



UGN70R320

POWER MOSFET

GALLIUM NITRIDE (GaN) ENHANCEMENT-MODE POWER TRANSISTOR

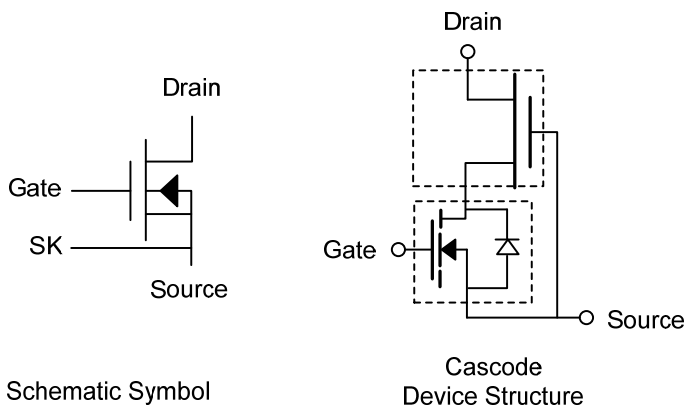
DESCRIPTION

The UTC **UGN70R320** is an enhancement mode GaN HEMT power transistor. Provides high breakdown voltage, high current and high operating speed which is suitable for high power applications.

FEATURES

- * $R_{DS(ON)} \leq 400 \text{ m}\Omega$ @ $V_{GS}=8.0\text{V}$, $I_D=4.0\text{A}$
- * Easy to use, compatible with standard gate drivers
- * Excellent $Q_G \times R_{DS(ON)}$ figure of merit (FOM)
- * Low Q_{RR} , no free-wheeling diode required
- * Low switching loss

SYMBOL

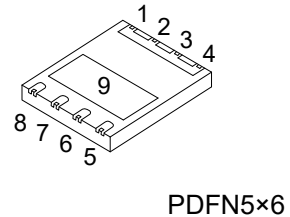


ORDERING INFORMATION

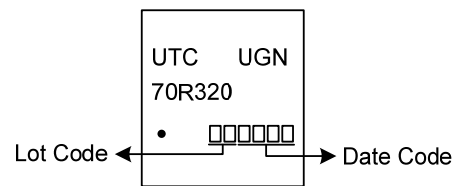
Ordering Number		Package	Pin Assignment									Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	9	
UGN70R320L-P5060-R	UGN70R320G-P5060-R	PDFN5×6	D	D	D	D	S	S	SK	G	S	Tape Reel

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

UGN70R320G-P5060-R		(1)Packing Type	(1) R: Tape Reel
		(2)Package Type	(2) P5060: PDFN5×6
		(3)Green Package	(3) G: Halogen Free and Lead Free L: Lead Free



■ MARKING



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

PARAMETER			SYMBOL	RATINGS	UNIT
Drain-Source Voltage (T _J =-55 ~ +150°C)			V _{DSS}	700	V
Transient Drain to Source Voltage (Note 2)			V _(TR) DSS	800	V
Gate-Source Voltage			V _{GSS}	±20	V
Drain Current	Continuous	T _C =25°C	I _D	5	A
		T _C =100°C		3.2	A
	Pulsed width:100μS (Note 2)	T _C =25°C	I _{DM}	16	A
		T _C =150°C		12	A
Power Dissipation			P _D	15	W
Junction Temperature			T _J	-55 ~ +150	°C
Operating Temperature			T _C	-55 ~ +150	°C
Storage Temperature Range			T _{STG}	-55 ~ +150	°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. In off-state, spike duty cycle D < 0.01, spike duration < 2μs.

3. Defined by product design and characterization. Value is not tested to full current in production.

■ THERMAL DATA

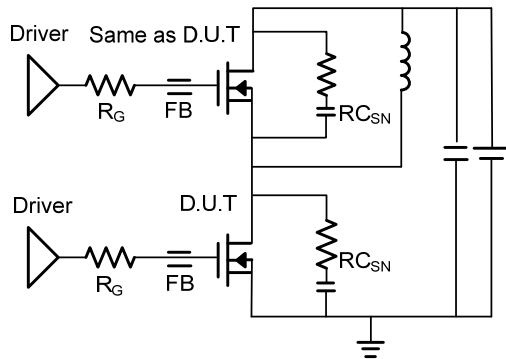
PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ _{JA}	50	°C/W
Junction to Case	θ _{JC}	8.2	°C/W

Note: Device on one layer epoxy PCB for drain connection (vertical and without air stream cooling, with 6cm²copper area and 70μm thickness).

