



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



$V_{DSS}$	1200V
$R_{DS(on)}$ (Typ.)	40mΩ
$I_D$	55A
$P_D$	262W

### ●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

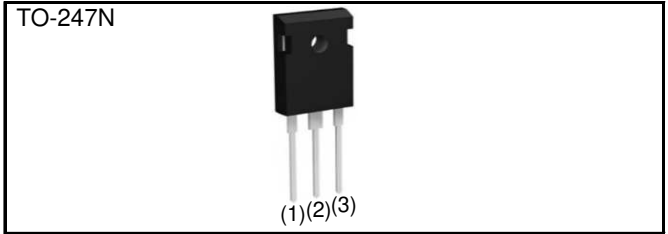
### ●Application

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

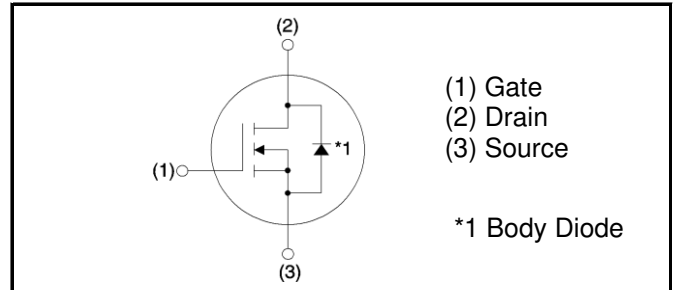
### ●Absolute maximum ratings ( $T_a = 25^\circ\text{C}$ )

Parameter	Symbol	Value	Unit	
Drain - Source voltage	$V_{DSS}$	1200	V	
Continuous drain current	$T_c = 25^\circ\text{C}$	$I_D^{*1}$	55	A
	$T_c = 100^\circ\text{C}$	$I_D^{*1}$	39	A
Pulsed drain current	$I_{D,pulse}^{*2}$	137	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	$^\circ\text{C}$	
Range of storage temperature	$T_{stg}$	-55 to +175	$^\circ\text{C}$	

### ●Outline



### ●Inner circuit



### ●Packaging specifications

Type	Packing	Tube
	Reel size (mm)	-
	Tape width (mm)	-
	Basic ordering unit (pcs)	30
	Taping code	C11
	Marking	SCT3040KL

### ● Thermal resistance

Parameter	Symbol	Values			Unit
		Min.	Typ.	Max.	
Thermal resistance, junction - case	$R_{thJC}$	-	0.44	0.57	°C/W

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

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Drain - Source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 1mA$	1200	-	-	V
Zero gate voltage drain current	$I_{DSS}$	$V_{DS} = 1200V, V_{GS} = 0V$ $T_j = 25^\circ\text{C}$	-	1	10	$\mu\text{A}$
		$T_j = 150^\circ\text{C}$	-	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	$V_{GS(th)}$	$V_{DS} = 10V, I_D = 10mA$	2.7	-	5.6	V
Static drain - source on - state resistance	$R_{DS(on)}^{*5}$	$V_{GS} = 18V, I_D = 20A$ $T_j = 25^\circ\text{C}$	-	40	52	$\text{m}\Omega$
		$T_j = 125^\circ\text{C}$	-	60	-	
Gate input resistance	$R_G$	$f = 1\text{MHz}, \text{open drain}$	-	7	-	$\Omega$

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

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Transconductance	$g_{fs}^{*5}$	$V_{DS} = 10\text{V}, I_D = 20\text{A}$	-	8.3	-	S
Input capacitance	$C_{iss}$	$V_{GS} = 0\text{V}$	-	1337	-	pF
Output capacitance	$C_{oss}$	$V_{DS} = 800\text{V}$	-	76	-	
Reverse transfer capacitance	$C_{rss}$	$f = 1\text{MHz}$	-	27	-	
Effective output capacitance, energy related	$C_{o(er)}$	$V_{GS} = 0\text{V}$ $V_{DS} = 0\text{V to } 600\text{V}$	-	122	-	pF
Turn - on delay time	$t_{d(on)}^{*5}$	$V_{DD} = 400\text{V}, I_D = 18\text{A}$	-	21	-	ns
Rise time	$t_r^{*5}$	$V_{GS} = 18\text{V}/0\text{V}$	-	39	-	
Turn - off delay time	$t_{d(off)}^{*5}$	$R_L = 22\Omega$	-	49	-	
Fall time	$t_f^{*5}$	$R_G = 0\Omega$	-	24	-	
Turn - on switching loss	$E_{on}^{*5}$	$V_{DD} = 600\text{V}, I_D = 20\text{A}$ $V_{GS} = 18\text{V}/0\text{V}$	-	283	-	$\mu\text{J}$
Turn - off switching loss	$E_{off}^{*5}$	$R_G = 0\Omega, L = 250\mu\text{H}$ * $E_{on}$ includes diode reverse recovery	-	118	-	

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

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Total gate charge	$Q_g^{*5}$	$V_{DD} = 600\text{V}$	-	107	-	nC
Gate - Source charge	$Q_{gs}^{*5}$	$I_D = 20\text{A}$	-	22	-	
Gate - Drain charge	$Q_{gd}^{*5}$	$V_{GS} = 18\text{V}$	-	41	-	
Gate plateau voltage	$V_{(plateau)}$	$V_{DD} = 600\text{V}, I_D = 20\text{A}$	-	9.6	-	V

