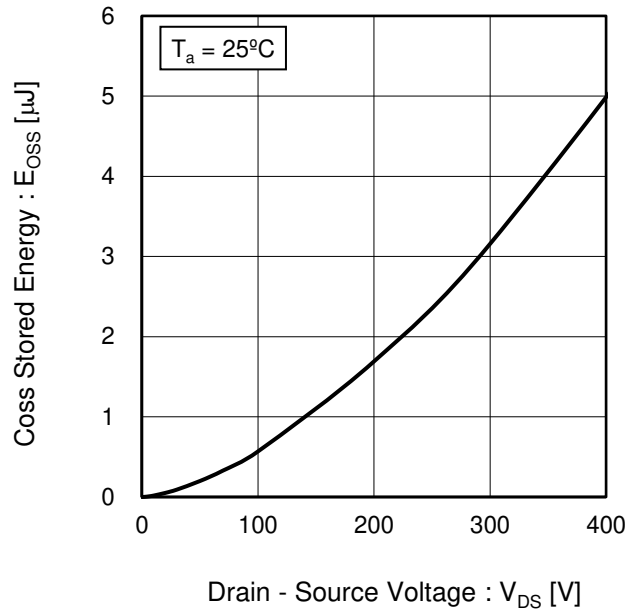


Fig.17 Switching Characteristics

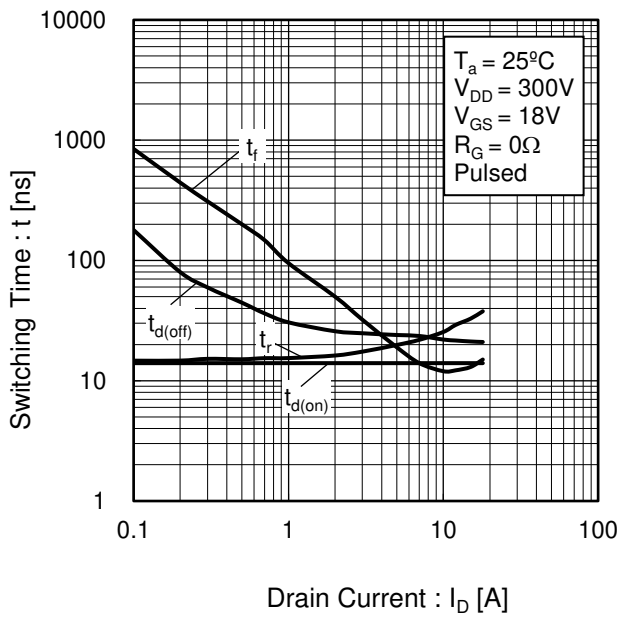
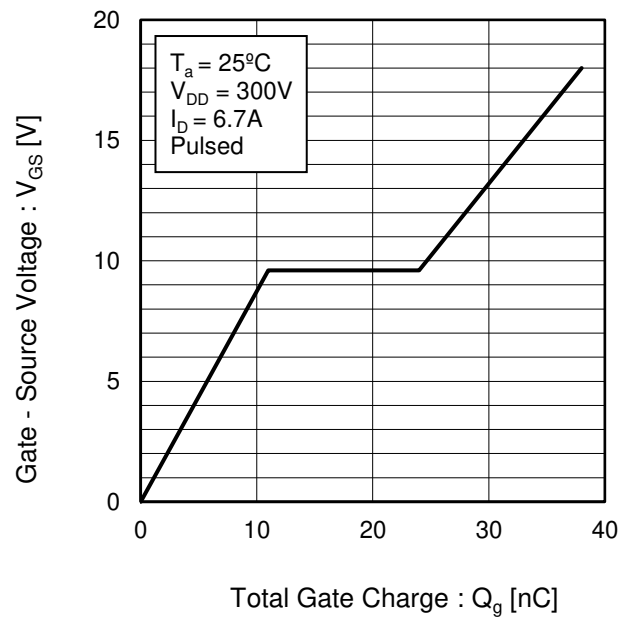