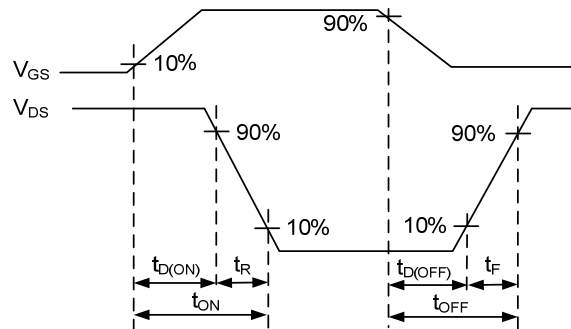
■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Voltage		V _{DSS_MAX}	V _{GS} =0V	700			V
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0V, I _{DSS} =250μA		1000		V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =700V, V _{GS} =0V		3	20	μA
			V _{DS} =700V, V _{GS} =0V, T _J =150°C		50		μA
Gate- Source Leakage Current	Forward	I _{GSS}	V _{GS} =20V			150	nA
	Reverse		V _{GS} =-20V			-150	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} , I _D =500μA	1.1	1.8	2.5	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =8.0V, I _D =4.0A		320	400	mΩ
			V _{GS} =8.0V, I _D =4.0A, T _J =150°C		640		mΩ
DYNAMIC CHARACTERISTICS							
Input Capacitance		C _{ISS}	V _{DS} =400V, V _{GS} =0V, f=1.0MHz		304		pF
Output Capacitance		C _{OSS}			11		pF
Reverse Transfer Capacitance		C _{RSS}			1		pF
Effective Output Capacitance, Energy Related		C _{o(er)}	V _{DS} =0~400V, V _{GS} =0V		16.4		pF
Effective Output Capacitance, Time Related		C _{o(tr)}			35		pF
Output Charge		Q _{OSS}			14		nC
SWITCHING CHARACTERISTICS							
Total Gate Charge (Note 1)		Q _G	V _{DS} =400V, V _{GS} =0~8V, I _D =3.0A		5.8		nC
Gate-Source Charge		Q _{GS}			1.6		nC
Gate-Drain Charge		Q _{GD}			2.1		nC
Turn-On Delay Time (Note 1)		t _{D(ON)}	V _{DS} =400V, V _{GS} =0~8V, I _D =3.0A, R _G =47Ω		14		ns
Turn-On Rise Time		t _{tr}			10		ns
Turn-Off Delay Time		t _{D(OFF)}			60		ns
Turn-Off Fall Time		t _f			10		ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS							
Drain-Source Diode Forward Voltage		V _{SD}	I _S =1.5A, V _{GS} =0V, T _J =25°C		1.2		V
			I _S =3.0A, V _{GS} =0V, T _J =25°C		1.6		V
			I _S =3.0A, V _{GS} =0V, T _J =150°C		2.3		V
Body Diode Reverse Recovery Time		t _{rr}	I _S =3.0A, V _{GS} =0V, V _{DD} =400V,		14		ns
Body Diode Reverse Recovery Charge		Q _{rr}	di/dt=1000A/μs		14		nC

