



USC120R015B

Power MOSFET

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

■ DESCRIPTION

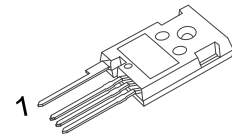
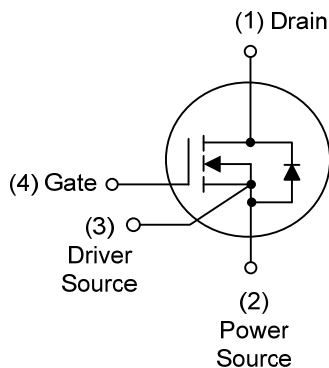
SiC The material can achieve high voltage with most carrier devices (MOSFET) with fast device structure characteristics, so it can realize the three characteristics of "high voltage", "low on resistance" and "high frequency" at the same time.

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

■ FEATURES

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

■ SYMBOL



TO-247-4

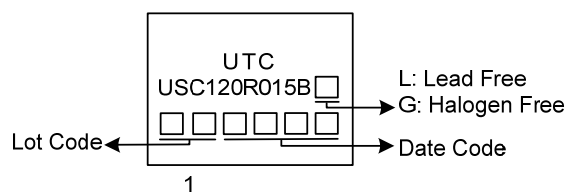
■ ORDERING INFORMATION

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
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■ 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 T _{surge} <100nS		V _{GSS}	-10 / +23	V
	Static			-4 / +18	V
Drain Current	Continuous	V _{GS} =18V T _C =25°C	I _D	126	A
		V _{GS} =18V 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.