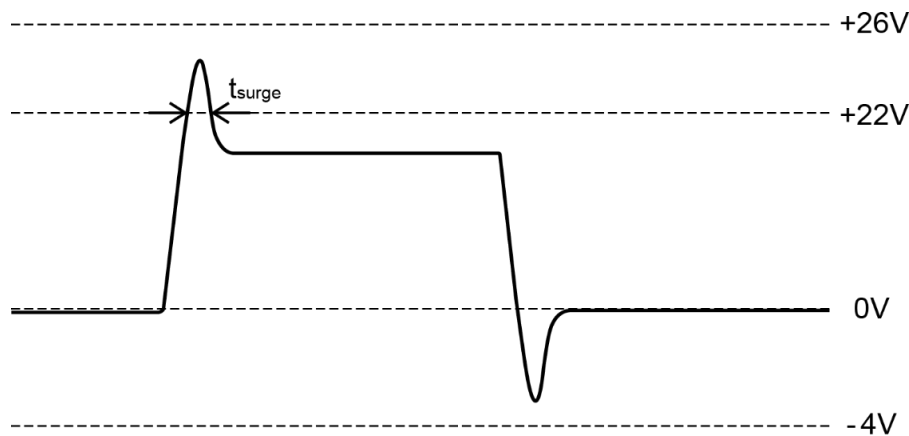
**●Body diode electrical characteristics (Source-Drain) ( $T_a = 25^\circ\text{C}$ )**

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Inverse diode continuous, forward current	$I_S^{*1}$	$T_c = 25^\circ\text{C}$	-	-	55	A
Inverse diode direct current, pulsed	$I_{SM}^{*2}$		-	-	137	A
Forward voltage	$V_{SD}^{*5}$	$V_{GS} = 0\text{V}, I_S = 20\text{A}$	-	3.2	-	V
Reverse recovery time	$t_{rr}^{*5}$	$I_F = 20\text{A}, V_R = 600\text{V}$ $di/dt = 1100\text{A}/\mu\text{s}$	-	25	-	ns
Reverse recovery charge	$Q_{rr}^{*5}$		-	115	-	nC
Peak reverse recovery current	$I_{rrm}^{*5}$		-	9	-	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

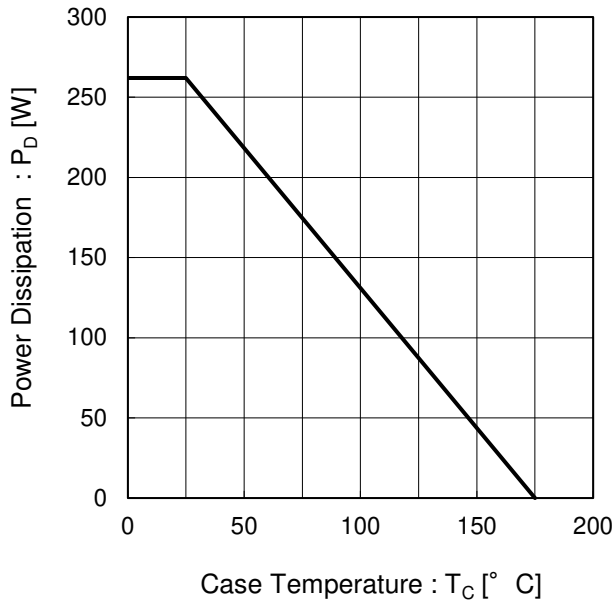


Fig.2 Maximum Safe Operating Area

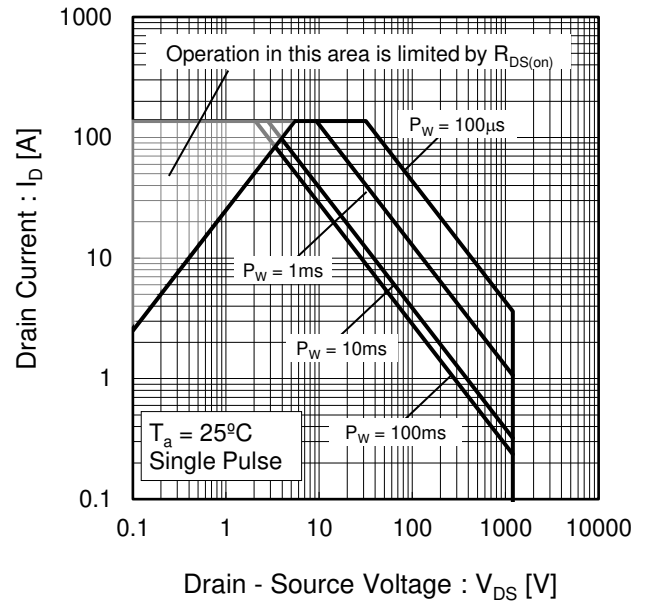
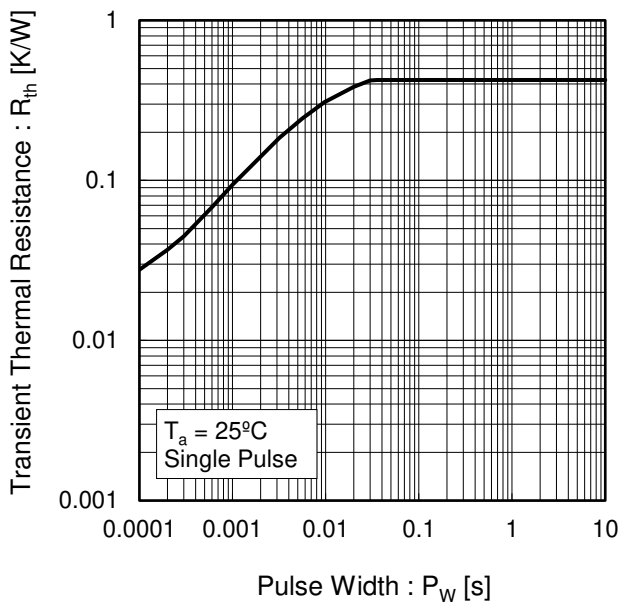


