



SKSC120N016-T74

$V_{DS} = 1200\text{ V}$

$I_D (T_C=25^\circ\text{C}) = 140\text{ A}$

$R_{DS(on).typ} = 16\text{ m}\Omega @ V_{GS}=18\text{ V}$

Part Number	PACKAGE
SKSC120N016-T74	TO-247-4L

Features

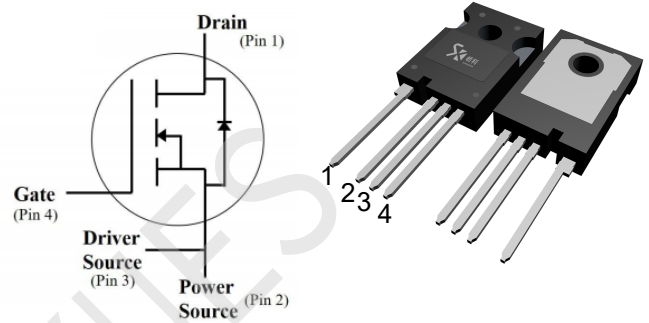
- Wide bandgap SiC MOSFET technology
- Low On-Resistance with High Blocking Voltage
- Low Capacitances with High-Speed switching
- Low reverse recovery(Qrr)
- Halogen free, RoHs compliant

Benefits

- Reduce switching losses
- Increased system Switching Frequency
- Increased power density
- Reduction of heat sink requirements

Applications

- Switch mode power supplies
- Renewable energy
- Motor drives
- High voltage DC/DC converters





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Maximum Ratings ($T_C=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter	Test conditions	Value	Unit	Note
V_{DSmax}	Drain-Source Voltage	$V_{GS} = 0V, I_D = 100\mu A$	1200	V	
V_{GSmax}	Gate-Source voltage	AC ($f > 1\text{ Hz}$)	-10/+25	V	
V_{GSop}	Recommend Gate-Source Voltage	Static	-4/+15	V	
I_D	Continuous Drain current	$V_{GS} = 15V, T_C = 25^{\circ}\text{C}$	140	A	Note 1
		$V_{GS} = 15V, T_C = 100^{\circ}\text{C}$	99		
$I_{D,pulse}$	Pulsed Drain Current	Pulse with t_p limited by T_{jmax} at 1 ms Pulse with t_p limited by T_{jmax} at 100 μs	243 477	A	
T_j	Operating junction temperature		-55~175	$^{\circ}\text{C}$	
T_{stg}	Storage temperature		-55~175	$^{\circ}\text{C}$	

Note 1: Assumes a $R_{th(jc)}$ will be less than 0.26 K/W.

Electrical Characteristics $T_j=25^{\circ}\text{C}$ unless otherwise specified

Symbol	Parameter	Test conditions	Value			Unit	Note
			Min.	Typ.	Max.		
$V_{(BR)DSS}$	Drain-Source Breakdown voltage	$V_{GS} = 0V, I_D = 100\mu A$	1200			V	
$V_{GS(th)}$	Gate Threshold voltage	$V_{GS} = V_{DS}, I_D = 25mA$		2.9		V	Fig. 9
		$V_{GS} = V_{DS}, I_D = 25mA, T_j=175^{\circ}\text{C}$		2.0			
I_{GSS}	Gate-Source Leakage current	$V_{GS} = 15V, V_{DS} = 0V$			250	nA	
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 1200V, V_{GS} = 0V, T_j = 25^{\circ}\text{C}$		1	50	μA	
$R_{DS(on)}$	Drain-Source On-state Resistance	$V_{GS} = 18V, I_D = 75A$		16	21	m Ω	Fig. 3, 4, 5
		$V_{GS} = 18V, I_D = 75A, T_j = 175^{\circ}\text{C}$		32			
		$V_{GS} = 15V, I_D = 75A$		20	24		
		$V_{GS} = 15V, I_D = 75A, T_j = 175^{\circ}\text{C}$		30			
g_{fs}	Transconductance	$V_{GS} = 15V, I_D = 75A$		63		S	Fig. 6
		$V_{GS} = 15V, I_D = 75A, T_j = 175^{\circ}\text{C}$		58			



