

## SCT3105KLGC11-VB Datasheet

### N-Channel 1200 V(D-S) SiC Power MOSFET

PRODUCT SUMMARY		
V <sub>DS</sub> (V)	1200	
R <sub>DS(on)</sub> at 25 °C (Ω)	V <sub>GS</sub> = 18 V	0.08
Q <sub>g</sub> (nC)	110	

#### FEATURES

- Low figure-of-merit (FOM)  $R_{on} \times Q_g$
- Low input capacitance ( $C_{iss}$ )
- Reduced switching and conduction losses
- Ultra low gate charge ( $Q_g$ )
- Avalanche energy rated (UIS)



RoHS

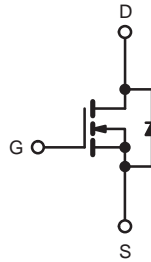
#### APPLICATIONS

- Server and telecom power supplies
- Switch mode power supplies (SMPS)
- Power factor correction power supplies (PFC)
- DC/DC converter

TO-247



Top View



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T <sub>C</sub> = 25 °C, unless otherwise noted)					
PARAMETER			SYMBOL	LIMIT	UNIT
Drain-Source Voltage			V <sub>DS</sub>	1200	V
Gate-Source Voltage			V <sub>GS</sub>	-10 / +22	
Continuous Drain Current (T <sub>J</sub> = 150 °C)	V <sub>GS</sub> at 18 V	T <sub>C</sub> = 25 °C	I <sub>D</sub>	30	A
		T <sub>C</sub> = 100 °C		21	
Pulsed Drain Current <sup>a</sup>			I <sub>DM</sub>	90	
Linear Derating Factor				2.1	W/°C
Single Pulse Avalanche Energy <sup>b</sup>			E <sub>AS</sub>	1200	mJ
Maximum Power Dissipation			P <sub>D</sub>	320	W
Operating Junction and Storage Temperature Range			T <sub>J</sub> , T <sub>stg</sub>	-55 to +175	°C
Drain-Source Voltage Slope	T <sub>J</sub> = 125 °C		dV/dt	50	V/ns
Reverse Diode dV/dt <sup>d</sup>		15			
Soldering Recommendations (Peak Temperature) <sup>c</sup>	for 10 s			260	°C


#### Notes

- Repetitive rating; pulse width limited by maximum junction temperature.
- $V_{DD} = 100$  V, starting  $T_J = 25$  °C,  $L = 30$  mH,  $R_g = 25$   $\Omega$ ,  $I_{AS} = 9$  A.
- 1.6 mm from case.
- $I_{SD} \leq I_D$ ,  $dI/dt = 100$  A/ $\mu$ s, starting  $T_J = 25$  °C.

**THERMAL RESISTANCE RATINGS**

PARAMETER	SYMBOL	TYP.	MAX.	UNIT
Maximum Junction-to-Ambient	$R_{thJA}$	-	40	°C/W
Maximum Junction-to-Case (Drain)	$R_{thJC}$	-	0.47	

