



USC120R014A

Power MOSFET

136A, 1200V N-CHANNEL SILICON CARBIDE PLANAR ENHANCEMENT POWER MOSFET

DESCRIPTION

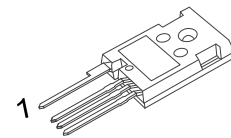
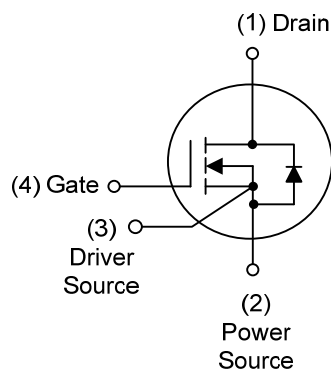
SiC The material can achieve high voltage with most carrier devices (MOSFET) with fast device structure characteristics, so it can realize the three characteristics of "high voltage", "low on resistance" and "high frequency" at the same time.

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

FEATURES

- * $R_{DS(ON)} \leq 18 \text{ m}\Omega$ @ $V_{GS}=15\text{V}$, $I_D=80\text{A}$
- * High Blocking Voltage
- * High Frequency Operation
- * Low on-resistance
- * Fast intrinsic diode with low reverse recovery
- * 100% avalanche tested

SYMBOL



TO-247-4

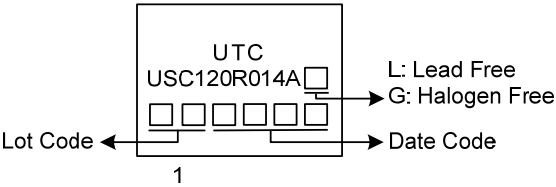
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment				Packing
Lead Free	Halogen Free		1	2	3	4	
USC120R014AL-T474-T	USC120R014AG-T474-T	TO-247-4	D	S	S	G	Tube

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

USC120R014AG-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		V _{GSS}	-8 / +19	V
	Static			-4 / +15	V
Drain Current	Continuous	V _{GS} =15A T _C =25°C	I _D	136	A
		V _{GS} =15A T _C =100°C		96	A
	Pulsed (Note 2)		I _{DM}	415	A
Avalanche Energy	V _{DD} =100V, V _{GS} =15V, L=2mH		E _{AS}	1225	mJ
Avalanche Peak Current			I _{AV}	35	A
Power Dissipation			P _D	517	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.

