

SCT3105KLGC11-VB Datasheet

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

PRODUCT SUMMARY		
V_{DS} (V)	1200	
$R_{DS(on)}$ at 25 °C (Ω)	$V_{GS} = 18$ V	0.08
Q_g (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)



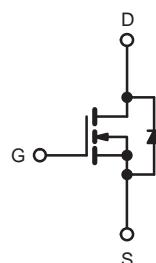
APPLICATIONS

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

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Top View



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS ($T_C = 25$ °C, unless otherwise noted)				
PARAMETER		SYMBOL	LIMIT	UNIT
Drain-Source Voltage		V_{DS}	1200	V
Gate-Source Voltage		V_{GS}	-10 / +22	
Continuous Drain Current ($T_J = 150$ °C)	V_{GS} at 18 V	I_D	30	A
	$T_C = 25$ °C		21	
Pulsed Drain Current ^a		I_{DM}	90	
Linear Derating Factor			2.1	W/°C
Single Pulse Avalanche Energy ^b		E_{AS}	1200	mJ
Maximum Power Dissipation		P_D	320	W
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to +175	°C
Drain-Source Voltage Slope	$T_J = 125$ °C	dV/dt	50	V/ns
Reverse Diode dV/dt ^d			15	
Soldering Recommendations (Peak Temperature) ^c	for 10 s		260	°C

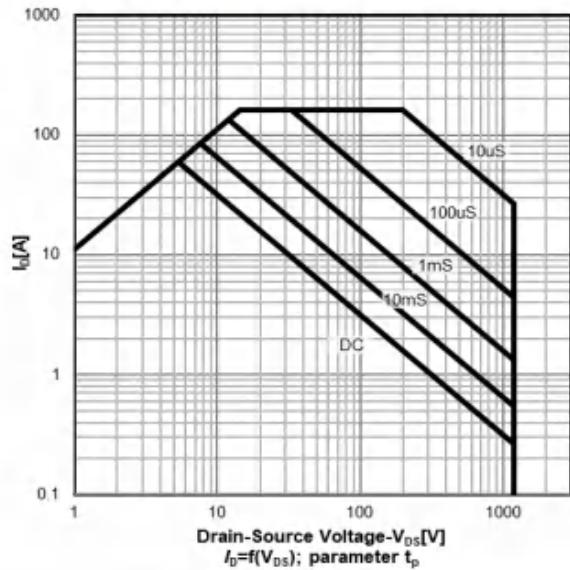
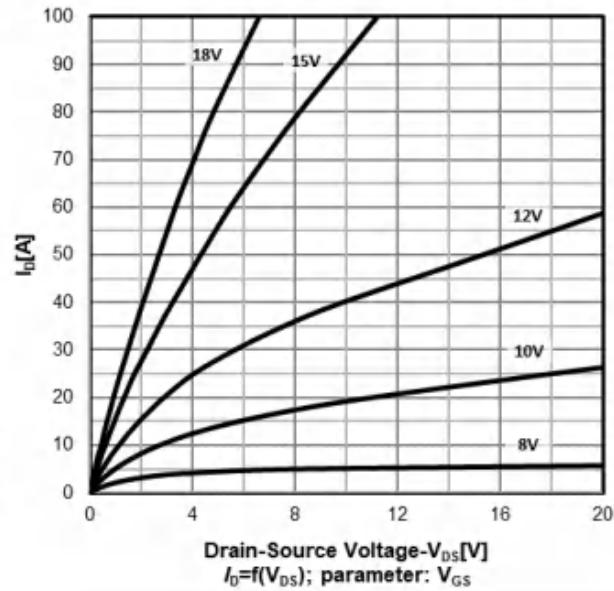
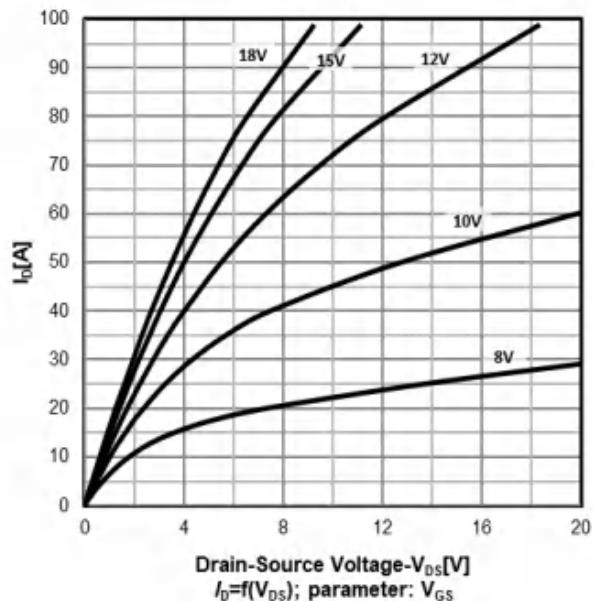
Notes