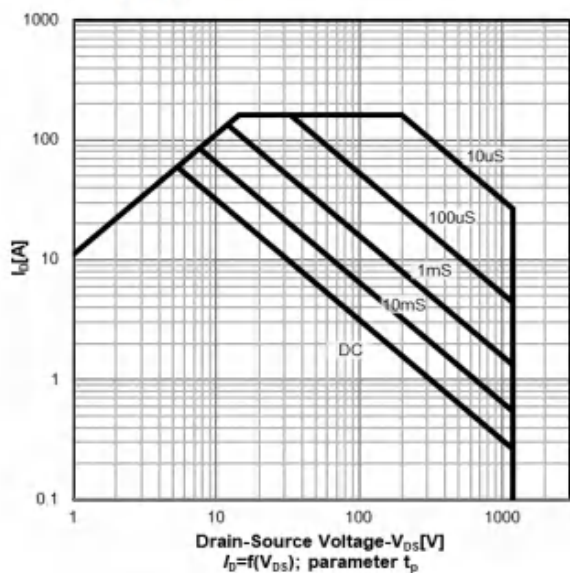
**SPECIFICATIONS** ( $T_J = 25\text{ }^{\circ}\text{C}$ , unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{GS} = 0\text{ V}$ , $I_D = 1\text{ mA}$	1200	-	-	V
$V_{DS}$ Temperature Coefficient	$\Delta V_{DS}/T_J$	Reference to $25\text{ }^{\circ}\text{C}$ , $I_D = 1\text{ mA}$	-	0.70	-	V/ $^{\circ}\text{C}$
Gate-Source Threshold Voltage (N)	$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 10\text{ mA}$	2.5	-	4.5	V
Gate-Source Leakage	$I_{GSS}$	$V_{GS} = +22\text{ V}$	-	-	100	nA
		$V_{GS} = -10\text{ V}$	-	-	100	$\mu\text{A}$
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 960\text{ V}$ , $V_{GS} = 0\text{ V}$	-	10	-	$\mu\text{A}$
		$V_{DS} = 960\text{ V}$ , $V_{GS} = 0\text{ V}$ , $T_J = 125\text{ }^{\circ}\text{C}$	-	-	100	
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS} = 18\text{ V}$ , $I_D = 30\text{ A}$	-	0.08	-	$\Omega$
Forward Transconductance	$g_{fs}$	$V_{DS} = 0\text{ V}$ , $I_D = 30\text{ A}$	-	16	-	S
<b>Dynamic</b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0\text{ V}$ , $V_{DS} = 800\text{ V}$ , $f = 1\text{ MHz}$	-	3000	-	pF
Output Capacitance	$C_{oss}$		-	123	-	
Reverse Transfer Capacitance	$C_{rss}$		-	10	-	
Effective Output Capacitance, Energy Related <sup>a</sup>	$C_{o(er)}$	$V_{DS} = 0\text{ V to } 800\text{ V}$ , $V_{GS} = 0\text{ V}$	-	156	-	pF
Effective Output Capacitance, Time Related <sup>b</sup>	$C_{o(tr)}$		-	268	-	
Total Gate Charge	$Q_g$	$V_{GS} = -5/18\text{ V}$ , $I_D = 20\text{ A}$ , $V_{DS} = 800\text{ V}$	-	101	-	nC
Gate-Source Charge	$Q_{gs}$		-	29	-	
Gate-Drain Charge	$Q_{gd}$		-	33	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 800\text{ V}$ , $I_D = 20\text{ A}$ , $V_{GS} = -5/18\text{ V}$ , $R_g = 2\text{ }\Omega$	-	18	25	ns
Rise Time	$t_r$		-	24	55	
Turn-Off Delay Time	$t_{d(off)}$		-	80	-	
Fall Time	$t_f$		-	12	-	
Gate Input Resistance	$R_g$	$f = 1\text{ MHz}$ , open drain	-	3.2	-	$\Omega$
<b>Drain-Source Body Diode Characteristics</b>						
Continuous Source-Drain Diode Current	$I_S$	MOSFET symbol showing the integral reverse p - n junction diode 	-	-	30	A
Pulsed Diode Forward Current	$I_{SM}$		-	-	90	
Diode Forward Voltage	$V_{SD}$	$T_J = 25\text{ }^{\circ}\text{C}$ , $I_S = 30\text{ A}$ , $V_{GS} = 0$	-	-	4.1	V
Reverse Recovery Time	$t_{rr}$	$T_J = 25\text{ }^{\circ}\text{C}$ , $I_F = I_S = 30\text{ A}$ , $di/dt = 1000\text{ A}/\mu\text{s}$ , $V_R = 800\text{ V}$	-	75	-	ns
Reverse Recovery Charge	$Q_{rr}$		-	220	-	$\mu\text{C}$
Reverse Recovery Current	$I_{RRM}$		-	60	-	A