Fig.3 Typical Transient Thermal Resistance vs. Pulse Width



●Electrical characteristic curves

Fig.4 Typical Output Characteristics(I)

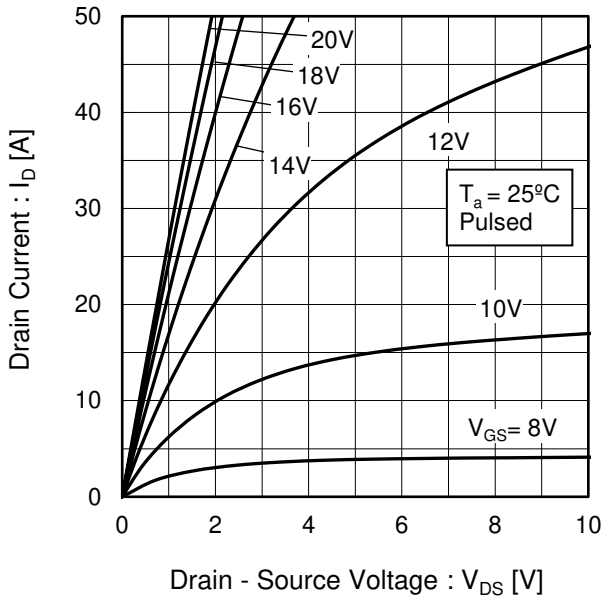


Fig.5 Typical Output Characteristics(II)

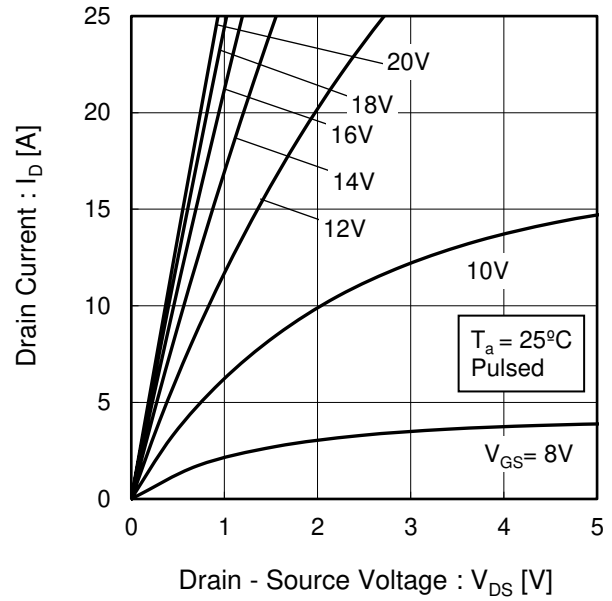


Fig.6  $T_j = 150^\circ\text{C}$  Typical Output Characteristics(I)

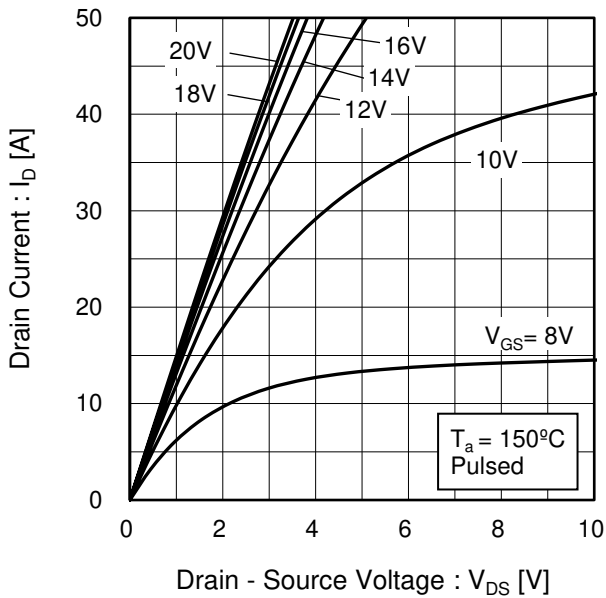
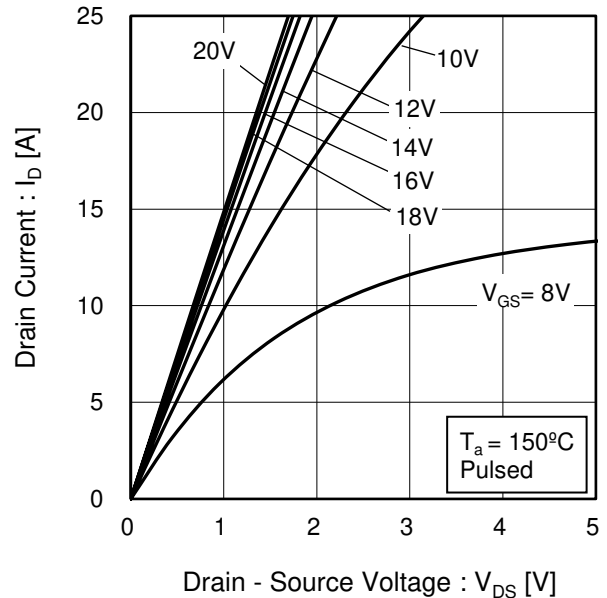