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

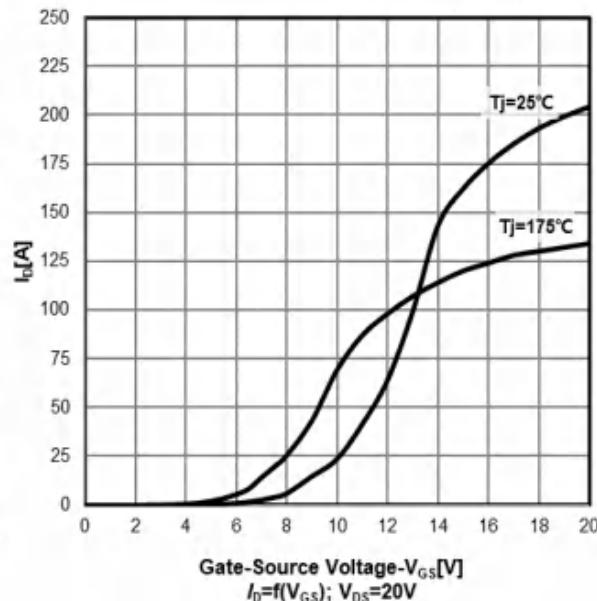
THERMAL RESISTANCE RATINGS							
PARAMETER	SYMBOL	TYP.	MAX.	UNIT			
Maximum Junction-to-Ambient	R_{thJA}	-	40	$^{\circ}\text{C}/\text{W}$			
Maximum Junction-to-Case (Drain)	R_{thJC}	-	0.47				
SPECIFICATIONS ($T_J = 25^{\circ}\text{C}$, unless otherwise noted)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	
Static							
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0 \text{ V}$, $I_D = 1 \text{ mA}$		1200	-	-	
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	Reference to 25°C , $I_D = 1 \text{ mA}$		-	0.70	-	
Gate-Source Threshold Voltage (N)	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 10 \text{ mA}$		2.5	-	4.5	
Gate-Source Leakage	I_{GSS}	$V_{GS} = +22 \text{ V}$		-	-	100	
		$V_{GS} = -10 \text{ V}$		-	-	100	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 960 \text{ V}$, $V_{GS} = 0 \text{ V}$		-	10	-	
		$V_{DS} = 960 \text{ V}$, $V_{GS} = 0 \text{ V}$, $T_J = 125^{\circ}\text{C}$		-	-	100	
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS} = 18 \text{ V}$	$I_D = 30 \text{ A}$	-	0.08	-	
Forward Transconductance	g_{fs}	$V_{DS} = 0 \text{ V}$, $I_D = 30 \text{ A}$		-	16	-	
Dynamic							
Input Capacitance	C_{iss}	$V_{GS} = 0 \text{ V}$, $V_{DS} = 800 \text{ V}$, $f = 1 \text{ MHz}$		-	3000	-	
Output Capacitance	C_{oss}			-	123	-	
Reverse Transfer Capacitance	C_{rss}			-	10	-	
Effective Output Capacitance, Energy Related ^a	$C_{o(er)}$			-	156	-	
Effective Output Capacitance, Time Related ^b	$C_{o(tr)}$	$V_{DS} = 0 \text{ V to } 800 \text{ V}$, $V_{GS} = 0 \text{ V}$		-	268	-	
Total Gate Charge	Q_g			-	101	-	
Gate-Source Charge	Q_{gs}	$V_{GS} = -5/18 \text{ V}$	$I_D = 20 \text{ A}$, $V_{DS} = 800 \text{ V}$	-	29	-	
Gate-Drain Charge	Q_{gd}			-	33	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 800 \text{ V}$, $I_D = 20 \text{ A}$, $V_{GS} = -5/18 \text{ V}$, $R_g = 2 \Omega$		-	18	25	
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	-	
Drain-Source Body Diode Characteristics							
Continuous Source-Drain Diode Current	I_S	MOSFET symbol showing the integral reverse p - n junction diode		-	-	30	
Pulsed Diode Forward Current	I_{SM}			-	-	90	
Diode Forward Voltage	V_{SD}	$T_J = 25^{\circ}\text{C}$, $I_S = 30 \text{ A}$, $V_{GS} = 0$		-	-	4.1	
Reverse Recovery Time	t_{rr}	$T_J = 25^{\circ}\text{C}$, $I_F = I_S = 30 \text{ A}$, $dl/dt = 1000 \text{ A}/\mu\text{s}$, $V_R = 800 \text{ V}$		-	75	-	
Reverse Recovery Charge	Q_{rr}			-	220	-	
Reverse Recovery Current	I_{RRM}			-	60	-	