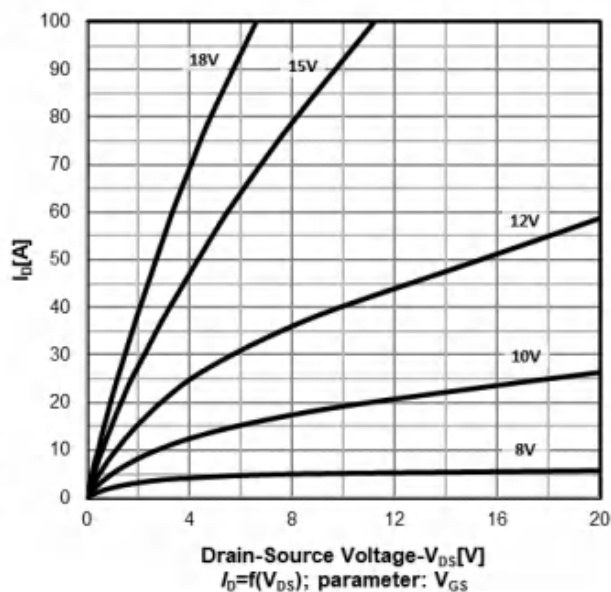
**Notes**

- a.  $C_{oss(er)}$  is a fixed capacitance that gives the same energy as  $C_{oss}$  while  $V_{DS}$  is rising from 0 % to 80 %  $V_{DSS}$ .  
 b.  $C_{oss(tr)}$  is a fixed capacitance that gives the same charging time as  $C_{oss}$  while  $V_{DS}$  is rising from 0 % to 80 %  $V_{DSS}$ .

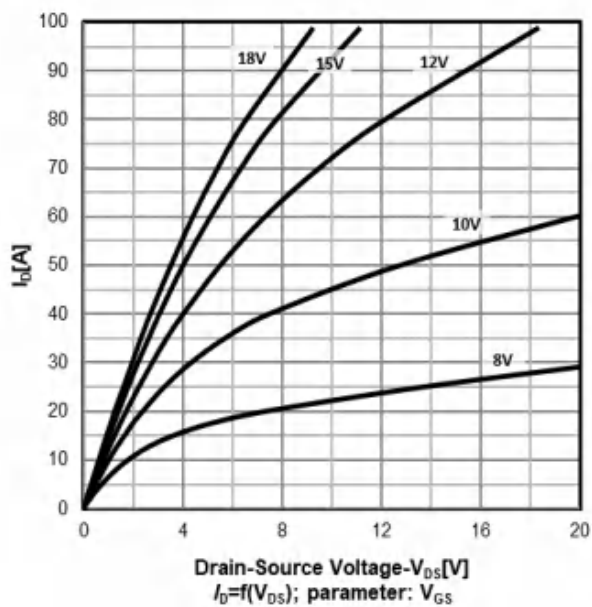
Safe operating area  $T_c=25^\circ\text{C}$   
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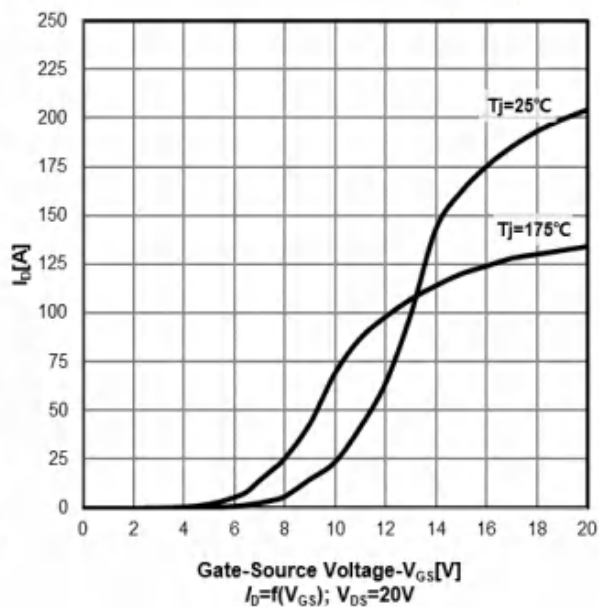
On-Region characteristics  $T_j=25^\circ\text{C}$



