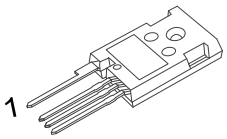
USC120R015B

Power MOSFET

126A, 1200V N-CHANNEL SILICON CARBIDE PLANAR ENHANCEMENT POWER MOSFET



TO-247-4

■ DESCRIPTION

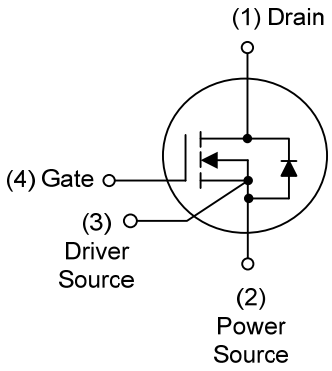
SiC The material can achieve high voltage with most carrier devices (MOSFET) with fast device structure characteristics, so it can realize the three characteristics of "high voltage", "low on resistance" and "high frequency" at the same time.

It is widely used in electric vehicle charger, industrial equipment power supply, efficient power regulator inverter and rectification part and other uses.

■ FEATURES

* $R_{DS(ON)} \leq 18\ m\Omega$ @ V_{GS}=18V, I_D=80A
* High Blocking Voltage
* High Frequency Operation
* Low on-resistance
* Fast intrinsic diode with low reverse recovery
* 100% avalanche tested

■ SYMBOL



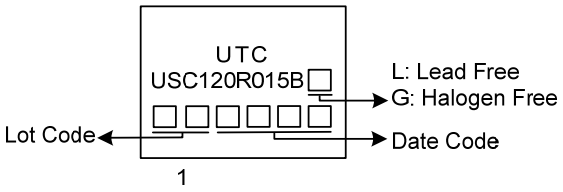
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment				Packing
Lead Free	Halogen Free		1	2	3	4	
USC120R015BL-T474-T	USC120R015BG-T474-T	TO-247-4	D	S	S	G	Tube

Note: Pin Assignment: D: Drain S: Source G: Gate

USC120R015BG-T474-T (1)Packing Type (2)Package Type (3)Green Package	(1) T: Tube (2) T474: TO-247-4 (3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



■ ABSOLUTE MAXIMUM RATINGS (T_C=25°C, unless otherwise specified)

PARAMETER			SYMBOL	RATINGS	UNIT
Drain-Source Voltage			V_{DSS}	1200	V
Gate-Source Voltage	Dynamic		V_{GSS}	-10 / +23	V
	Static			-4 / +18	V
Drain Current	Continuous	V_{GS}=18A T_C=25°C	I_D	126	A
		V_{GS}=18A T_C=100°C		90	A
	Pulsed (Note 2)		I_{DM}	340	A
Power Dissipation			P_D	484	W
Junction Temperature			T_J	-55 ~ +175	°C
Storage Temperature			T_{STG}	-55 ~ +175	°C

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.
2. Repetitive Rating: Pulse width limited by maximum junction temperature.

■ THERMAL DATA

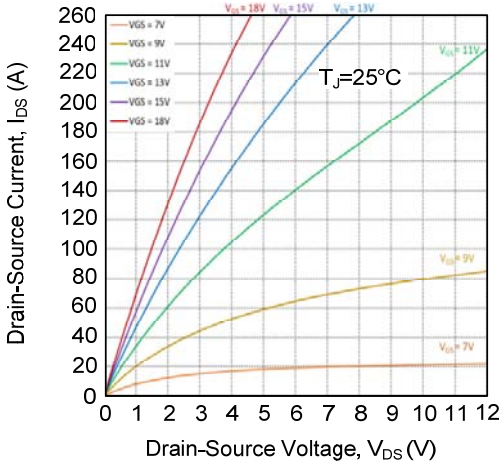
PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	50	°C/W
Junction to Case	θ_{JC}	0.31	°C/W