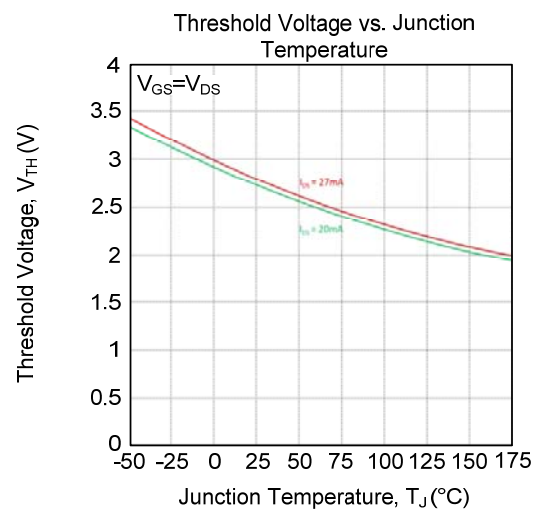
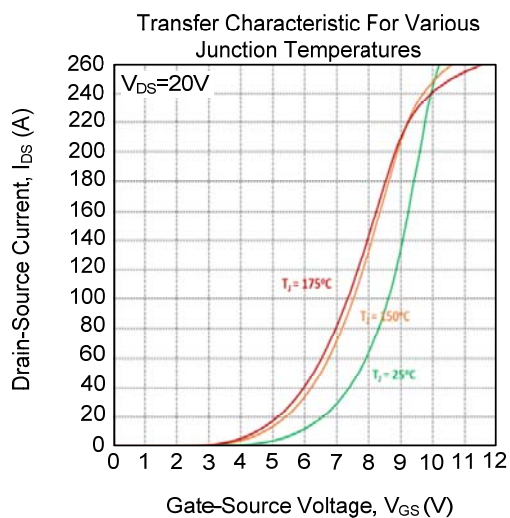
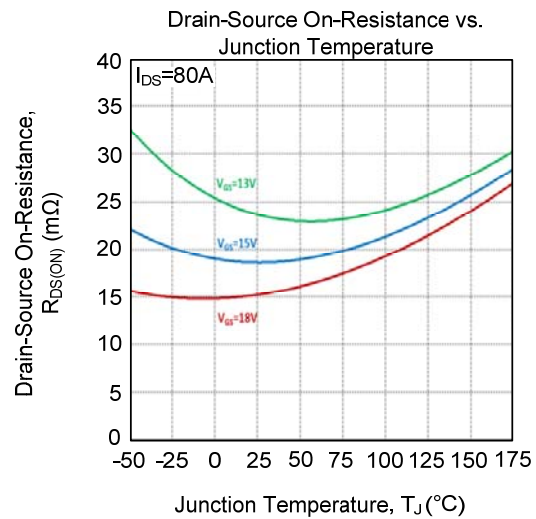
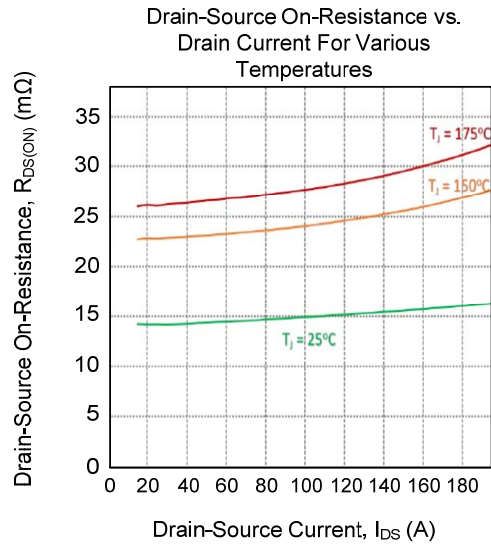
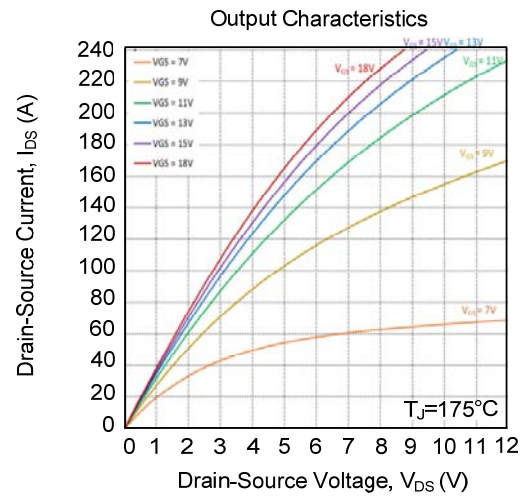
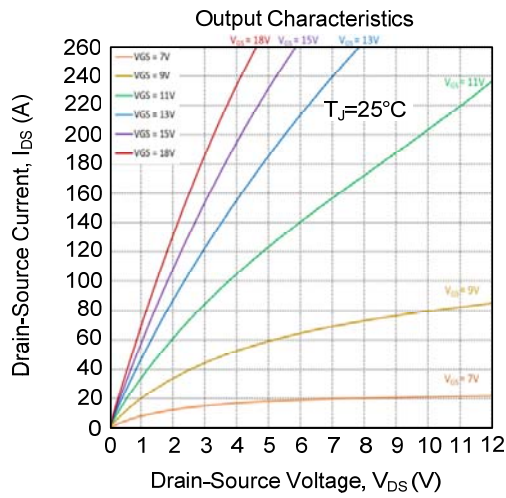
■ THERMAL DATA