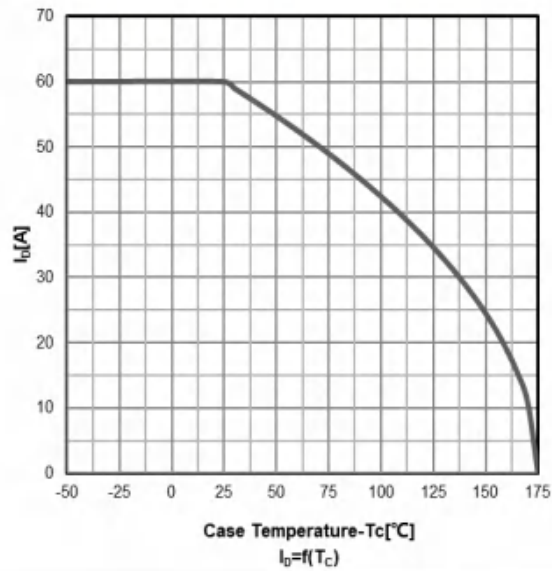
On-Region characteristics  $T_j=175^\circ\text{C}$



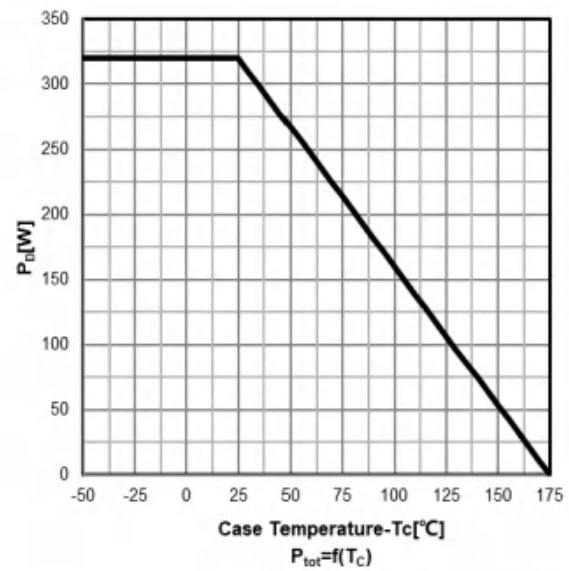
Transfer characteristics



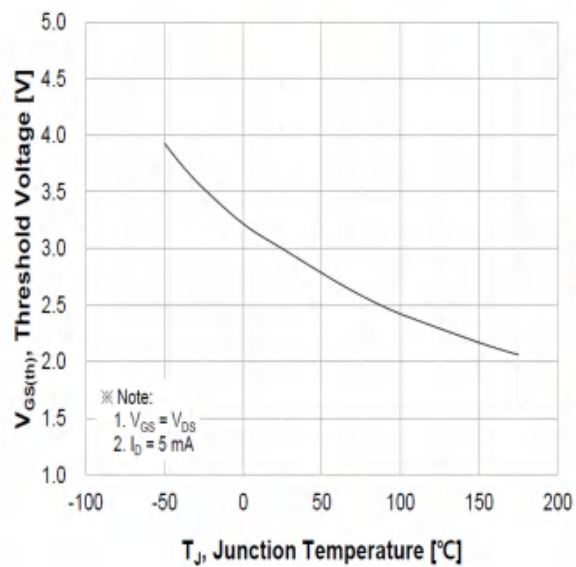
Drain current vs temperature



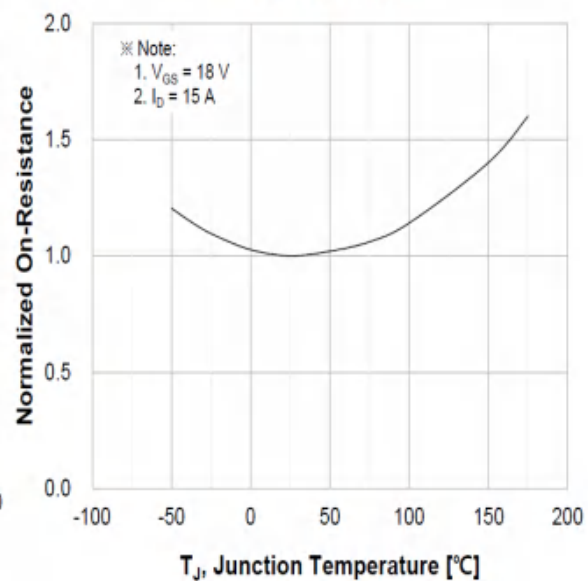