■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

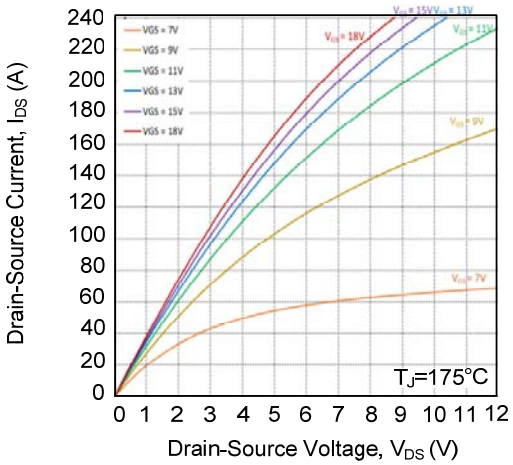
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	I_D=100μA, V_{GS}=0V	1200			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=1200V, V_{GS}=0V	0	1	50	μA
Gate- Source Leakage Current	Forward	I_{GSS}	V_{GS}=+18V, V_{DS}=0V	0	1	200	nA
	Reverse		V_{GS}=-4.0V, V_{DS}=0V	-200	-1	0	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=20μA	2.0	2.8	3.7	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=18V, I_D=80A		15	18	mΩ
Transconductance		g_{FS}	V_{DS}=20V, I_D=80A		58		S
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{DS}=1000V, V_{GS}=0V, f=100KHz		4300		pF
Output Capacitance		C_{OSS}			214		pF
Reverse Transfer Capacitance		C_{RSS}			19		pF
C_{OSS} Stored Energy		E_{OSS}			122		μJ
SWITCHING PARAMETERS							
Total Gate Charge		Q_G	V_{DS}=800V, V_{GS}=-4V / +18V, I_D=80A		222		nC
Gate to Source Charge		Q_{GS}			55		nC
Gate to Drain Charge		Q_{GD}			88		nC
Internal Gate Input Resistance		$R_{G(ING)}$	I_D=0A, f=1MHz		1.4		Ω
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Drain-Source Diode Forward Voltage		V_{SD}	V_{GS}=-4.0A, I_{SD}=40A		4.1		V
Continuous Diode Forward Current		I_S	V_{GS}=-4.0V			97	A
Body Diode Reverse Recovery Time		t_{rr}	V_{GS}=-4.0V, I_{SD}=80A, V_R=800V, d_{IF}/dt=4200A/μs		21		ns
Body Diode Reverse Recovery Charge		Q_{rr}			470		nC
Peak Reverse Recovery Current		I_{RRM}			40		A

