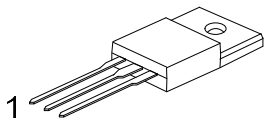
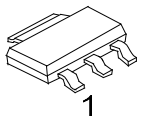
UT4N15M

POWER MOSFET

4.0A, 150V N-CHANNEL POWER MOSFET



TO-220F



SOT-223

■ DESCRIPTION

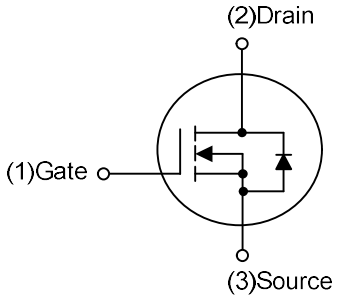
The UTC **UT4N15M** is a N-channel mode power MOSFET using UTC's advanced technology to provide customers with a minimum on-state resistance, low gate charge and high switching speed.

The UTC **UT4N15M** is suitable for high voltage synchronous rectifier and AC/DC converters, etc.

■ FEATURES

* $R_{DS(ON)} \leq 165\ m\Omega$ @ $V_{GS} = 10V$, $I_D = 2.0A$
  $R_{DS(ON)} \leq 175\ m\Omega$ @ $V_{GS} = 4.5V$, $I_D = 2.0A$
* High Switching Speed
* High Cell Density Trench Technology

■ SYMBOL



■ ORDERING INFORMATION

Order Number		Package	Pin Assignment			Packing
Lead Free	Halogen-Free		1	2	3	
UT4N15ML-AA3-R	UT4N15MG-AA3-R	SOT-223	G	D	S	Tape Reel
UT4N15ML-TF3-T	UT4N15MG-TF3-T	TO-220F	G	D	S	Tube

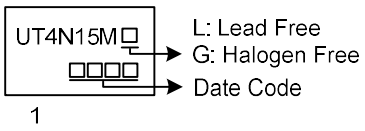
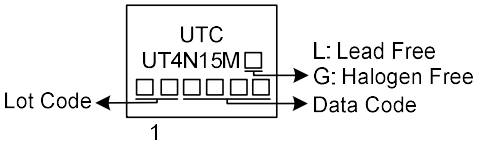
Note: Pin Assignment: G: Gate D: Drain S: Source

UT4N15MG-AA3-R
(1)Packing Type
(2)Package Type
(3)Green Package

(1) R: Tape Reel, T: Tube
(2) AA3: SOT-223, TF3: TO-220F
(3) G: Halogen Free and Lead Free, L: Lead Free

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■ MARKING

SOT-223	TO-220F
	

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	150	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current	Continuous	I_D	4	A
	Pulsed (Note 2)	I_{DM}	12	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	4.5	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	2.4	V/nS
Power Dissipation	SOT-223	P_D	2.5	W
	TO-220F		24	W
Junction Temperature		T_J	+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. Repetitive Rating: Pulse width limited by maximum junction temperature.
3. L = 0.1mH, I_{AS} = 9.5A, V_{DD} = 50V, R_G = 25 Ω, Starting T_J = 25°C
4. I_{SD} ≤ 4.0A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-223	θ_{JA}	140	°C/W
	TO-220F		62.5	°C/W
Junction to Case	SOT-223	θ_{JC}	50 (Note)	°C/W
	TO-220F		5.2	°C/W

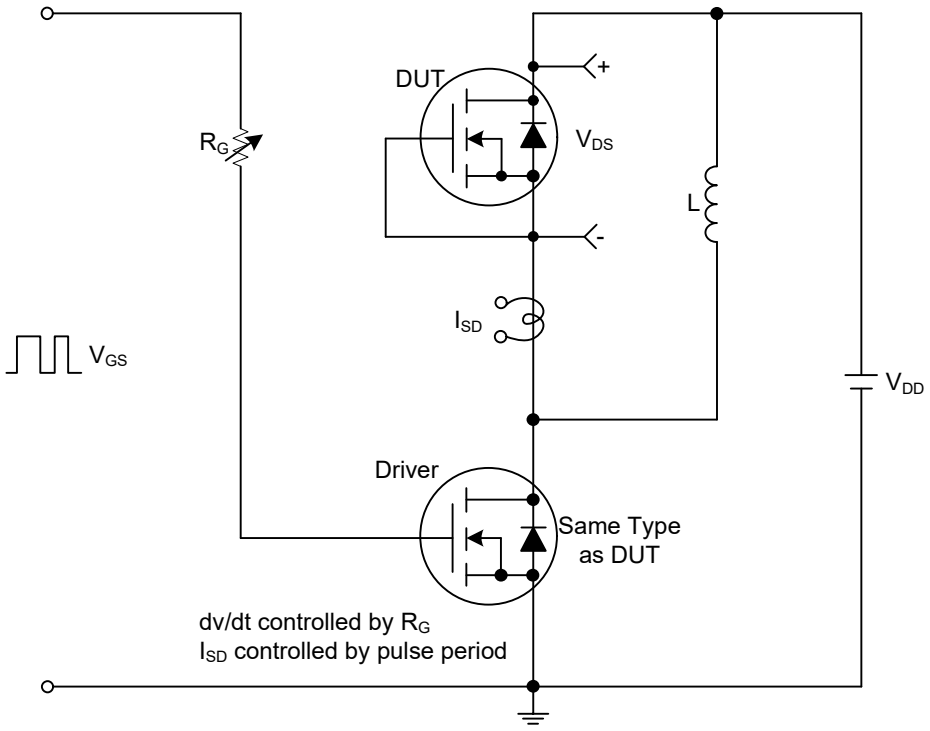
Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