Fig.7  $T_j = 150^\circ\text{C}$  Typical Output Characteristics(II)



●Electrical characteristic curves

Fig.8 Typical Transfer Characteristics (I)

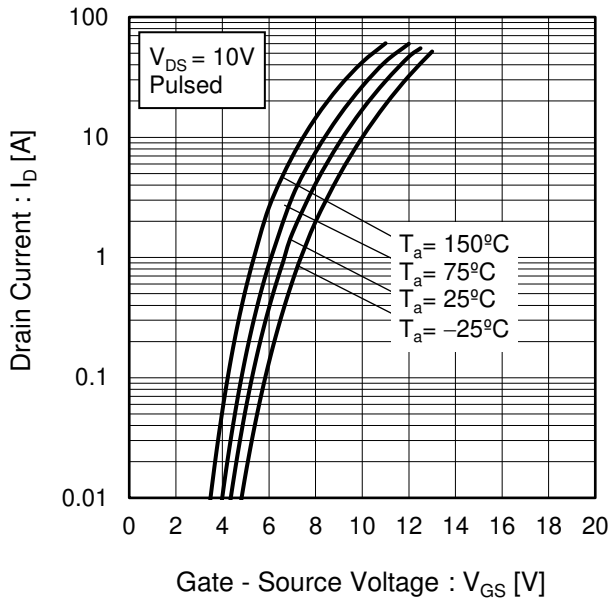


Fig.9 Typical Transfer Characteristics (II)

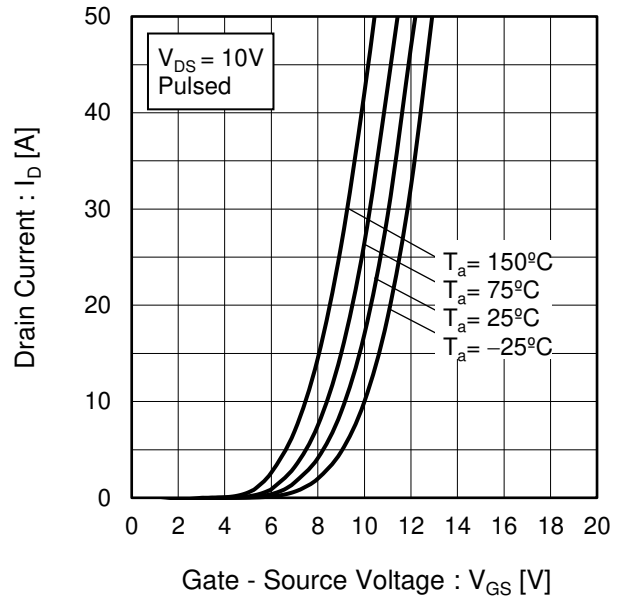


Fig.10 Gate Threshold Voltage vs. Junction Temperature

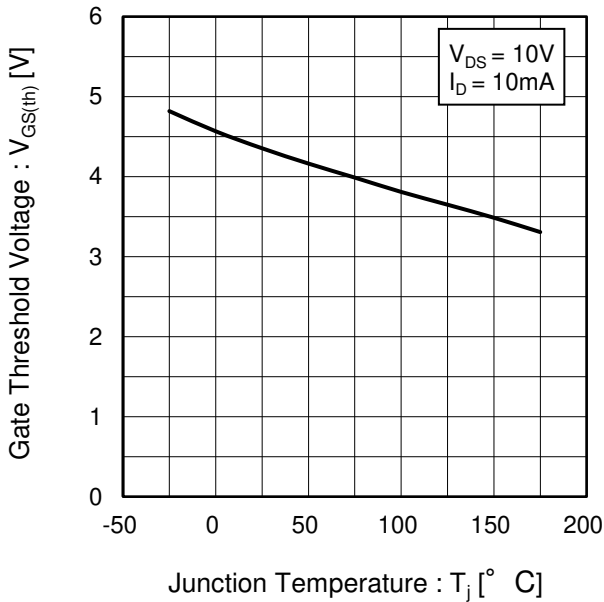
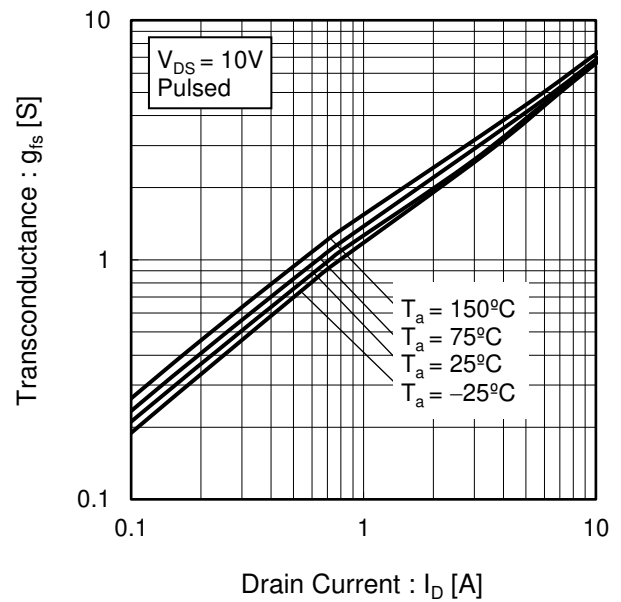