■ TYPICAL CHARACTERISTICS

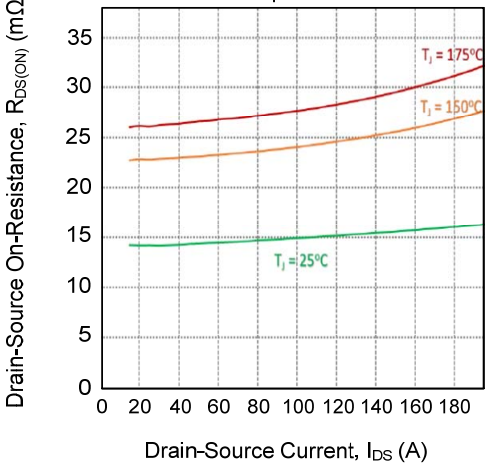
Output Characteristics



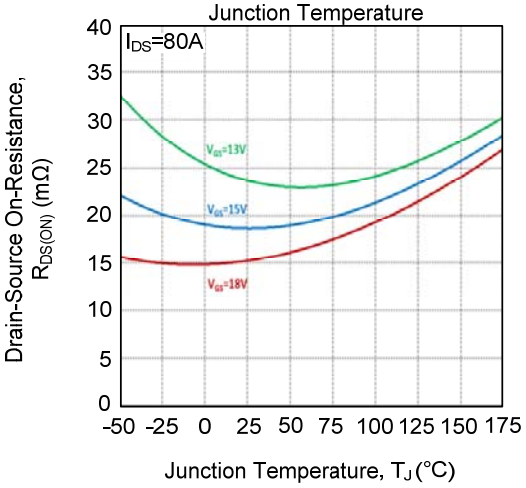
Output Characteristics



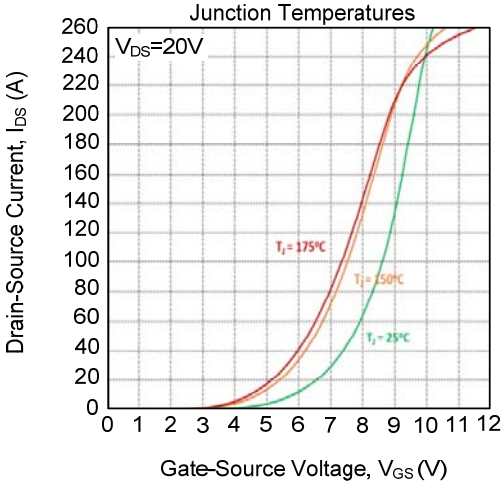
Drain-Source On-Resistance vs. Drain Current For Various Temperatures



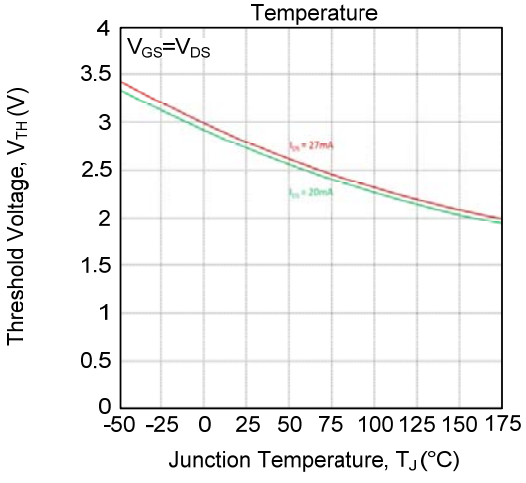
Drain-Source On-Resistance vs. Junction Temperature



Transfer Characteristic For Various Junction Temperatures

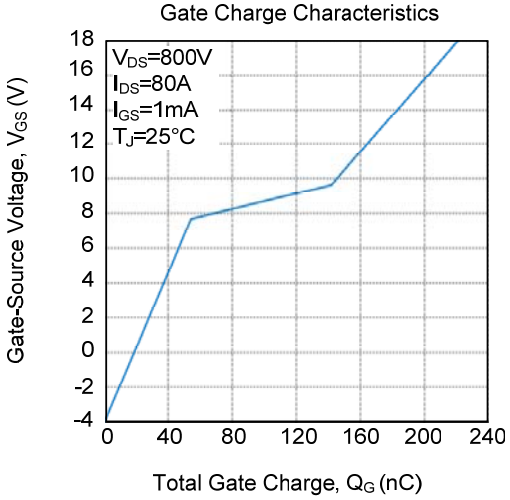


Threshold Voltage vs. Junction Temperature

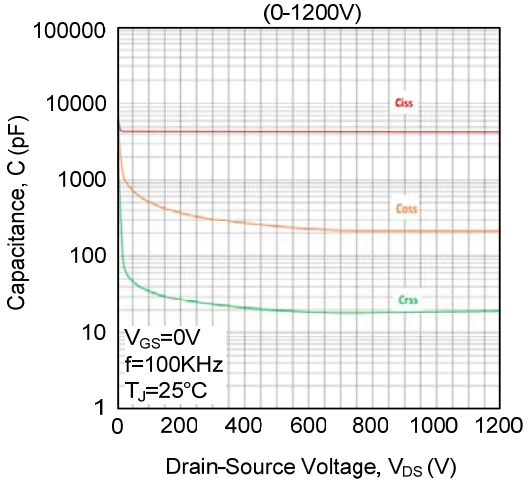


■ TYPICAL CHARACTERISTICS (Cont.)