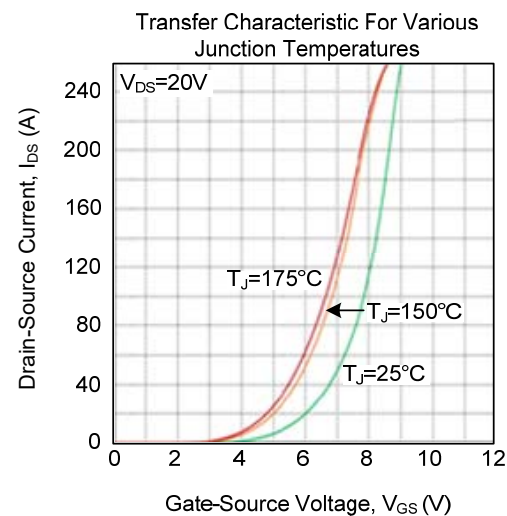
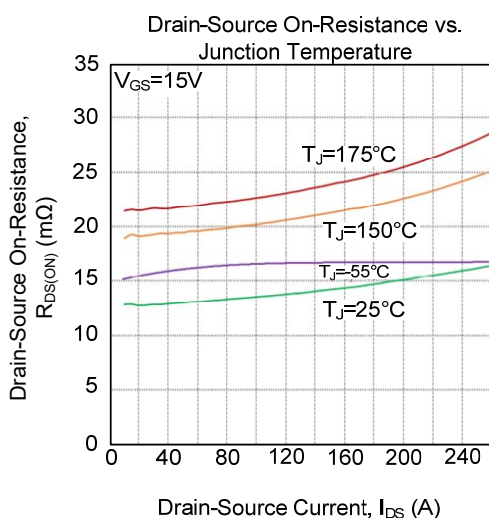
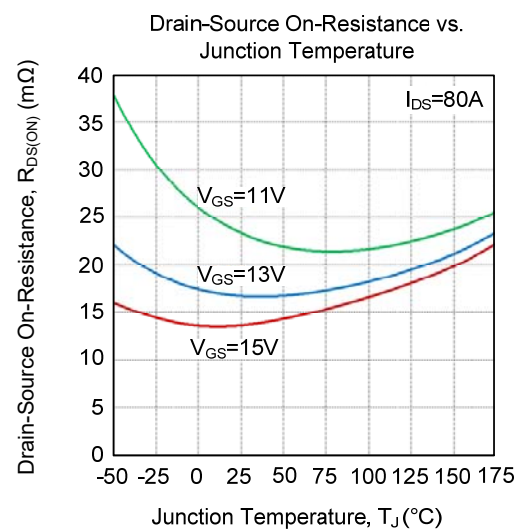
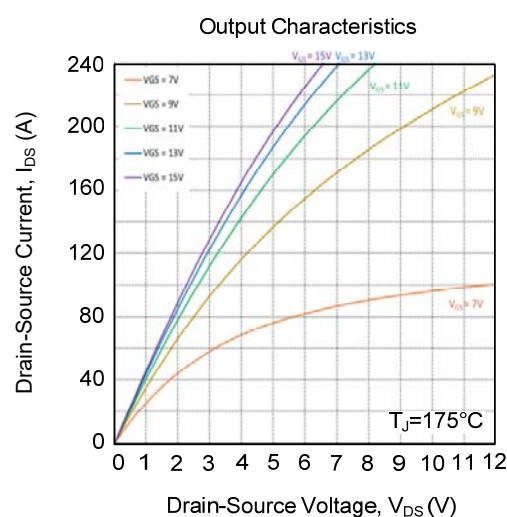
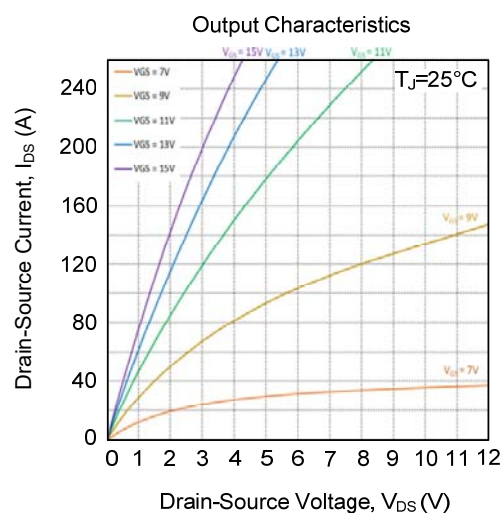
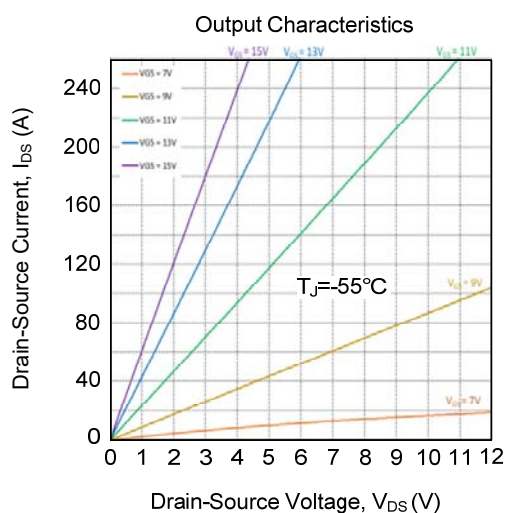
■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ _{JA}	50	°C/W
Junction to Case	θ _{JC}	0.29	°C/W