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Gate Charge Characteristics

Symbol	Parameter	Test conditions	Value			Unit	Note
			Min.	Typ.	Max.		
Q_{GS}	Gate to Source Charge	$V_{DS} = 800V$ $I_D = 75A$ $V_{GS} = -4V/15V$		113		nC	Fig. 10
Q_{GD}	Gate to Drain Charge			49			
Q_G	Total Gate Charge			221			

AC Characteristics ($T_J=25^{\circ}C$ unless otherwise specified)

Symbol	Parameter	Test conditions	Value			Unit	Note
			Min.	Typ.	Max.		
C_{iss}	Input Capacitance	$V_{GS} = 0V, V_{DS} = 1000V$ $f = 100\text{ KHz}$ $V_{AC} = 25mV$		6534		pF	Fig. 13
C_{oss}	Output Capacitance			212		pF	
C_{rss}	Reverse Transfer Capacitance			21		pF	
$R_{G(int)}$	Internal Gate Resistance	$f=1\text{ MHz}, V_{AC} = 25mV$		1.3		Ω	



Reverse Diode Characteristics ($T_j=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter	Test conditions	Value			Unit	Note
			Min.	Typ.	Max.		
V_{SD}	Diode Forward Voltage	$V_{GS} = -4\text{V}, I_{SD} = 37.5\text{A}$		4.0		V	Fig. 7,8
		$V_{GS} = -4\text{V}, I_{SD} = 37.5\text{A}, T_j = 175^{\circ}\text{C}$		3.5			
I_S	Continuous Diode Forward Current	$V_{GS} = -4\text{V}, T_C = 25^{\circ}\text{C}$		129		A	
$I_{S, pulse}$	Diode pulse Current	$V_{GS} = -4\text{V}$, pulse width t_p limited by T_{jmax}		243		A	