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

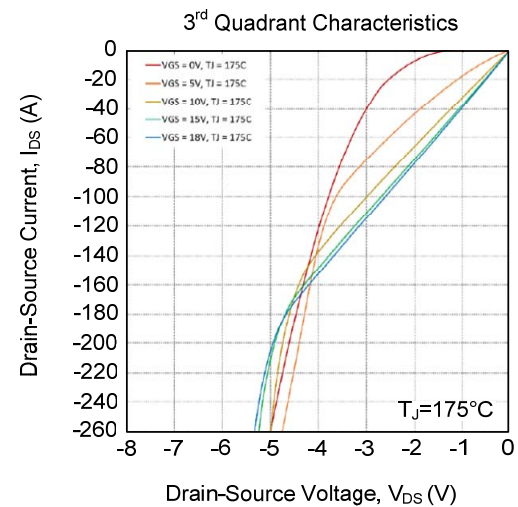
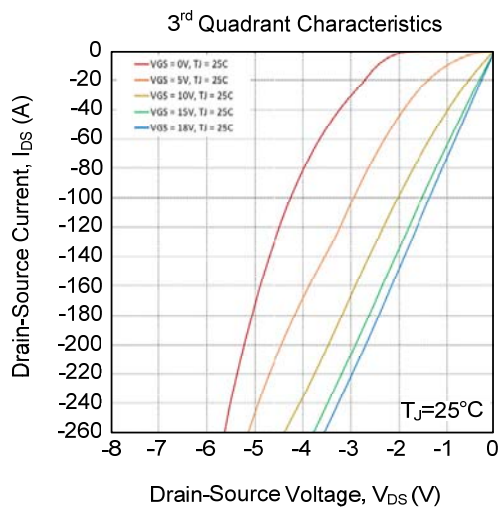
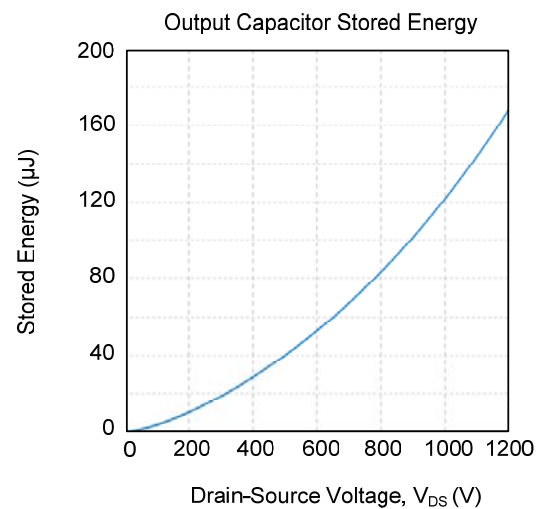
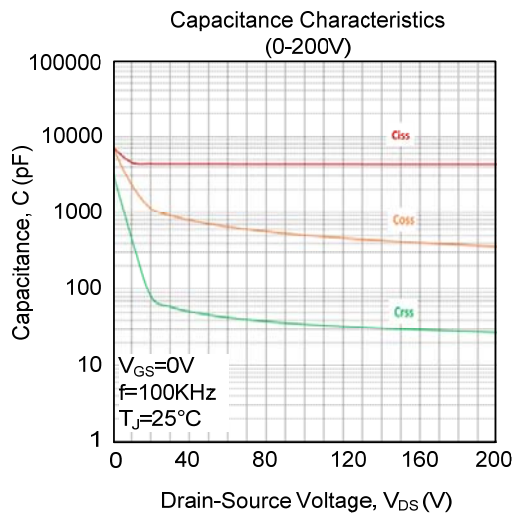
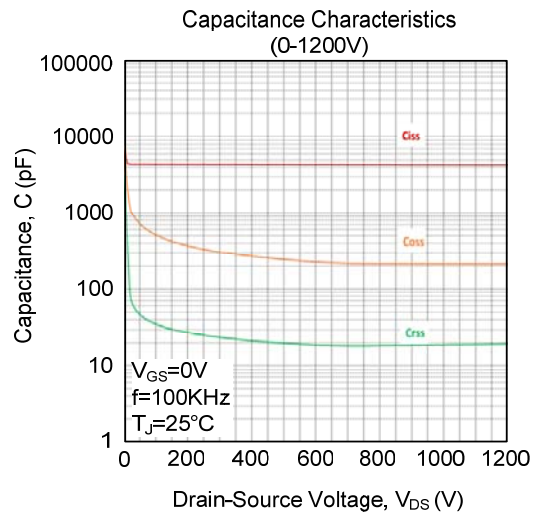
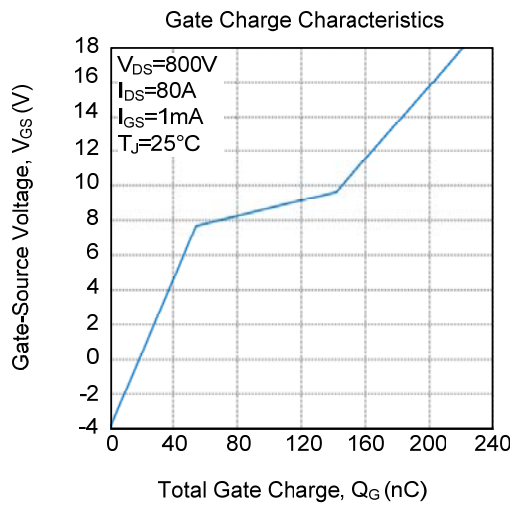
■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