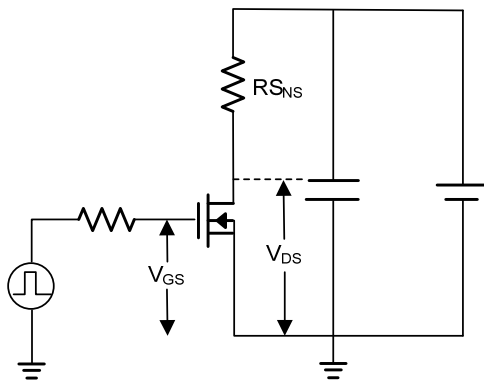
■ TEST CIRCUITS AND WAVEFORMS



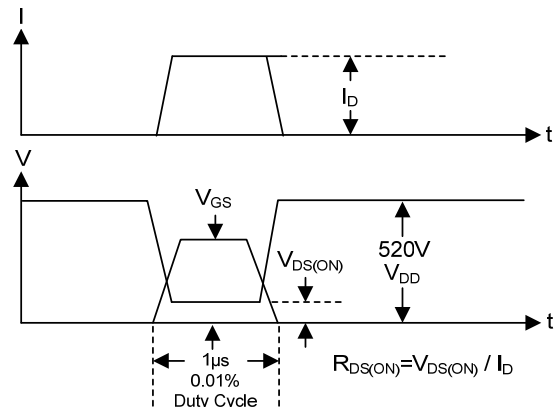
Switching Time Test Circuit



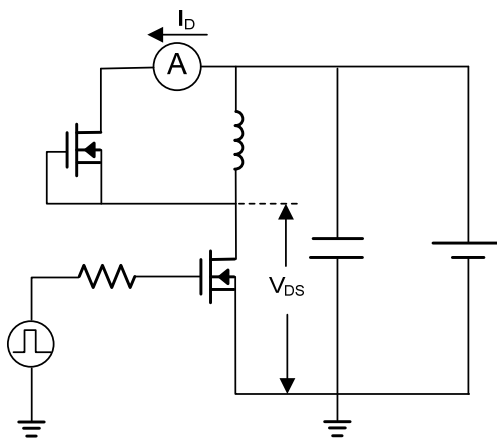
Switching Time Waveform



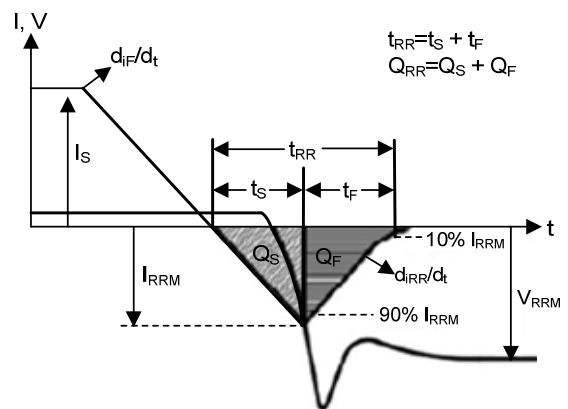
Dynamic $R_{DS(ON)}$ Test Circuit