Notes

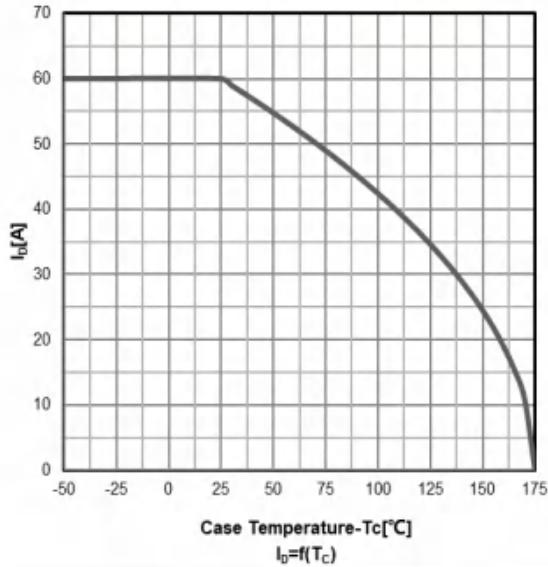
a. $C_{oss(er)}$ is a fixed capacitance that gives the same energy as C_{oss} while V_{DS} is rising from 0 % to 80 % V_{DSS} .
 b. $C_{oss(tr)}$ is a fixed capacitance that gives the same charging time as C_{oss} while V_{DS} is rising from 0 % to 80 % V_{DSS} .

Safe operating area $T_c=25\text{ }^\circ\text{C}$
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On-Region characteristics $T_j=25\text{ }^\circ\text{C}$ On-Region characteristics $T_j=175\text{ }^\circ\text{C}$ 