Typical Performance

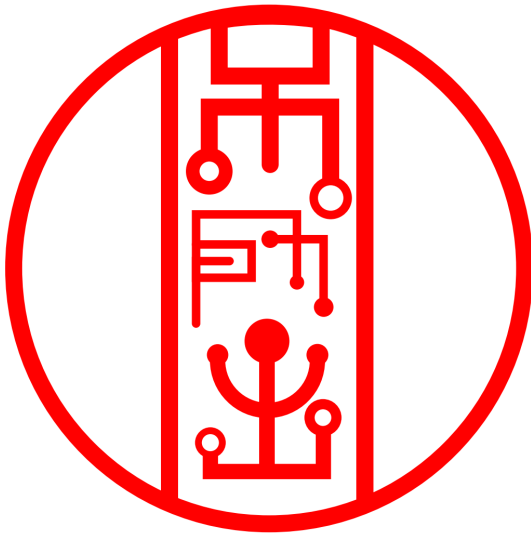


Figure 1. Output characteristics at $T_j=25^\circ\text{C}$

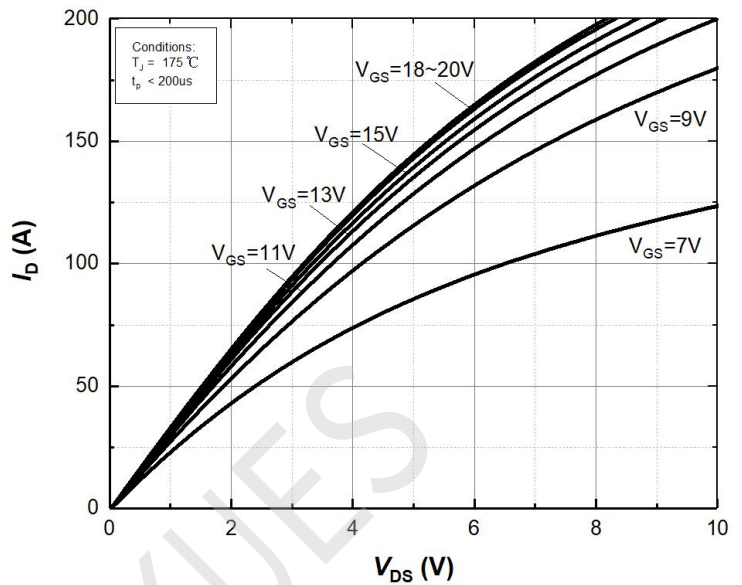


Figure 2. Output characteristics at $T_j=175^\circ\text{C}$

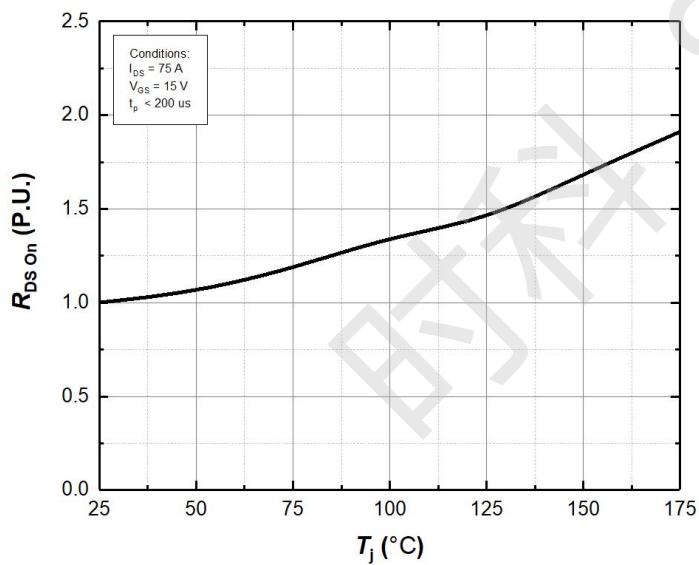


Figure 3. Normalized On-Resistance vs. Temperature

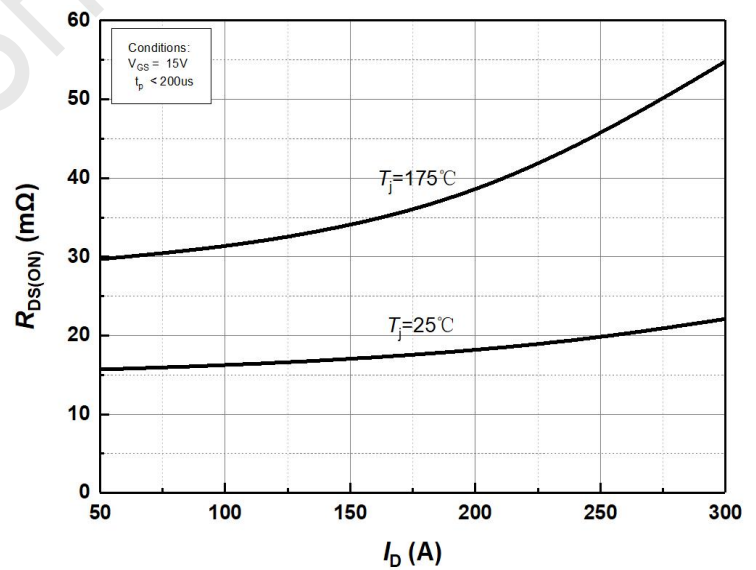