Dynamic $R_{DS(ON)}$ Waveform

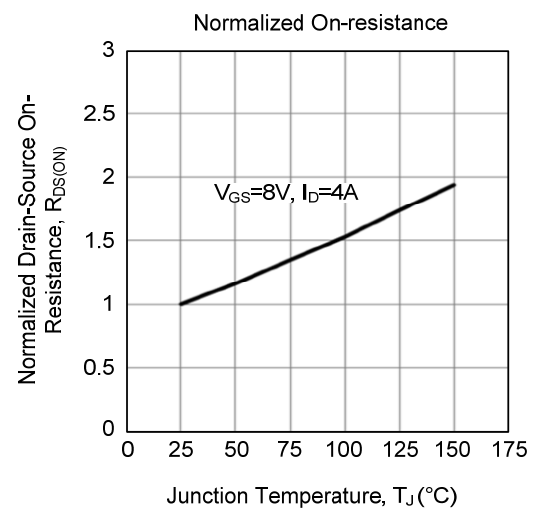
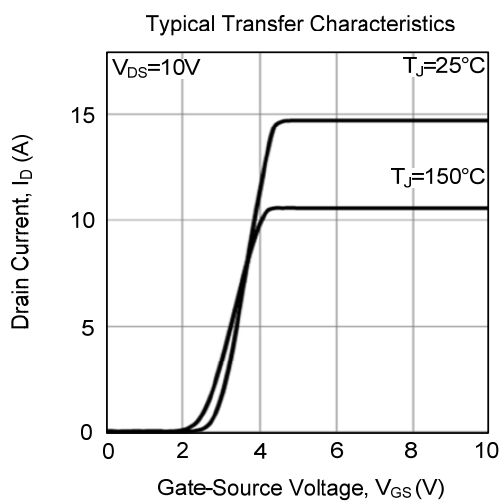
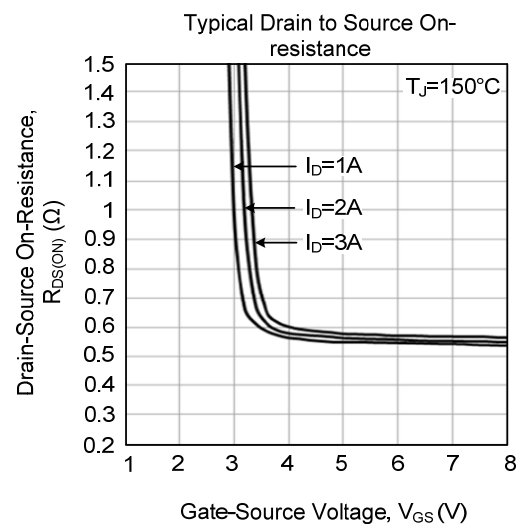
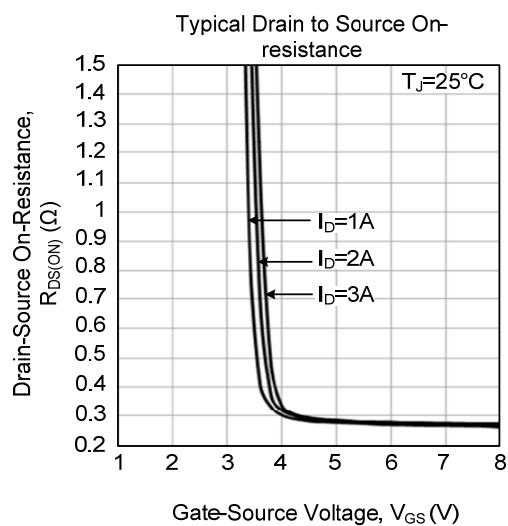
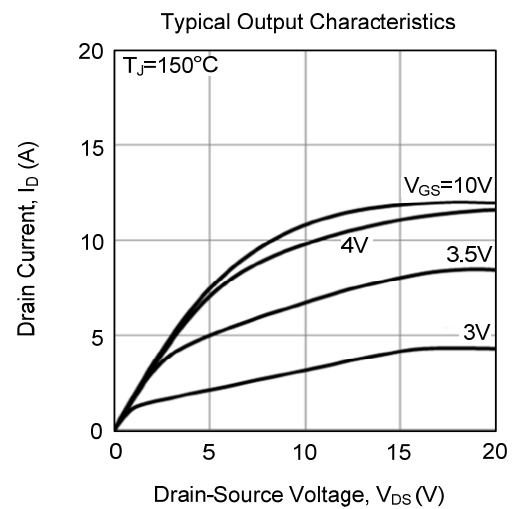
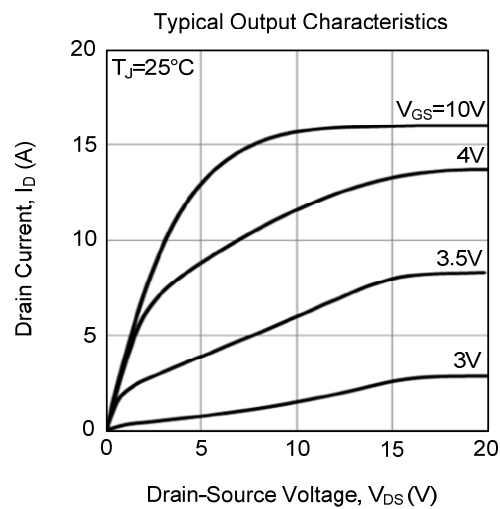