Fig.18 Dynamic Input Characteristics



●Electrical characteristic curves

Fig.19 Typical Switching Loss vs. Drain - Source Voltage

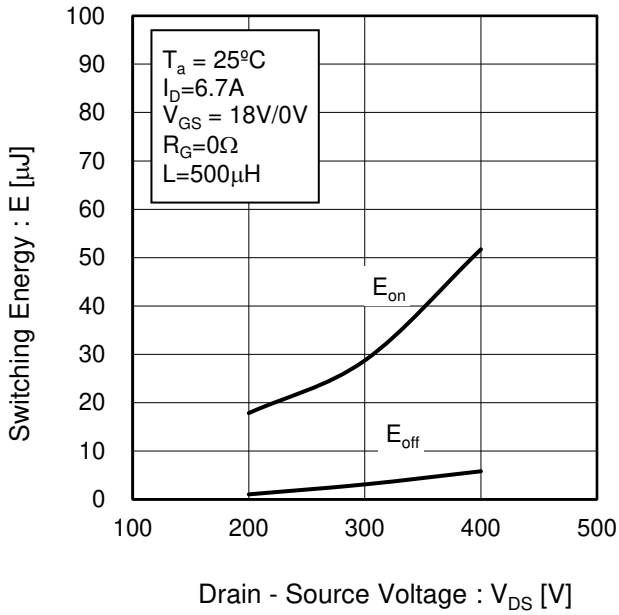


Fig.20 Typical Switching Loss vs. Drain Current

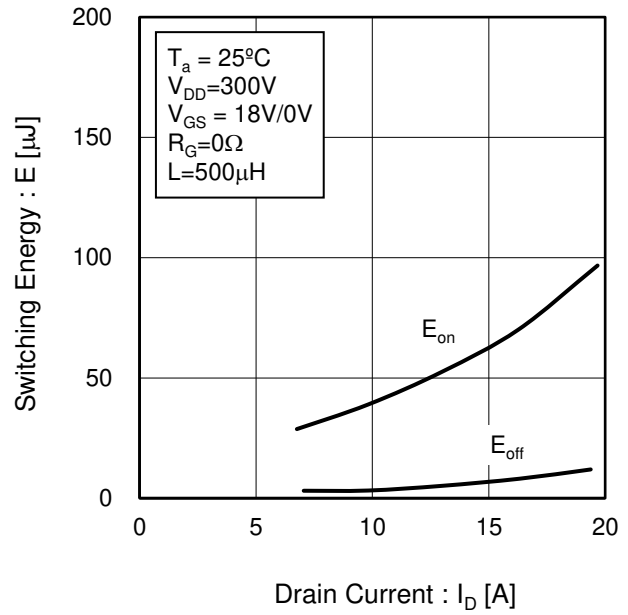
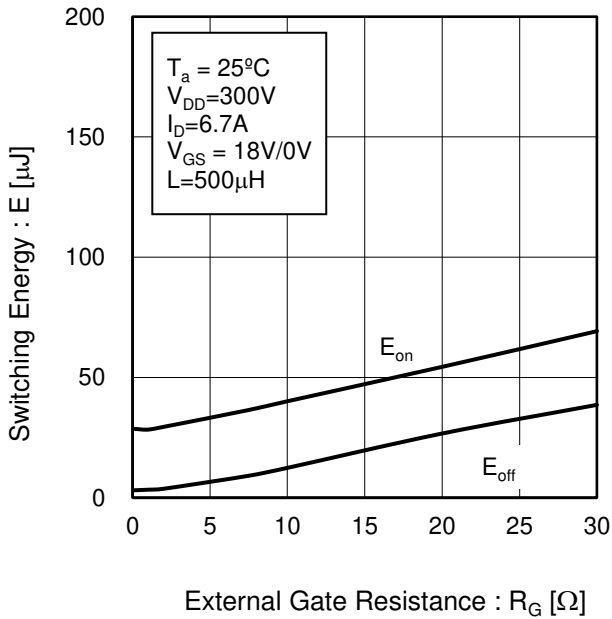