Figure 4. On-Resistance vs. Drain current for Various Temperature

Typical Performance

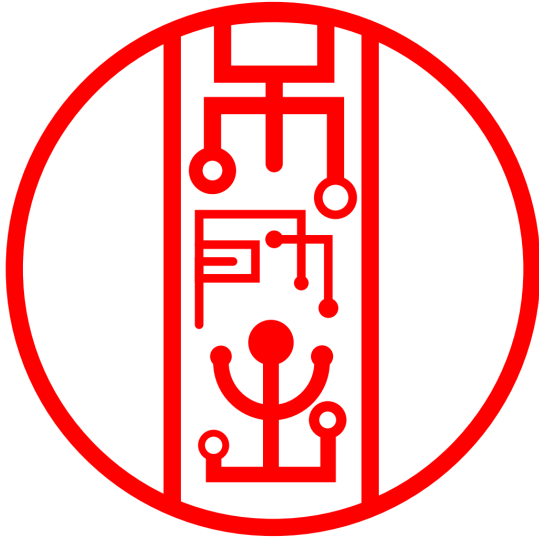


Figure 5. On-Resistance vs. Temperature for Various Gate Voltage

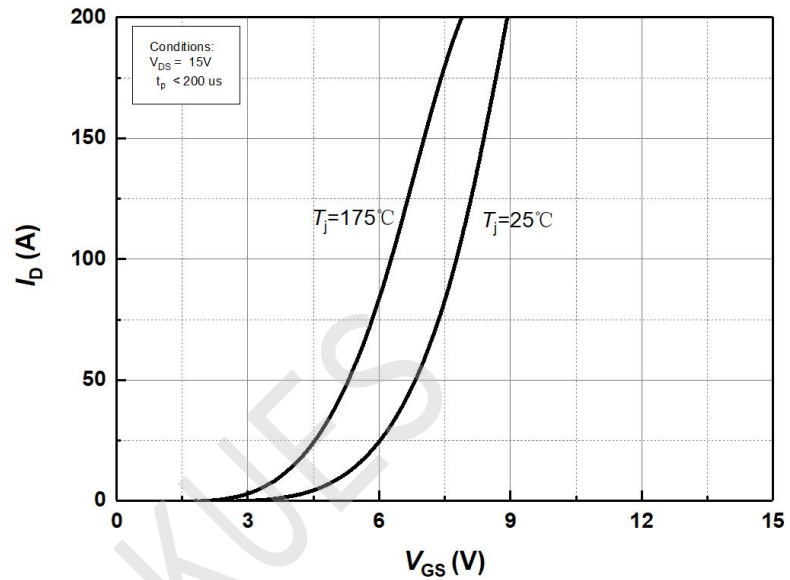


Figure 6. Transfer Characteristics for Various Junction Temperatures

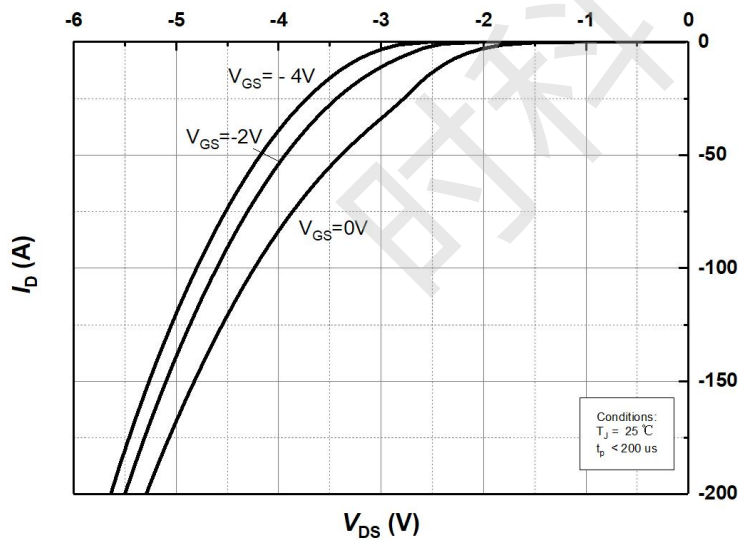


Figure 7. Body Diode Characteristics at $T_J = 25^\circ\text{C}$