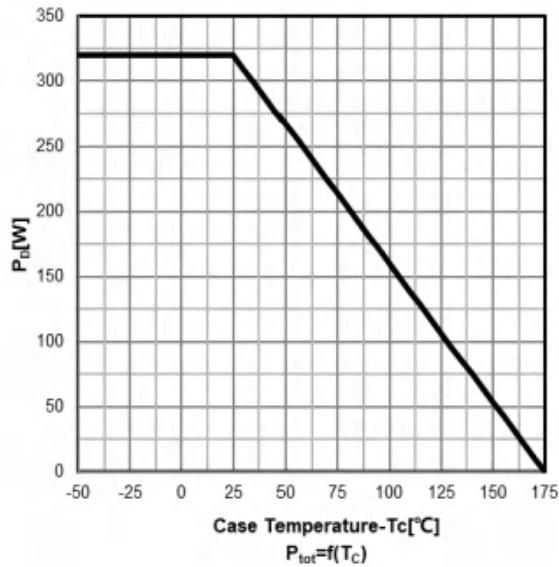
Transfer characteristics



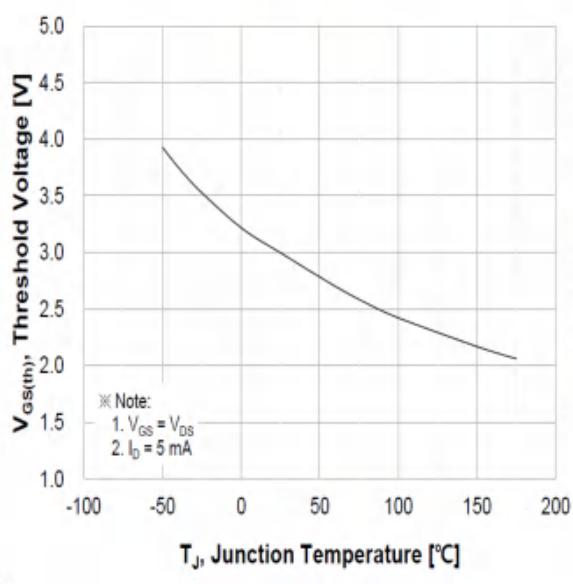
Drain current vs temperature



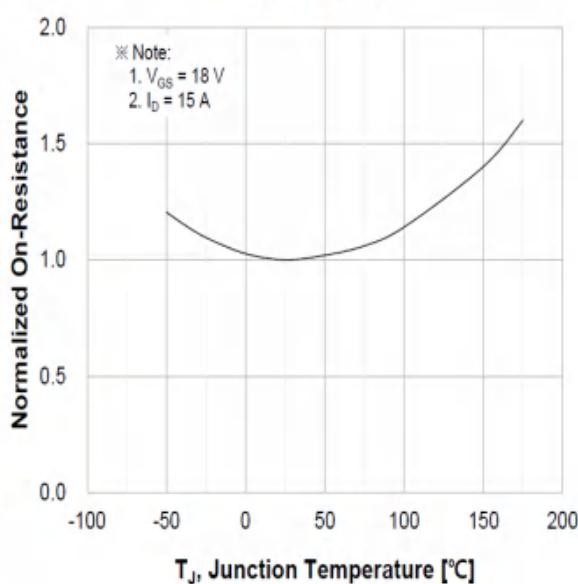
Power dissipation

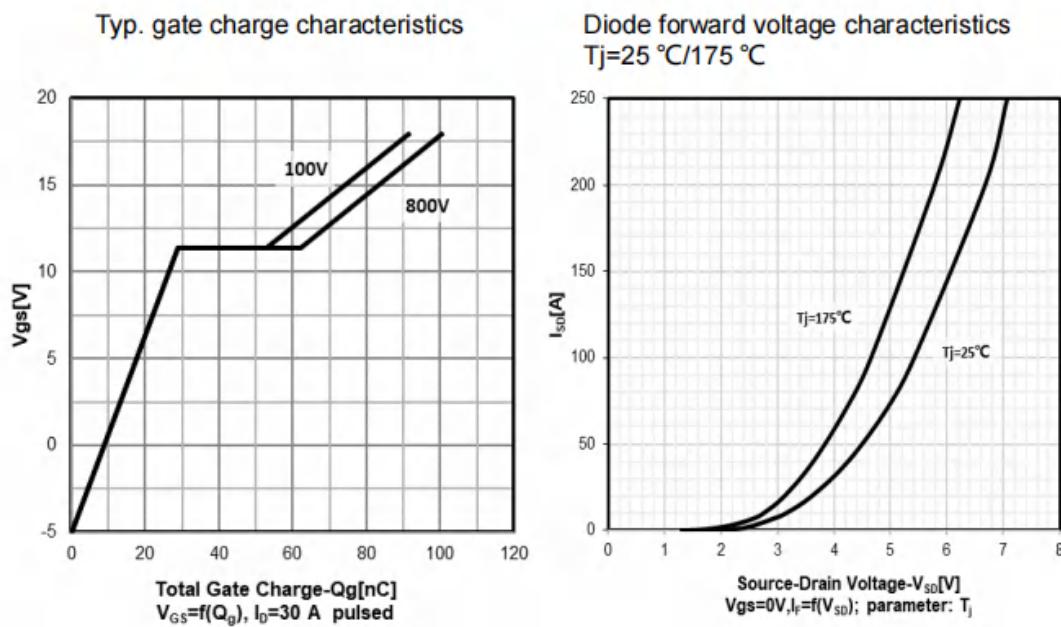
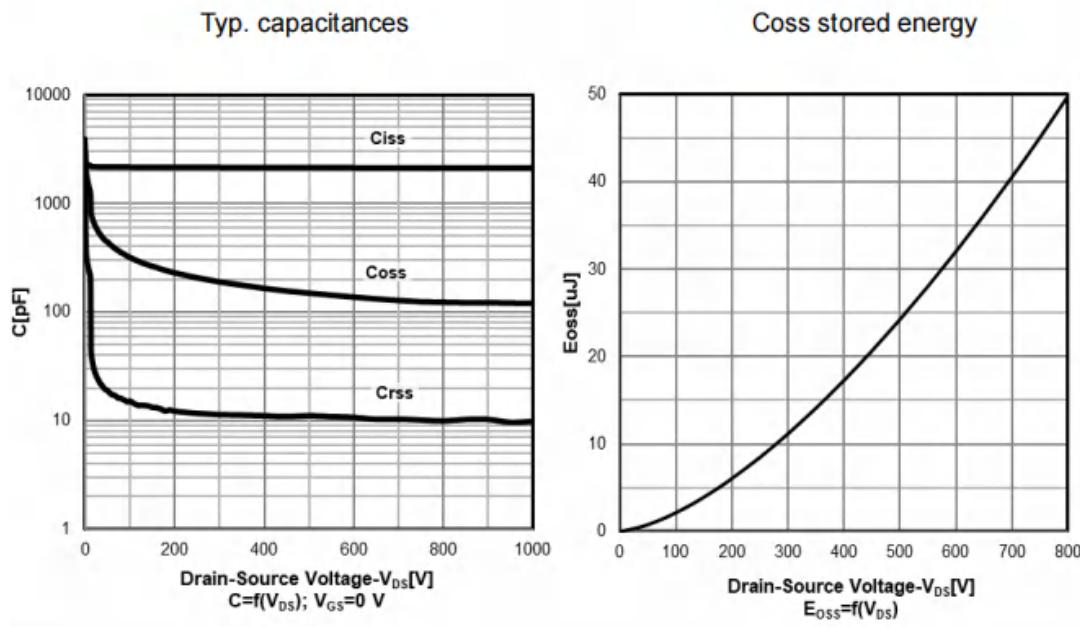