Fig.11 Transconductance vs. Drain Current



●Electrical characteristic curves

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

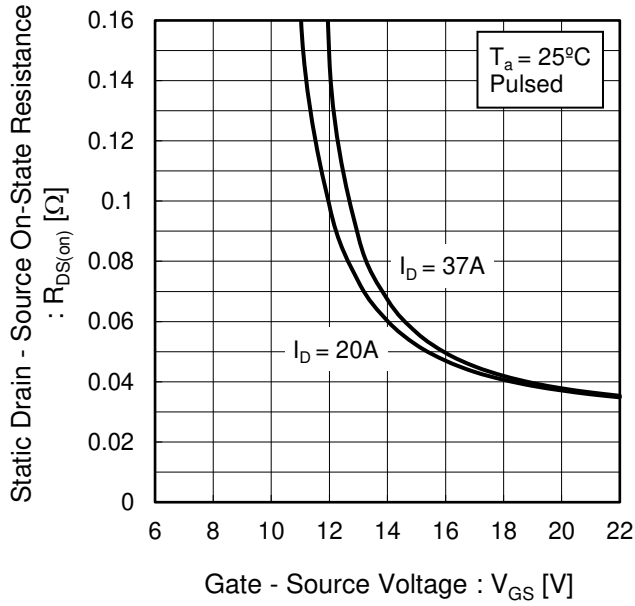


Fig.13 Static Drain - Source On - State Resistance vs. Junction Temperature

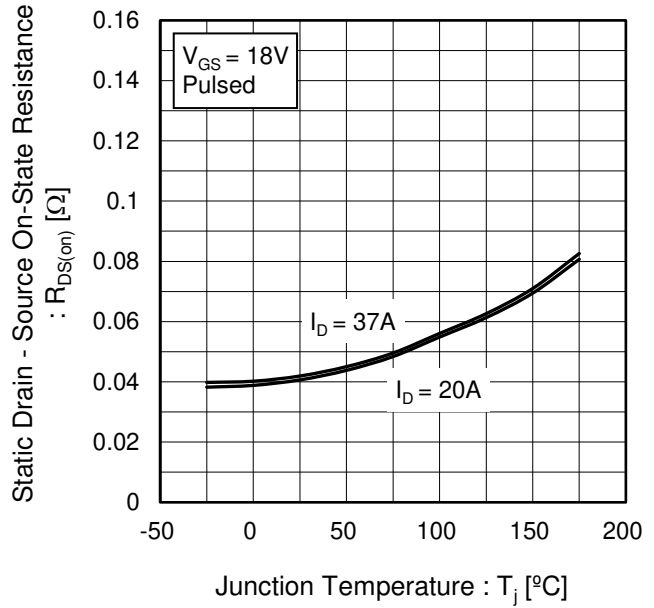
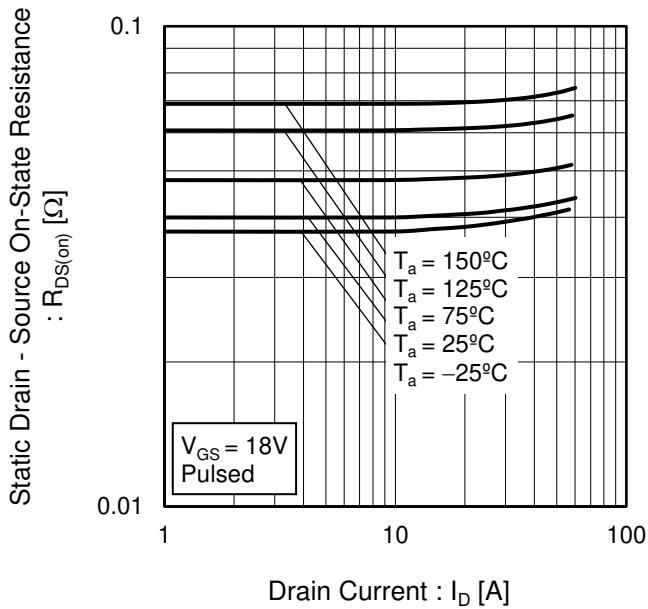