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

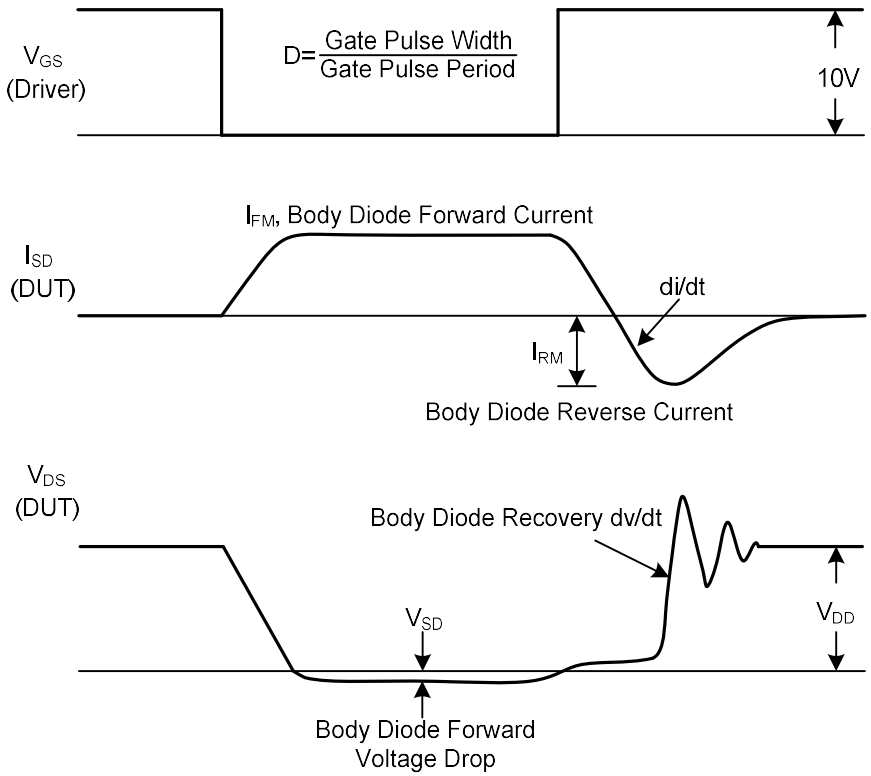
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	I_D=250μA, V_{GS}=0V	150			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=150V, V_{GS}=0V			10	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{GS}=+20V, V_{DS}=0V			+100	nA
	Reverse		V_{GS}=-20V, V_{DS}=0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	1.0		3.0	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=2.0A			165	mΩ
			V_{GS}=4.5V, I_D=2.0A			175	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=25V, f=1.0MHz		830		pF
Output Capacitance		C_{OSS}			70		pF
Reverse Transfer Capacitance		C_{RSS}			40		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 1)		Q_G	V_{DS}=120V, V_{GS}=10V, I_D=4.0A I_G=1mA (Note 1, 2)		30		nC
Gate to Source Charge		Q_{GS}			5		nC
Gate to Drain Charge		Q_{GD}			6		nC
Turn-on Delay Time (Note 1)		$t_{D(ON)}$	V_{DD}=75V, V_{GS}=10V, I_D=4.0A, R_G =25Ω (Note 1, 2)		5		ns
Rise Time		t_R			19		ns
Turn-off Delay Time		$t_{D(OFF)}$			99		ns
Fall-Time		t_F			52		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I_S				4	A
Maximum Body-Diode Pulsed Current		I_{SM}				12	A
Drain-Source Diode Forward Voltage (Note 1)		V_{SD}	I_S=4.0A, V_{GS}=0V			1.4	V
Reverse Recovery Time (Note 1)		t_{rr}	I_S=4.0A, V_{GS}=0V, dI/dt=100A/μs		52		nS
Reverse Recovery Charge		Q_{rr}			84		nC

Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.
2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS



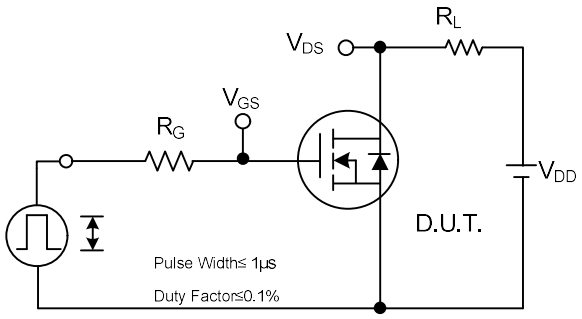
Peak Diode Recovery dv/dt Test Circuit



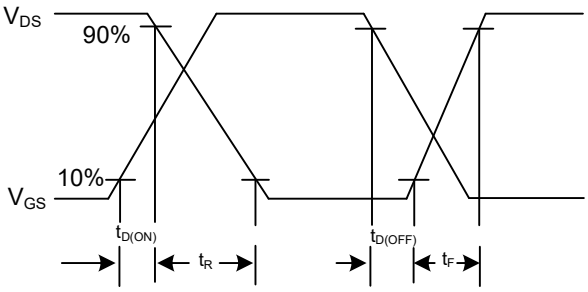
Peak Diode Recovery dv/dt Test Circuit and Waveforms