Fig.21 Typical Switching Loss vs. External Gate Resistance



●Electrical characteristic curves

Fig.22 Inverse Diode Forward Current vs. Source - Drain Voltage

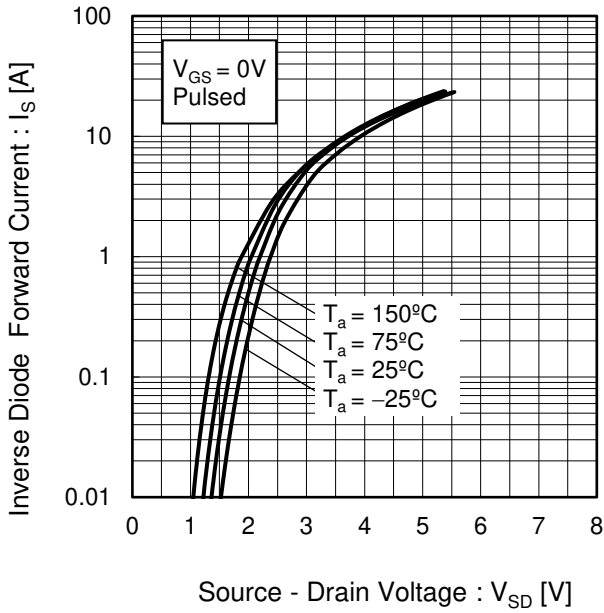
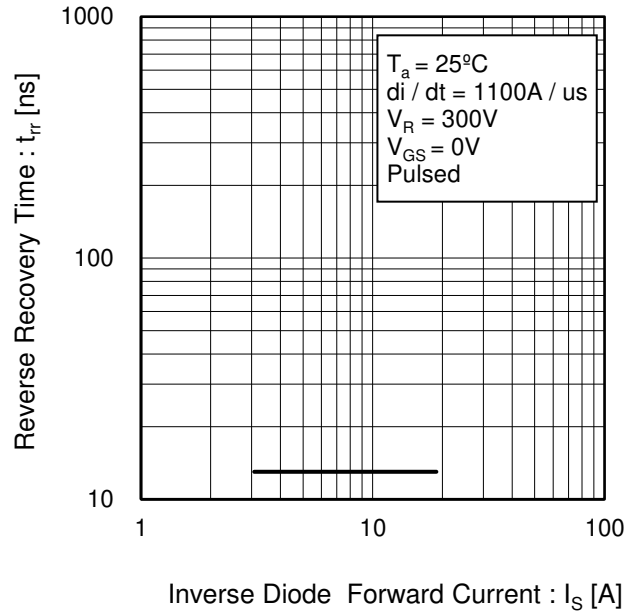