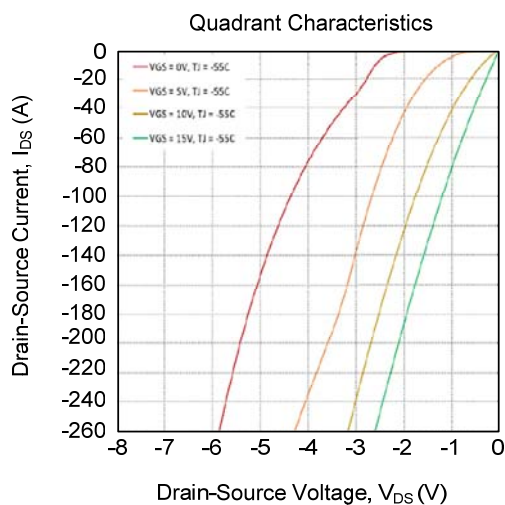
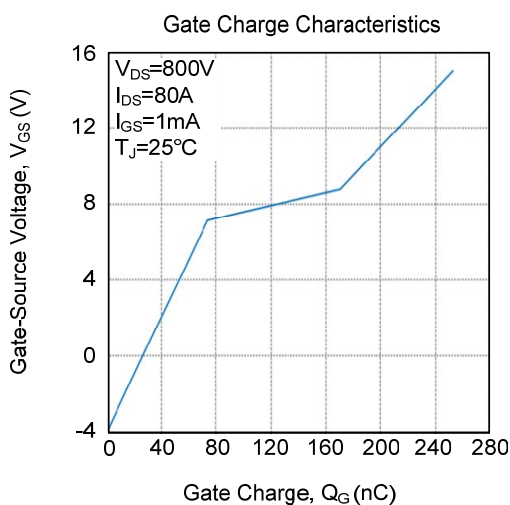
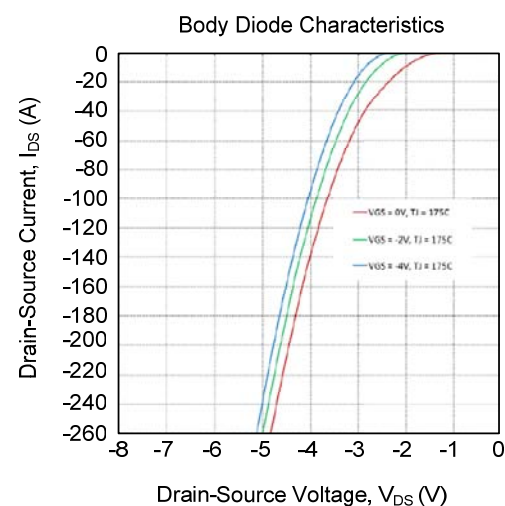
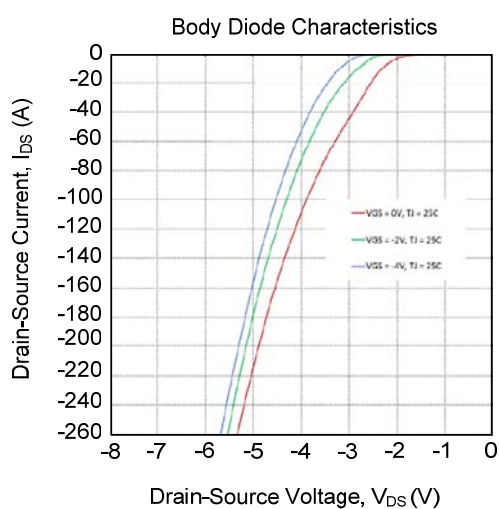
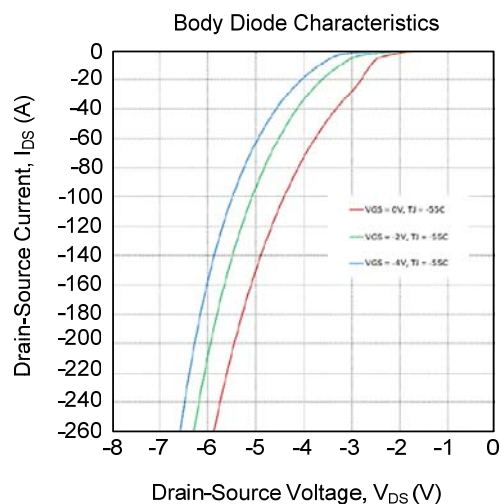
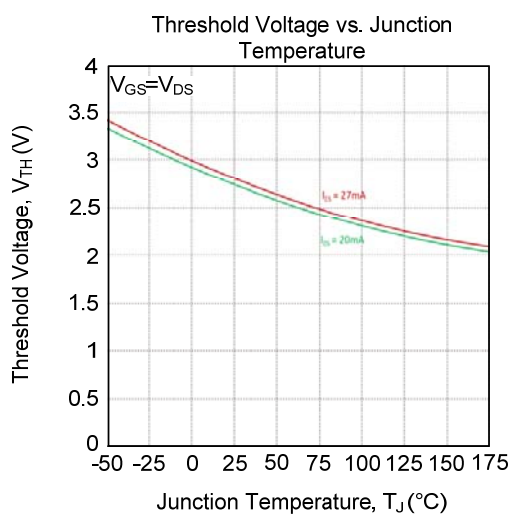
■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =100μA, V _{GS} =0V	1200			V
Zero Gate Voltage Drain Current		I _{DSS}	V _{DS} =1200V, V _{GS} =0V	0	1	50	μA
Gate- Source Leakage Current	Forward	I _{GSS}	V _{GS} =+15V, 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 =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} =15V, I _D =80A		14	18	mΩ	
		V _{GS} =15V, I _D =80A, T _J =150°C		22		mΩ	
		V _{GS} =15V, I _D =80A, T _J =175°C		25		mΩ	
Transconductance	g _{FS}	V _{DS} =20V, I _D =80A		66		S	
		V _{DS} =20V, I _D =80A, T _J =150°C		61		S	
		V _{DS} =20V, I _D =80A, T _J =175°C		59		S	
DYNAMIC PARAMETERS							
Input Capacitance	C _{ISS}	V _{DS} =1000V, V _{GS} =0V, f=100KHz		6385		pF	
Output Capacitance	C _{OSS}			255		pF	
Reverse Transfer Capacitance	C _{RSS}			17		pF	
C _{OSS} Stored Energy	E _{OSS}			149		μJ	