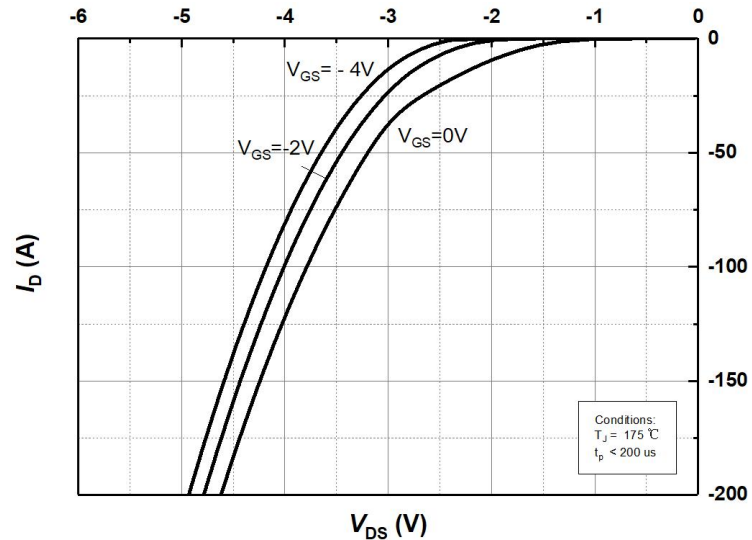


Figure 8. Body Diode Characteristics at $T_J = 175^\circ\text{C}$

Typical Performance

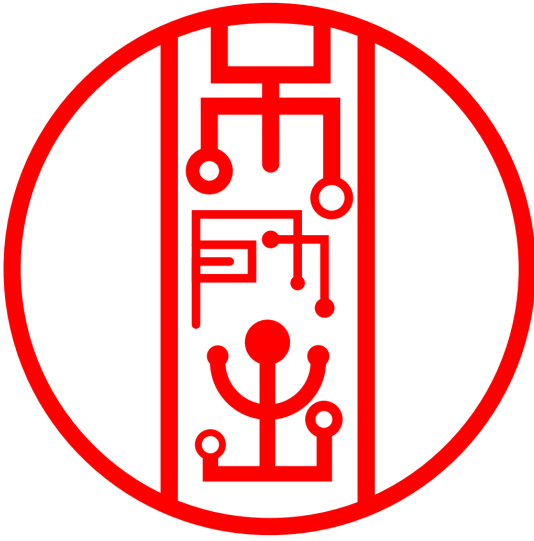


Figure 9. Threshold Voltage vs. Temperature

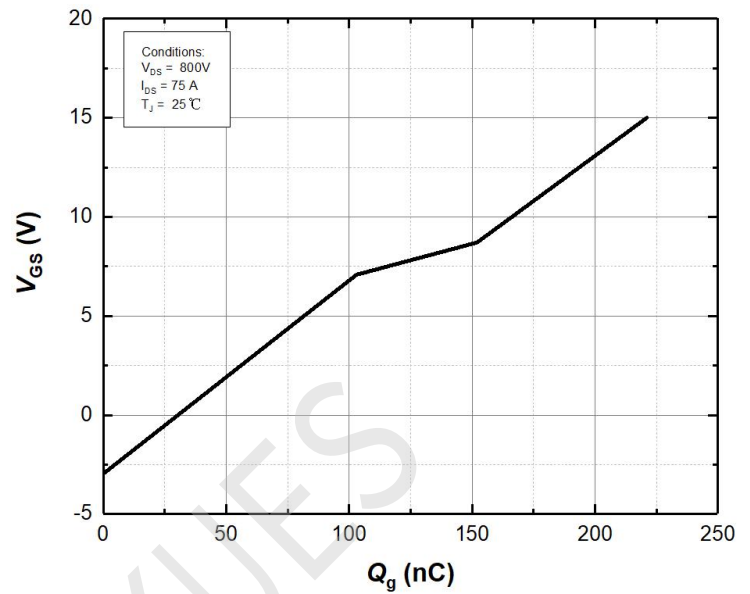


Figure 10 Gate Charge Characteristics

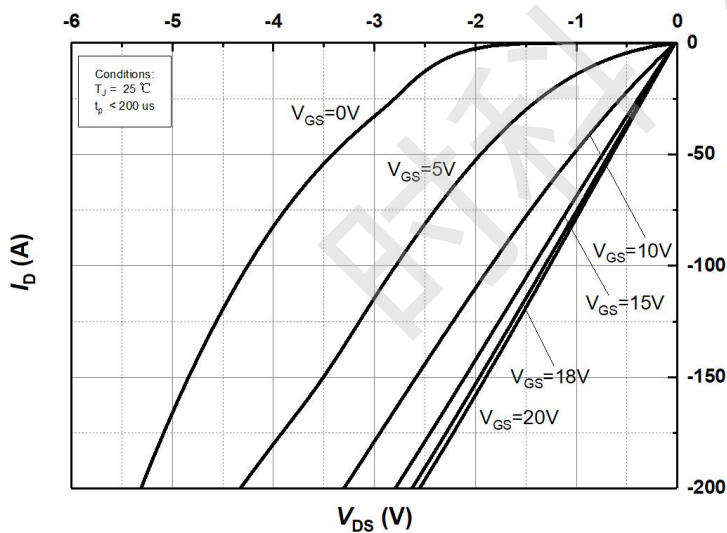