Fig.14 Static Drain - Source On - State Resistance vs. Drain Current



●Electrical characteristic curves

Fig.15 Typical Capacitance vs. Drain - Source Voltage

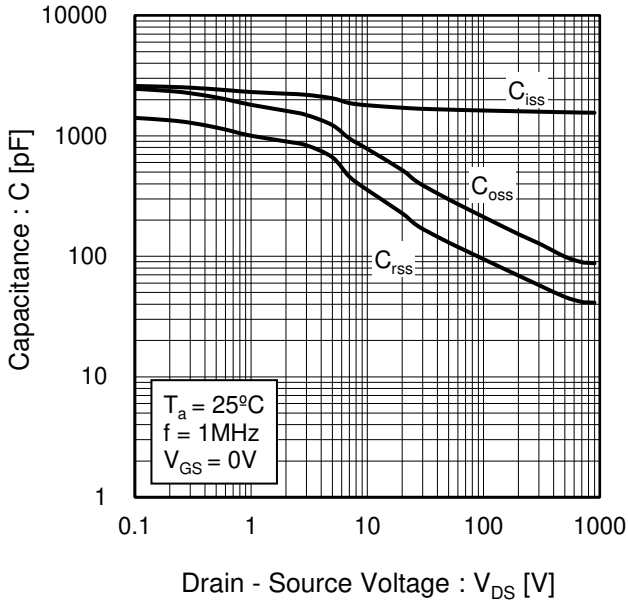


Fig.16 Coss Stored Energy

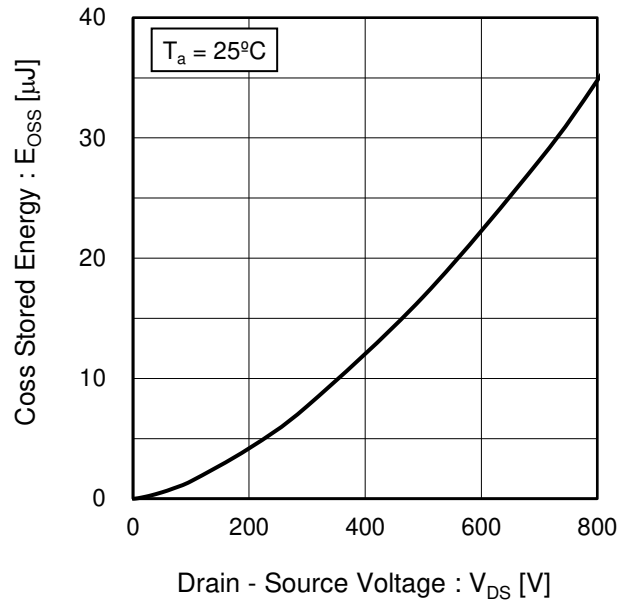


Fig.17 Switching Characteristics

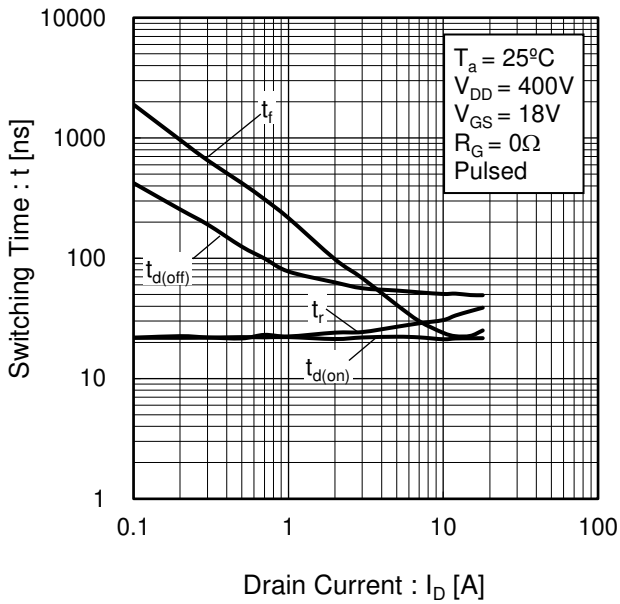
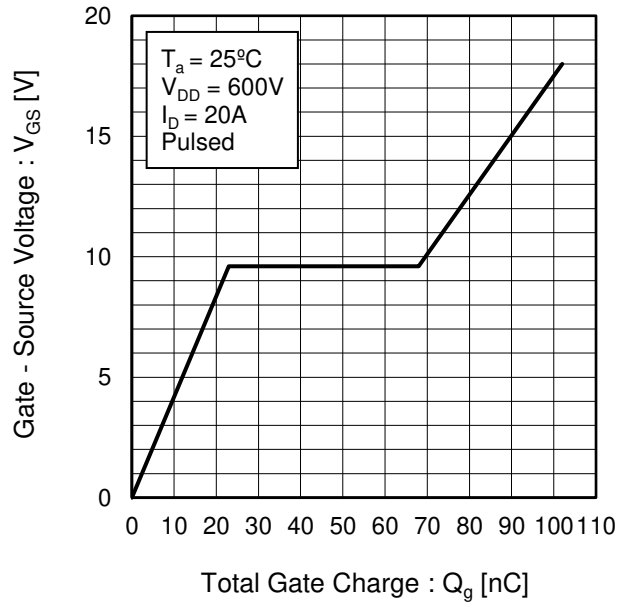