SWITCHING PARAMETERS							
Total Gate Charge	Q _G	V _{DS} =800V, V _{GS} =-4V / +15V, I _D =80A		255		nC	
Gate to Source Charge	Q _{GS}			75		nC	
Gate to Drain Charge	Q _{GD}			96		nC	
Internal Gate Input Resistance	R _{G(int)}	I _D =0A, f=1MHz		1.2		Ω	
Turn-on switching energy	E _{ON}	V _{DS} =800V, V _{GS} =-4V / +15V, I _D =80A, R _{G(ext)} =2Ω, L=100μH		1350		μJ	
Turn-off switching energy	E _{OFF}			140		μJ	
Turn-ON Delay Time	t _{D(ON)}			24		ns	
Rise Time	t _R			31		ns	
Turn-OFF Delay Time	t _{D(OFF)}			48		ns	
Fall-Time	t _F			9		ns	
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Drain-Source Diode Forward Voltage	V _{SD}	V _{GS} =-4.0V, I _{SD} =40A		3.8		V	
		V _{GS} =-4.0V, I _{SD} =40A, T _J =150°C		3.5		V	
		V _{GS} =-4.0V, I _{SD} =40A, T _J =175°C		3.4		V	
Continuous Diode Forward Current	I _S	V _{GS} =-4.0V			105	A	
Body Diode Reverse Recovery Time	t _{rr}	V _{GS} =-4.0V, I _{SD} =80A, V _R =800V, di _F /dt=4200A/μs		22		ns	
Body Diode Reverse Recovery Charge	Q _{rr}			530		nC	
Peak Reverse Recovery Current	I _{rrm}			44		A	