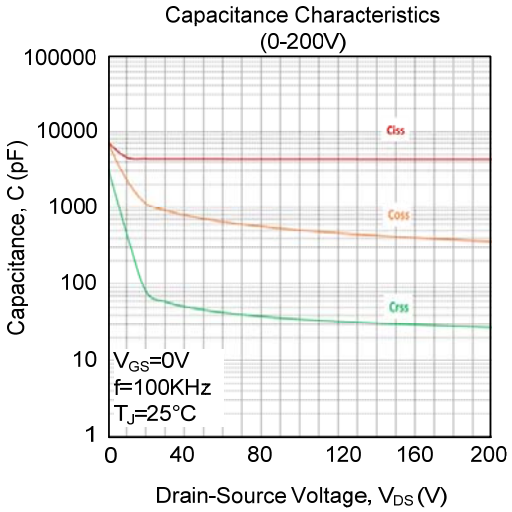
Gate Charge Characteristics



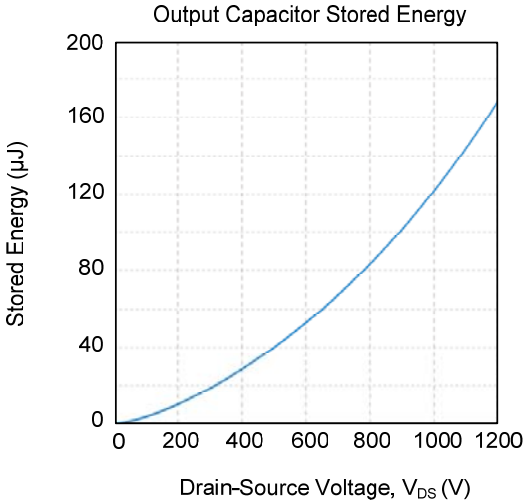
Capacitance Characteristics (0-1200V)



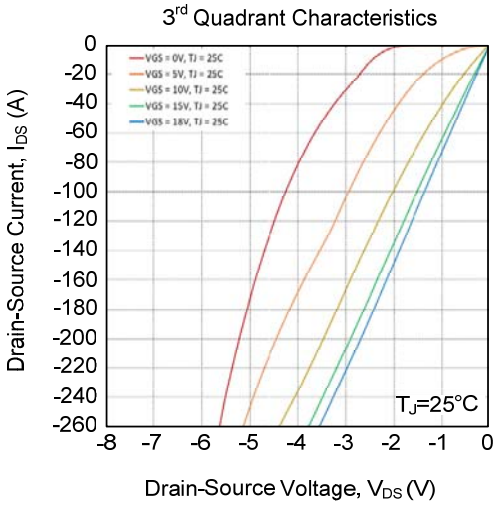
Capacitance Characteristics (0-200V)



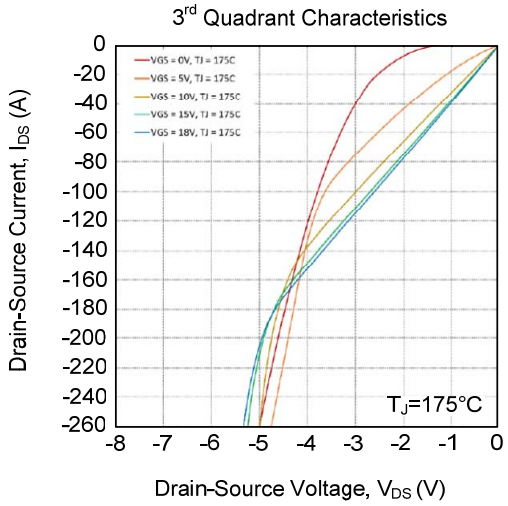
Output Capacitor Stored Energy



3rd Quadrant Characteristics



3rd Quadrant Characteristics



■ TYPICAL CHARACTERISTICS (Cont.)