Power dissipation



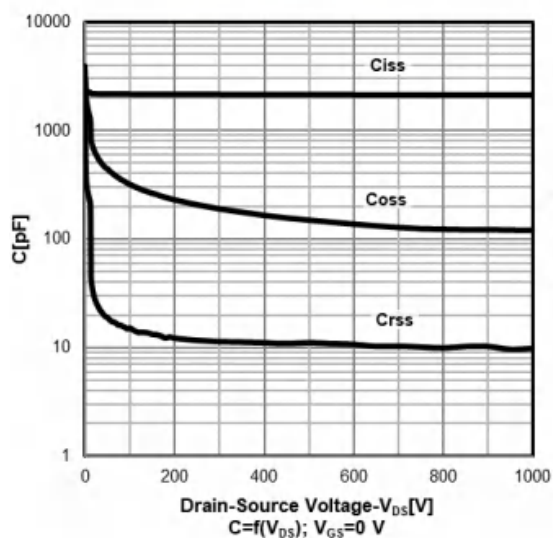
Threshold voltage vs temperature



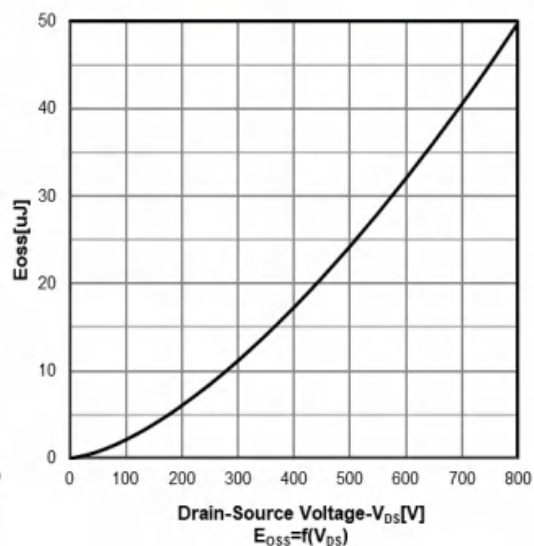
Normalized On-resistance vs temperature



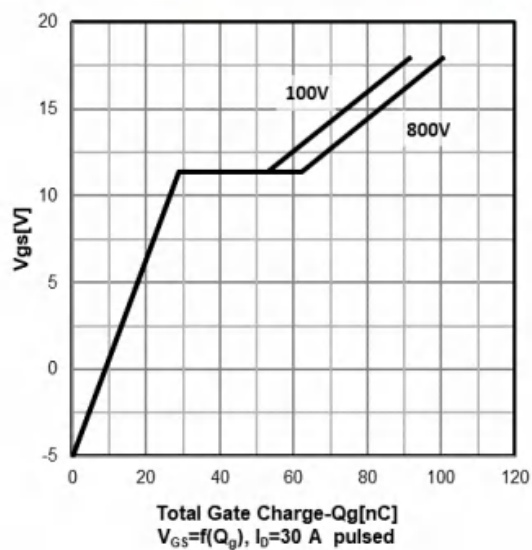
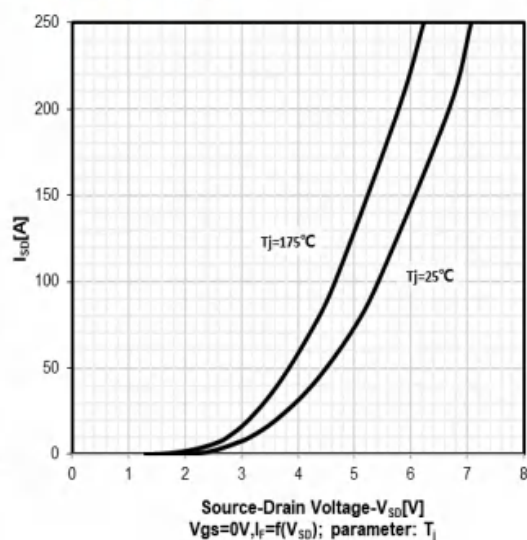
Typ. capacitances