Figure 11. 3rd Quadrant Characteristic at $T_J=25^{\circ}\text{C}$

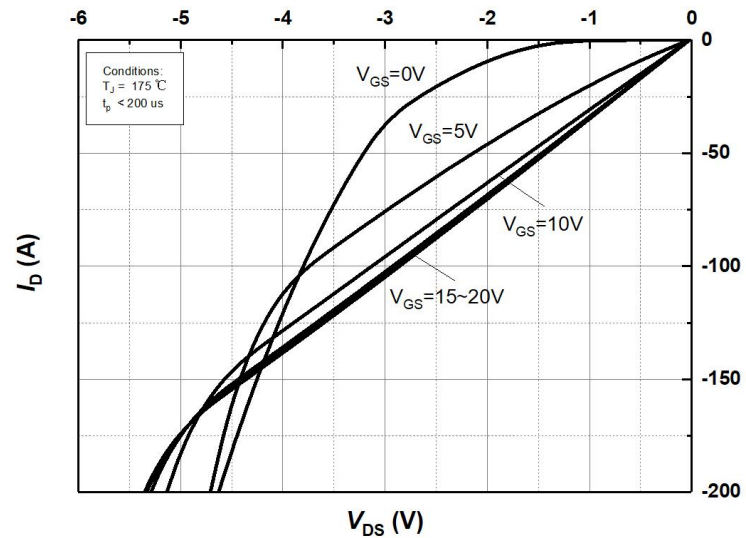


Figure 12. 3rd Quadrant Characteristic at $T_J=175^{\circ}\text{C}$

Typical Performance

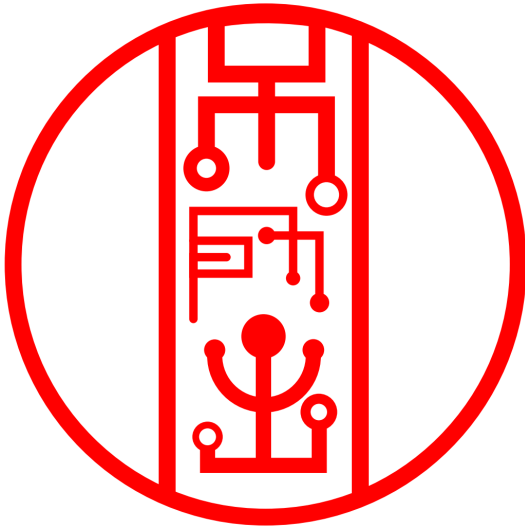


Figure 13. Capacitances vs. Drain-Source Voltage (0 – 1000V)

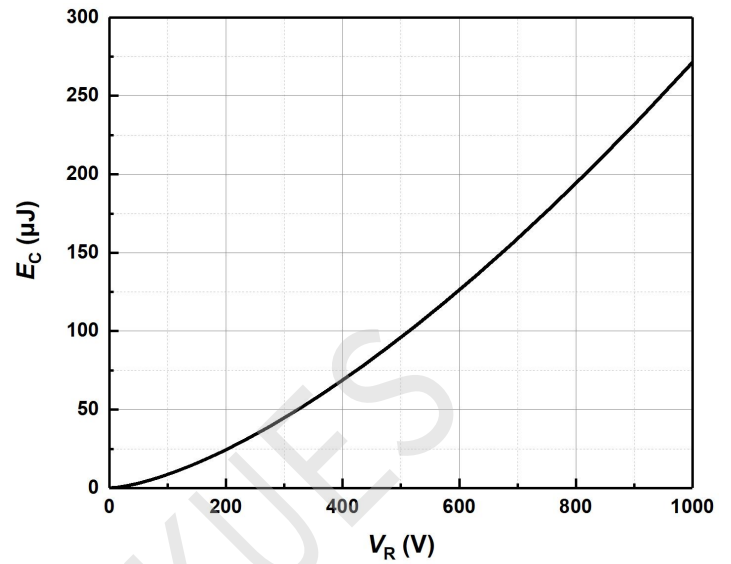


Figure 14. Output Capacitor Stored Energy