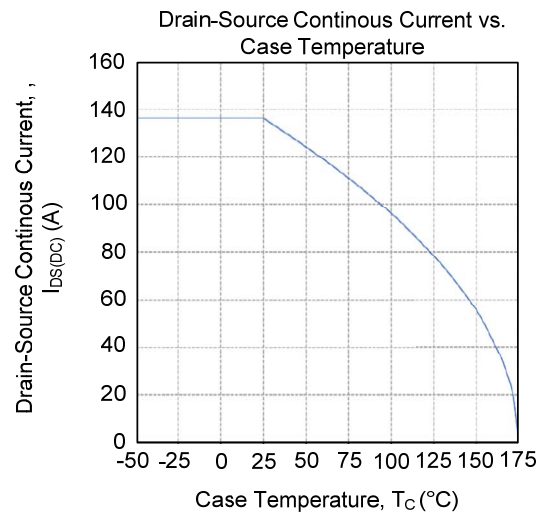
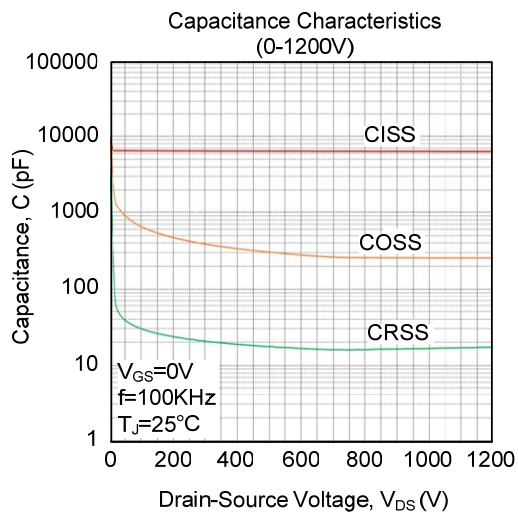
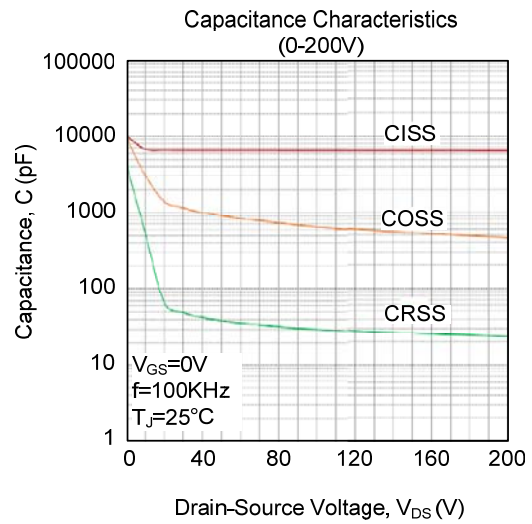
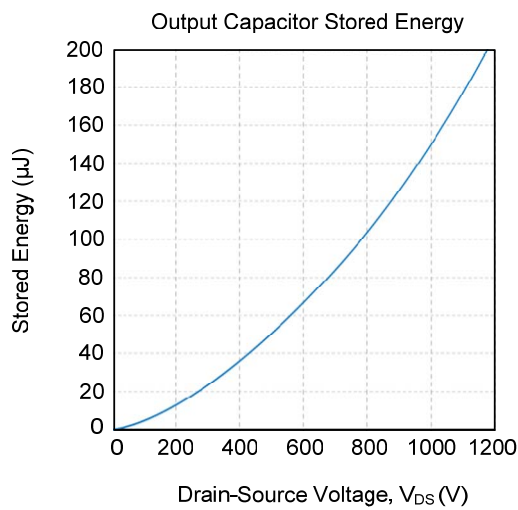
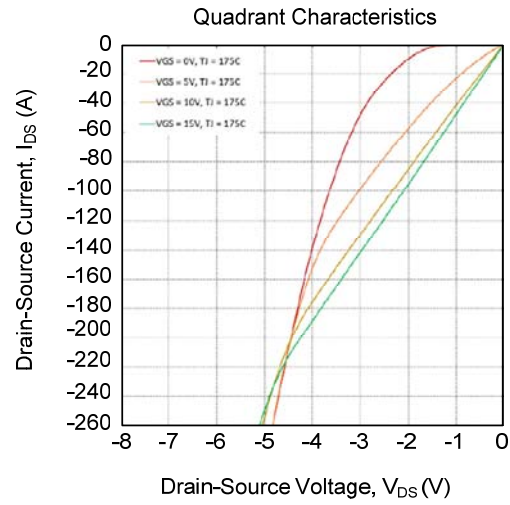
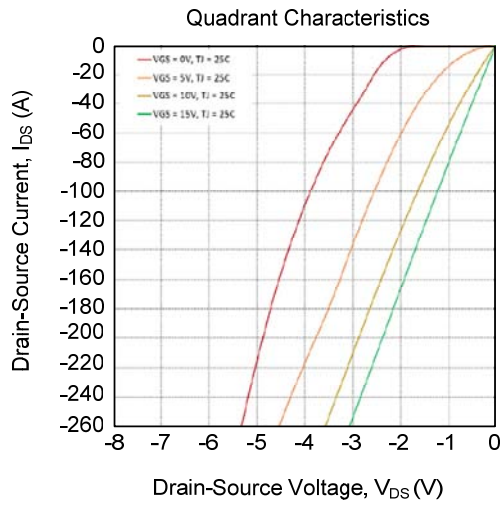
TYPICAL CHARACTERISTICS