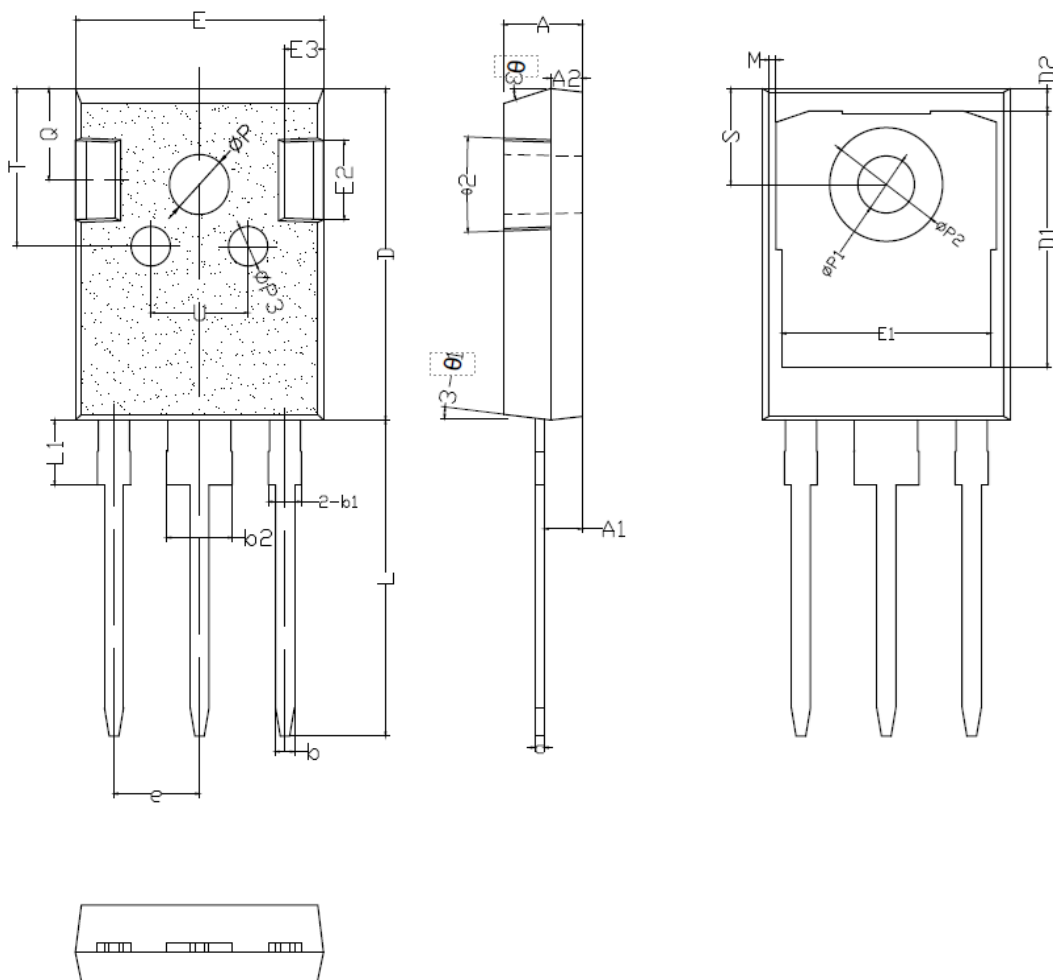
Coss stored energy



Typ. gate charge characteristics

Diode forward voltage characteristics  
 $T_J=25^\circ\text{C}/175^\circ\text{C}$ 

## TO-247 PACKAGE OUTLINE DIMENSIONS



SYMBOL	mm		
	MIN	NOM	MAX
*A	4.90	5.00	5.10
*A1	2.31	2.41	2.51
A2	1.90	2.00	2.10
*b	1.15	1.20	1.25
*b1	1.95	2.10	2.25
*b2	2.95	3.10	3.25
*c	0.55	0.60	0.65
*D	20.90	21.00	21.10
D1	16.35	16.55	16.75
D2	1.05	1.20	1.35

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