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
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =27mA	2.0	2.8	3.7	V
		V _{DS} =V _{GS} , I _D =27mA, T _J =150°C		2.1		V
		V _{DS} =V _{GS} , I _D =27mA, T _J =175°C		2.0		V
Static Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =18V, I _D =80A		15	18	mΩ
		V _{GS} =18V, I _D =80A, T _J =150°C		25		mΩ
		V _{GS} =18V, I _D =80A, T _J =175°C		28		mΩ
Transconductance	g _{FS}	V _{DS} =20V, I _D =80A		58		S
		V _{DS} =20V, I _D =80A, T _J =150°C		50		S
		V _{DS} =20V, I _D =80A, T _J =175°C		49		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
Turn-ON Delay Time	t _{D(ON)}	V _{DD} =800V, V _{GS} =-4V / 18V, I _D =80A, R _G =2.0Ω, L=100μH		17		ns
Rise Time	t _R			27		ns
Turn-OFF Delay Time	t _{D(OFF)}			42		ns
Fall-Time	t _F			9		ns
Turn-on switching energy	E _{ON}			1140		μJ
Gate to Drain Charge	E _{OFF}			140		μJ
Internal Gate Input Resistance	R _{G(int)}	I _D =0A, f=1MHz		1.4		Ω
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Drain-Source Diode Forward Voltage	V _{SD}	V _{GS} =-4.0V, I _{SD} =40A		4.1		V
		V _{GS} =-4.0V, I _{SD} =40A, T _J =150°C		3.7		V
		V _{GS} =-4.0V, I _{SD} =40A, T _J =175°C		3.6		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, di _F /dt=4200A/μs		21		ns
Body Diode Reverse Recovery Charge	Q _{rr}			470		nC
Peak Reverse Recovery Current	I _{RRM}			40		A

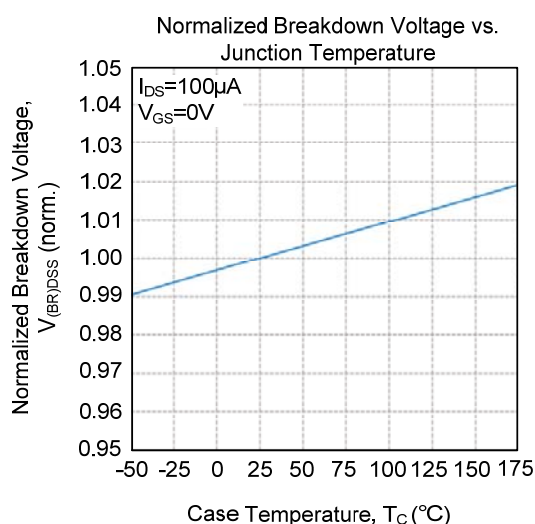
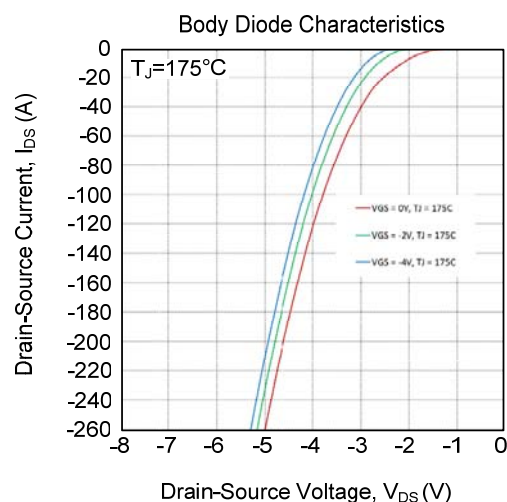
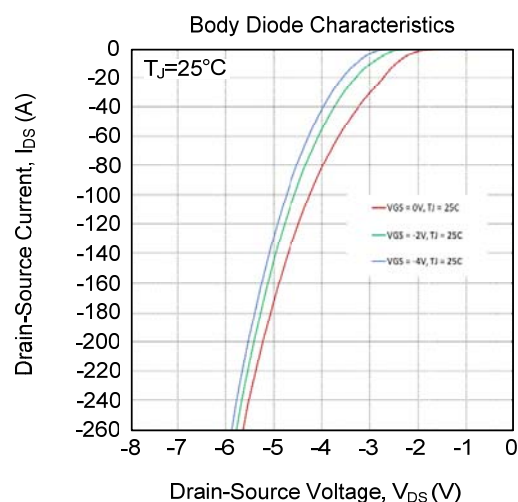
TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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