Diode Characteristic Test Circuits

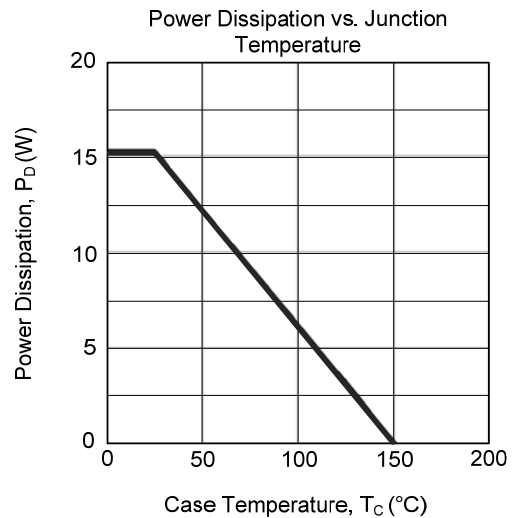
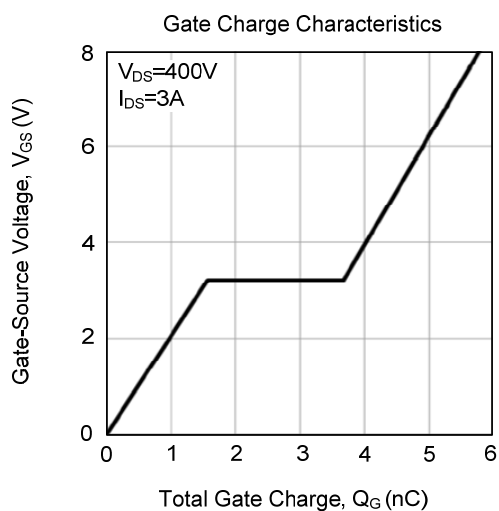
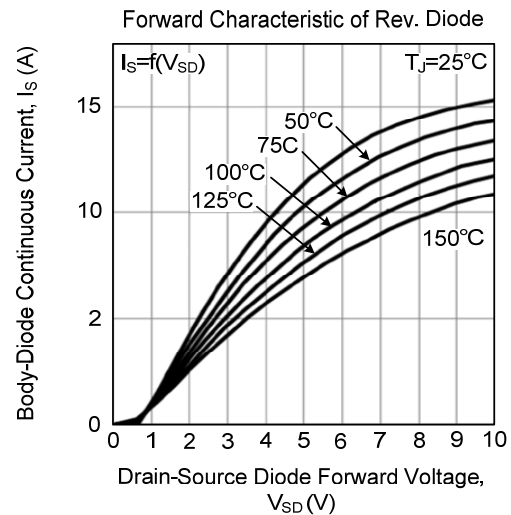
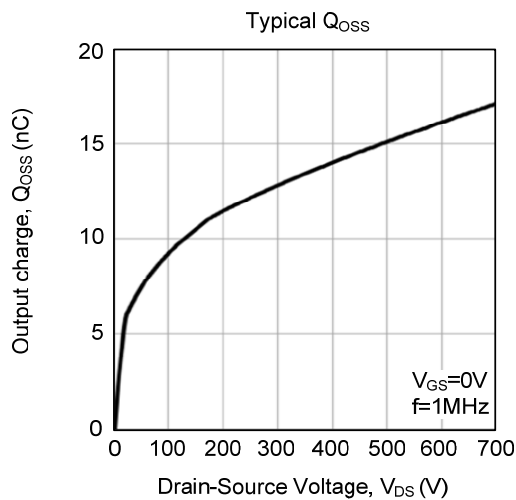
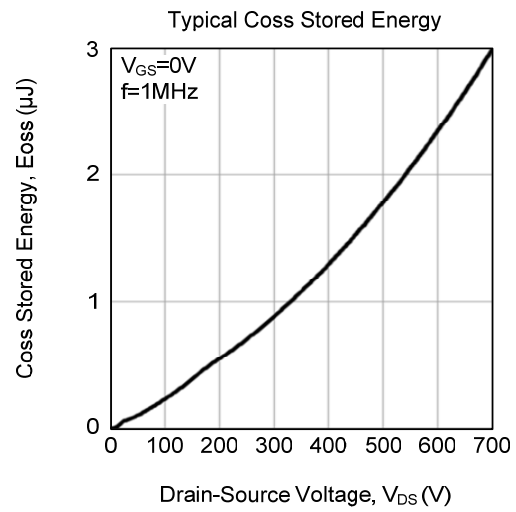
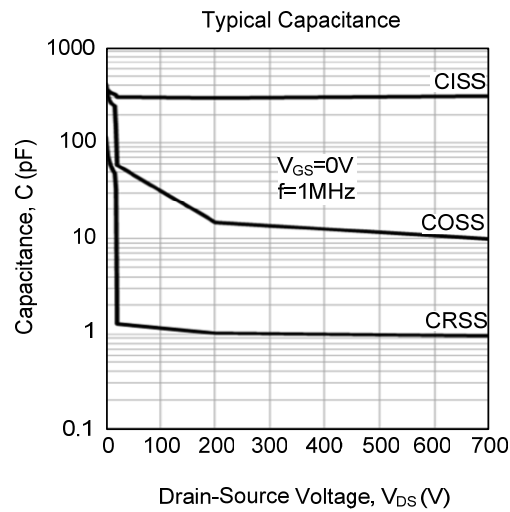