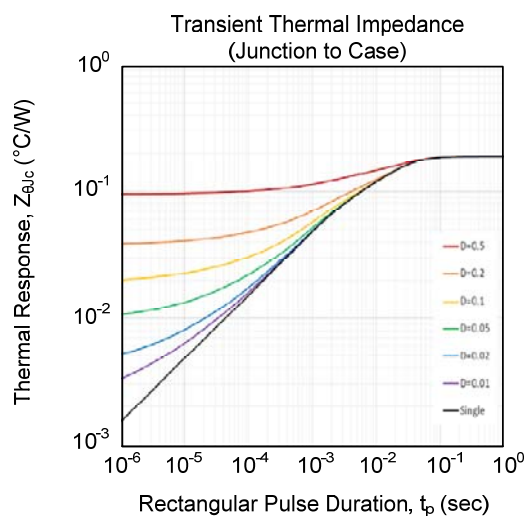
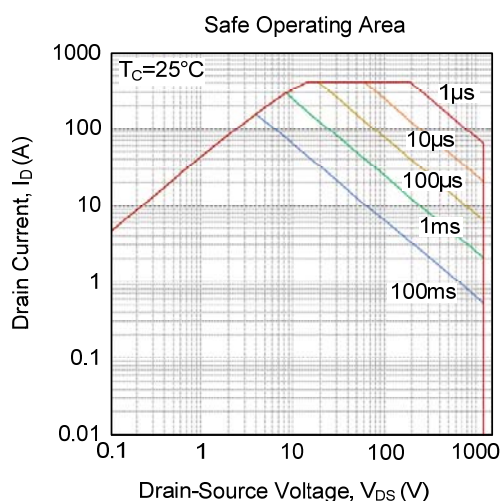
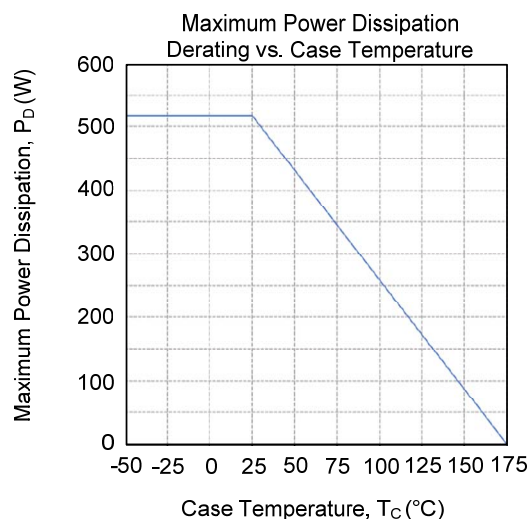
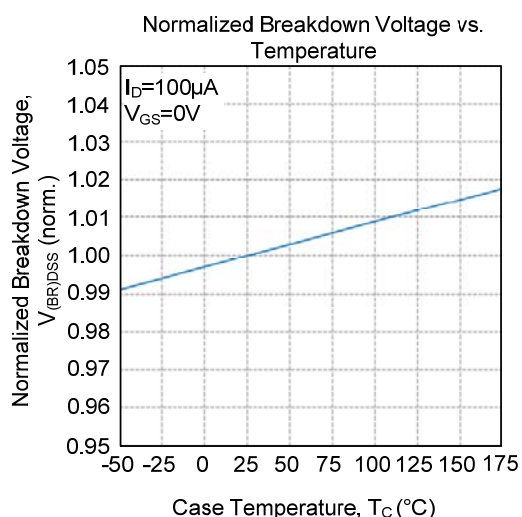
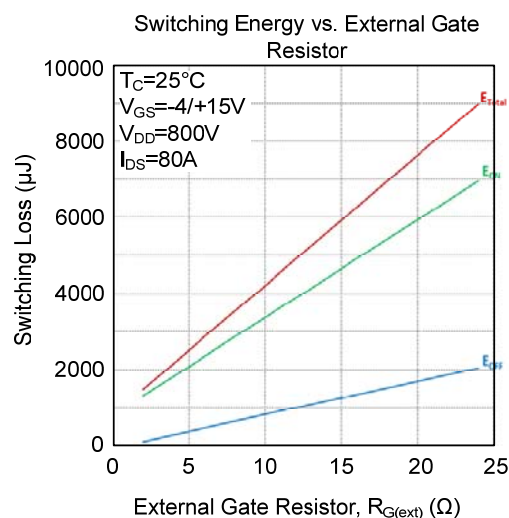
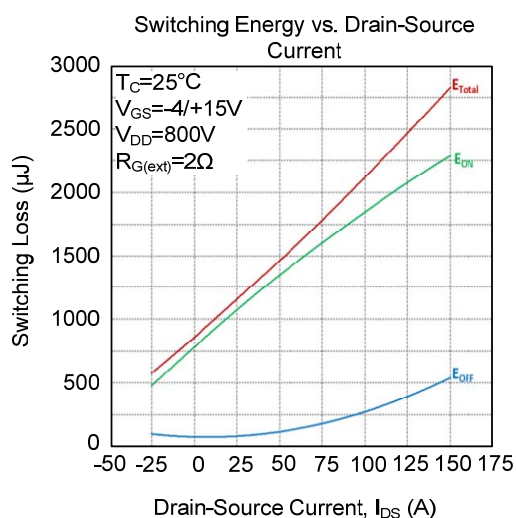
TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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