Fig.23 Reverse Recovery Time vs. Inverse Diode Forward Current



● Measurement circuits

Fig.1-1 Switching Time Measurement Circuit

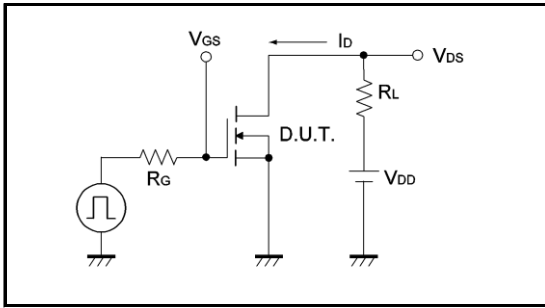


Fig.1-2 Switching Waveforms

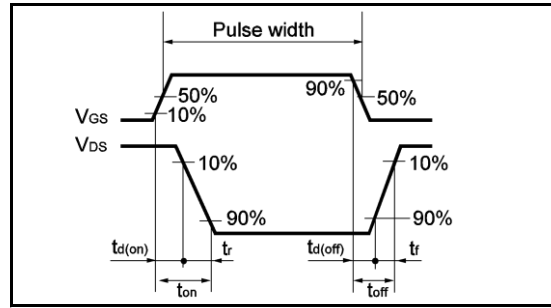


Fig.2-1 Gate Charge Measurement Circuit

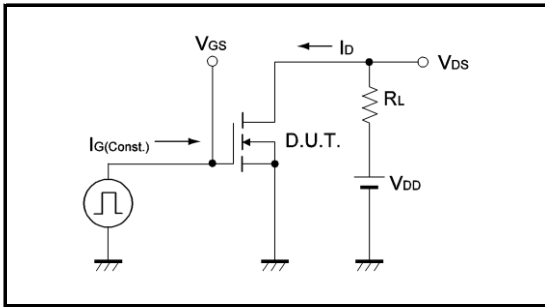


Fig.2-2 Gate Charge Waveform

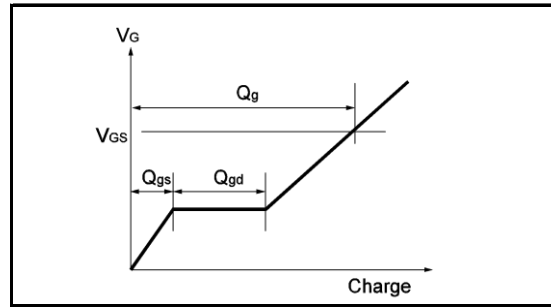


Fig.3-1 Switching Energy Measurement Circuit

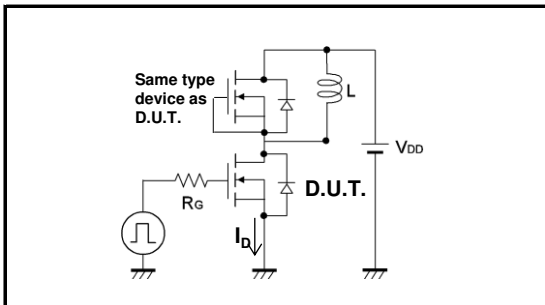


Fig.3-2 Switching Waveforms

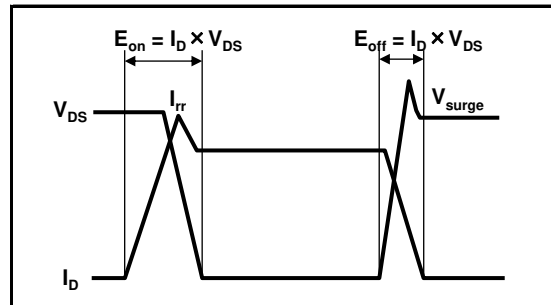


Fig.4-1 Reverse Recovery Time Measurement Circuit

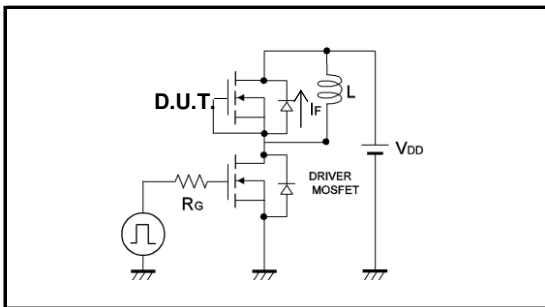
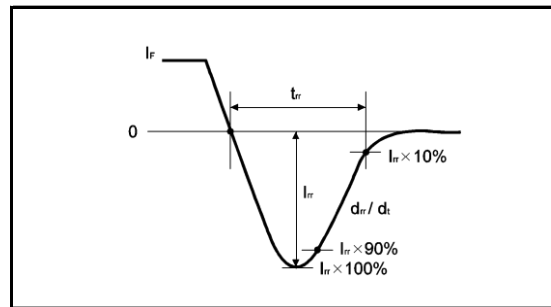


Fig.4-2 Reverse Recovery Waveform



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SCT3120AL - Web Page

[Distribution Inventory](#)

Part Number	SCT3120AL
Package	TO-247N
Unit Quantity	450
Minimum Package Quantity	30
Packing Type	Tube
Constitution Materials List	inquiry
RoHS	Yes