Diode Recovery Waveform

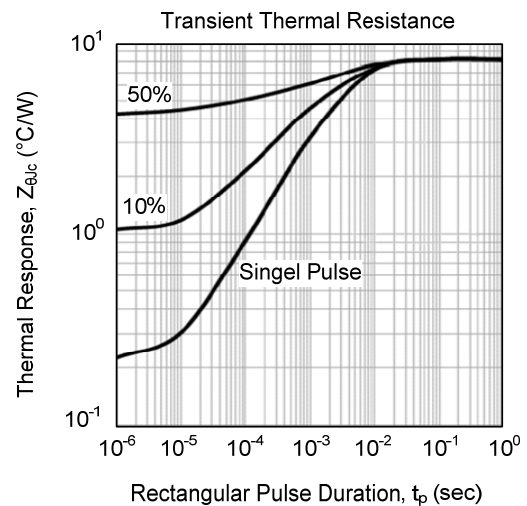
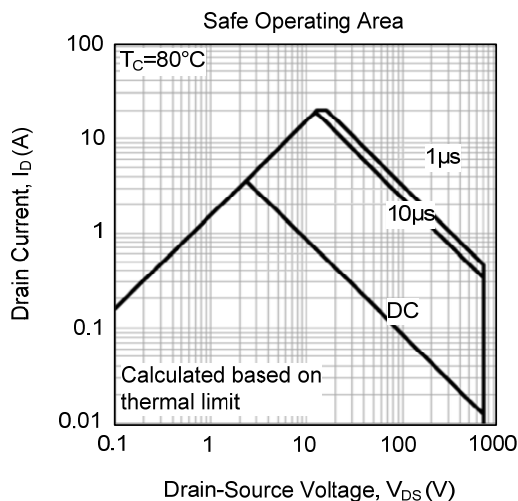
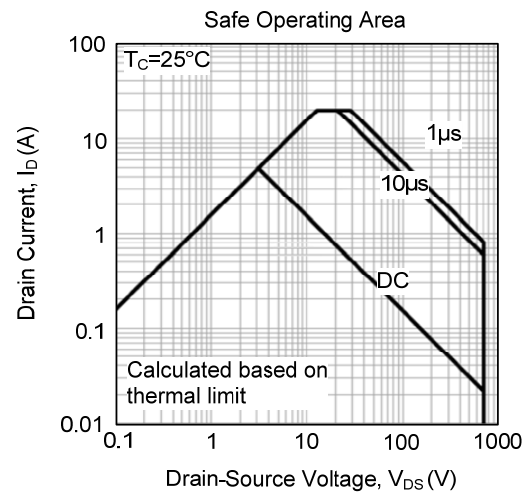
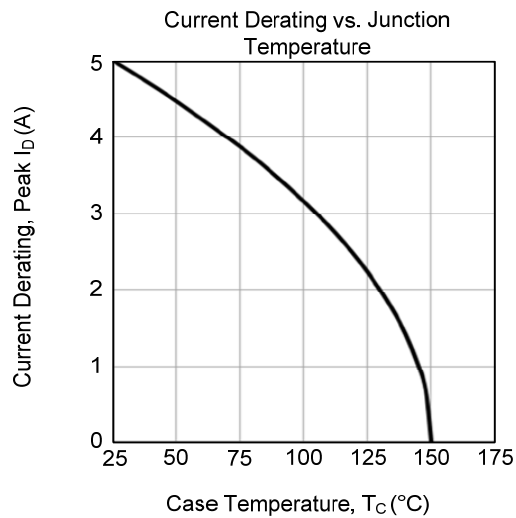
TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. UTC reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.