Threshold voltage vs temperature

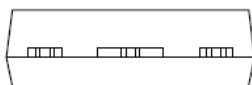
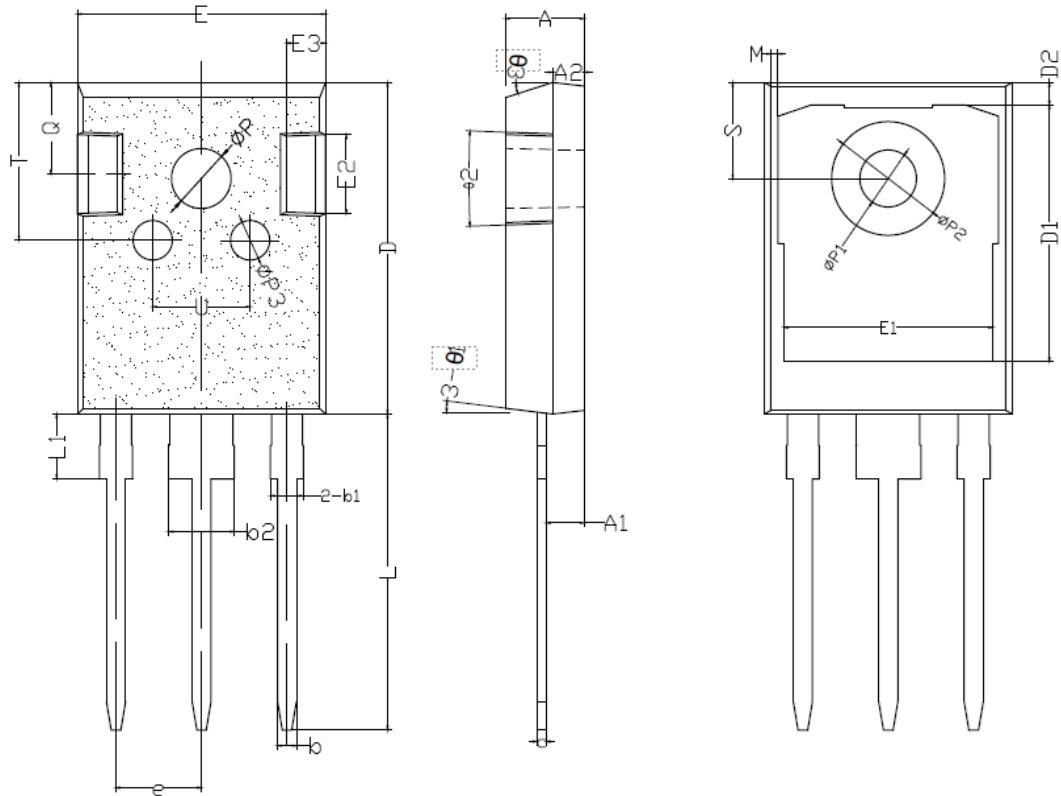


Normalized On-resistance vs temperature





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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