Fig.18 Dynamic Input Characteristics



●Electrical characteristic curves

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

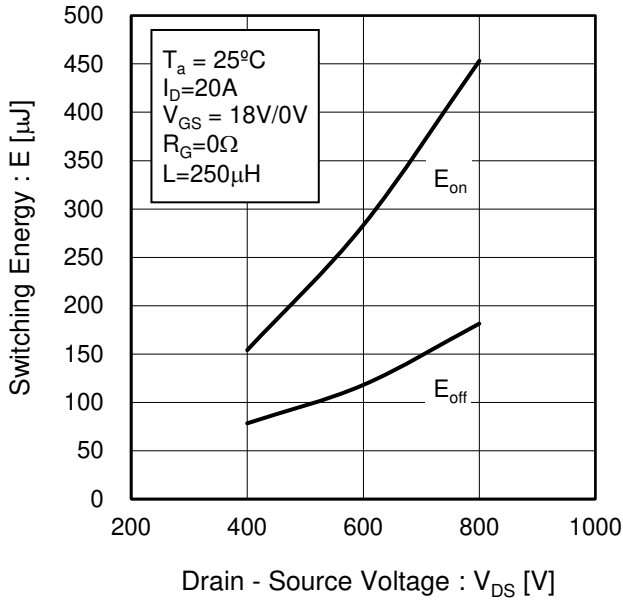


Fig.20 Typical Switching Loss vs. Drain Current

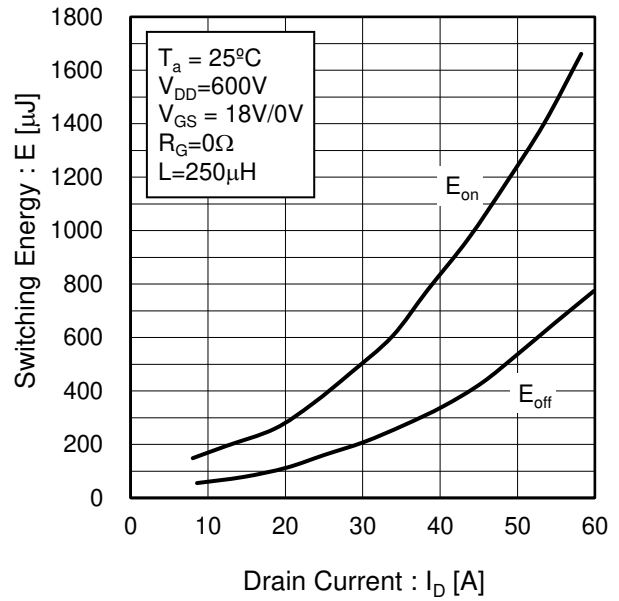
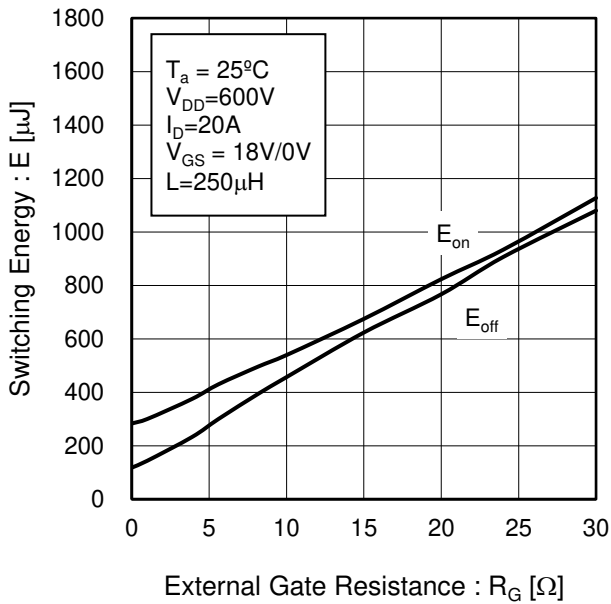


Fig.21 Typical Switching Loss vs. External Gate Resistance



●Electrical characteristic curves

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

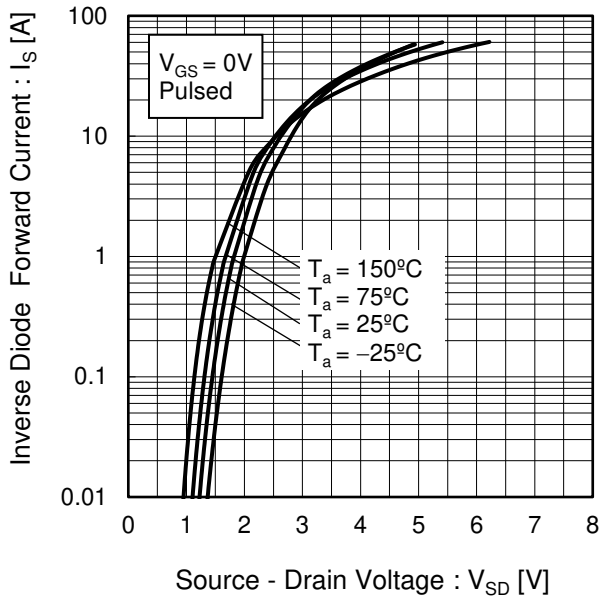
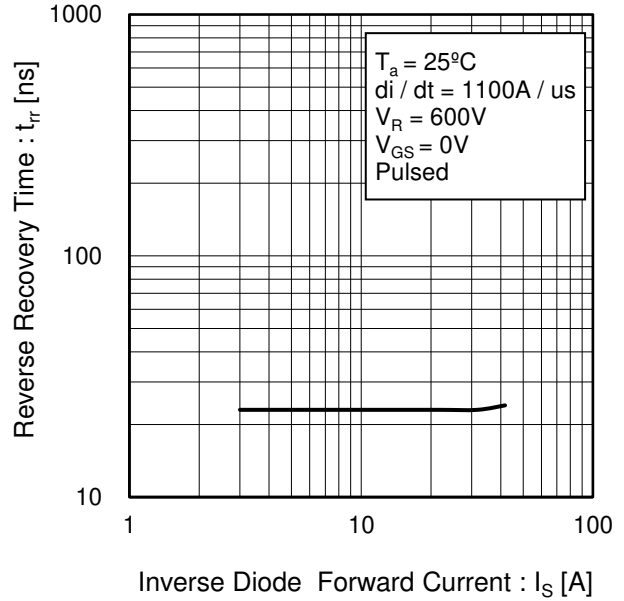


Fig.23 Reverse Recovery Time vs. Inverse Diode Forward Current



● Measurement circuits

Fig.1-1 Switching Time Measurement Circuit

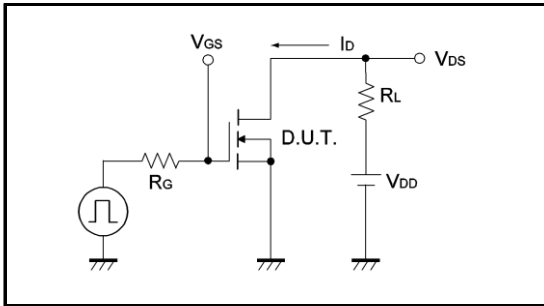


Fig.1-2 Switching Waveforms

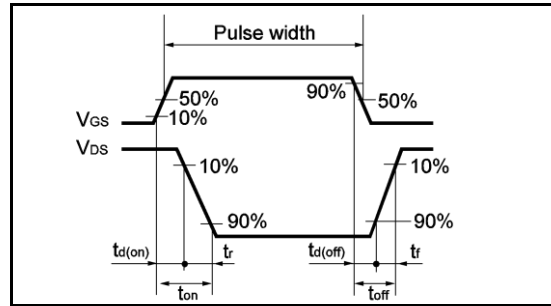


Fig.2-1 Gate Charge Measurement Circuit

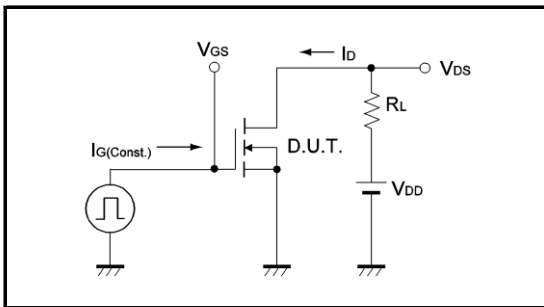


Fig.2-2 Gate Charge Waveform

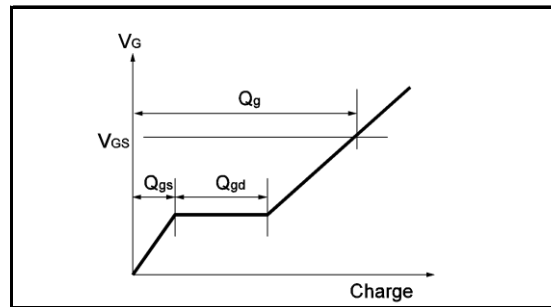


Fig.3-1 Switching Energy Measurement Circuit

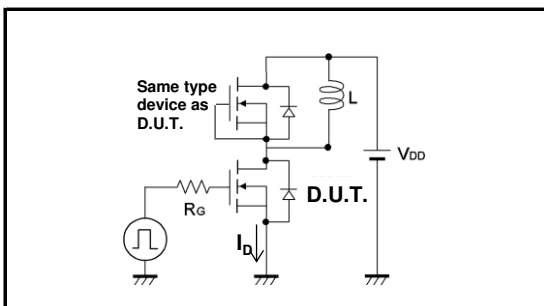


Fig.3-2 Switching Waveforms

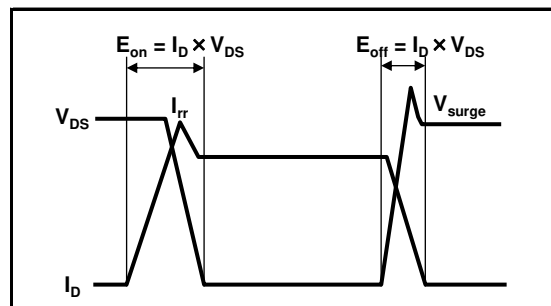


Fig.4-1 Reverse Recovery Time Measurement Circuit

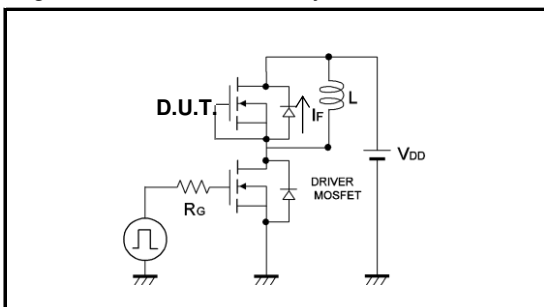
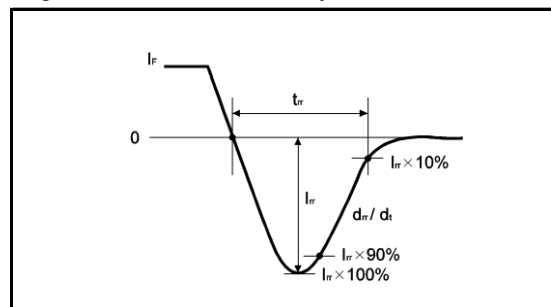


Fig.4-2 Reverse Recovery Waveform



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SCT3040KL - Web Page

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Part Number	SCT3040KL
Package	TO-247N
Unit Quantity	450
Minimum Package Quantity	30
Packing Type	Tube
Constitution Materials List	inquiry
RoHS	Yes