Peak Diode Recovery dv/dt Waveforms

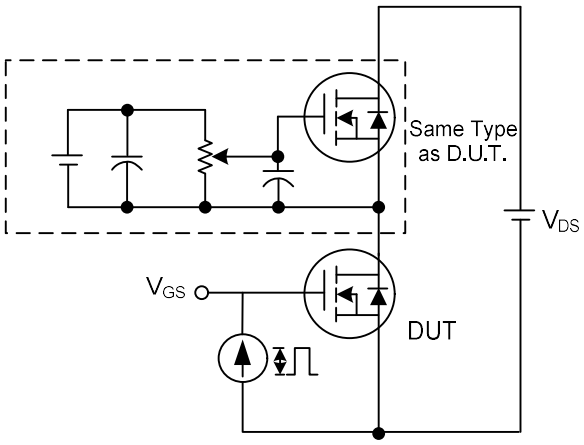
■ TEST CIRCUITS AND WAVEFORMS



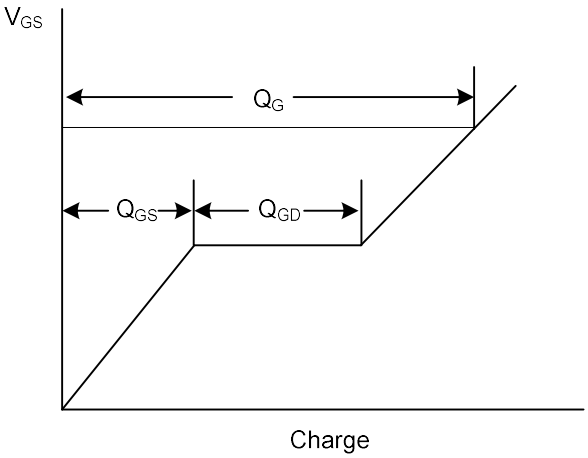
Switching Test Circuit



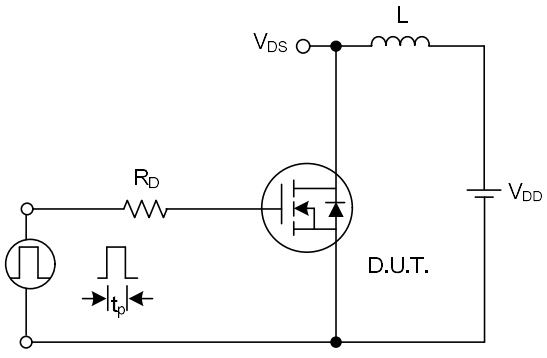
Switching Waveforms



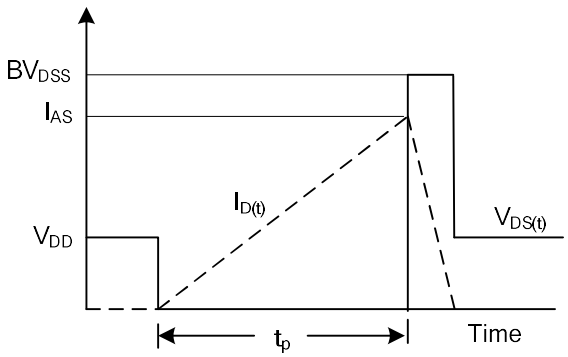
Gate Charge Test Circuit



Gate Charge Waveform

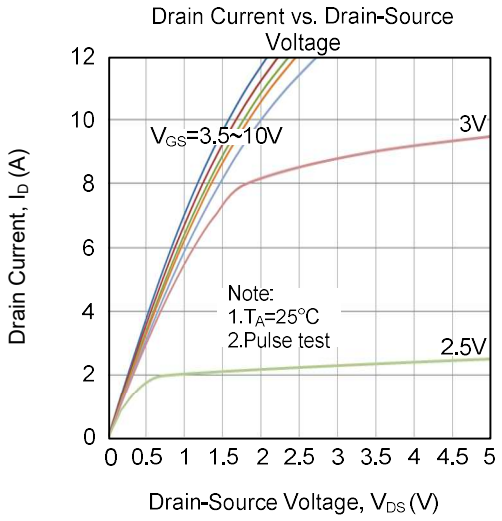


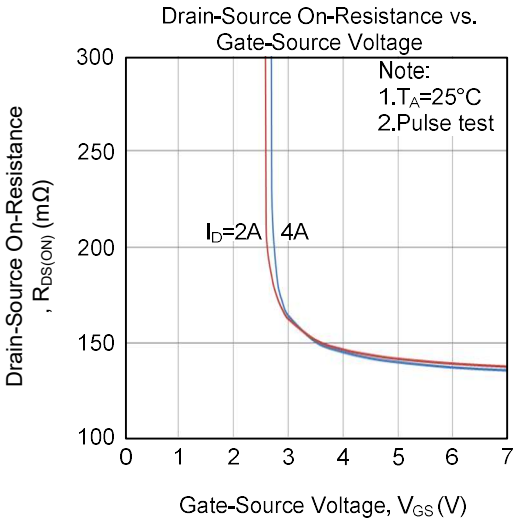
Unclamped Inductive Switching Test Circuit

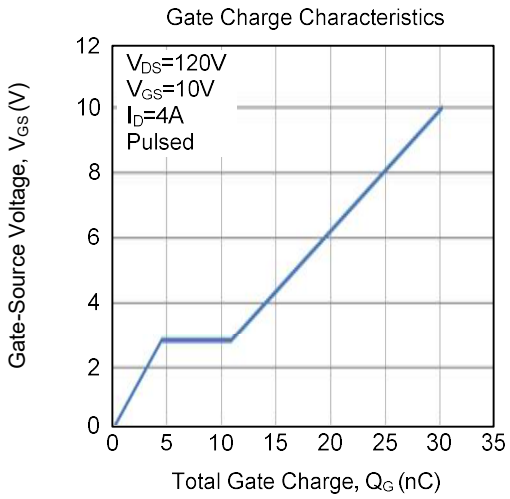


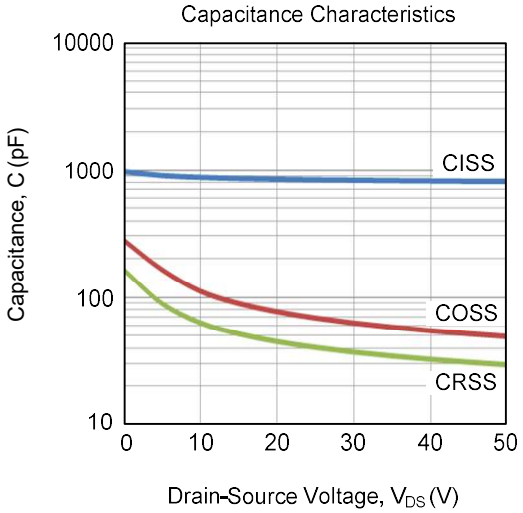
Unclamped Inductive Switching Waveforms

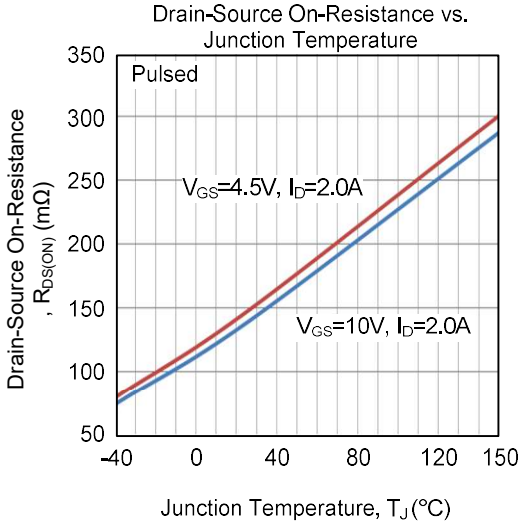
■ TYPICAL CHARACTERISTICS

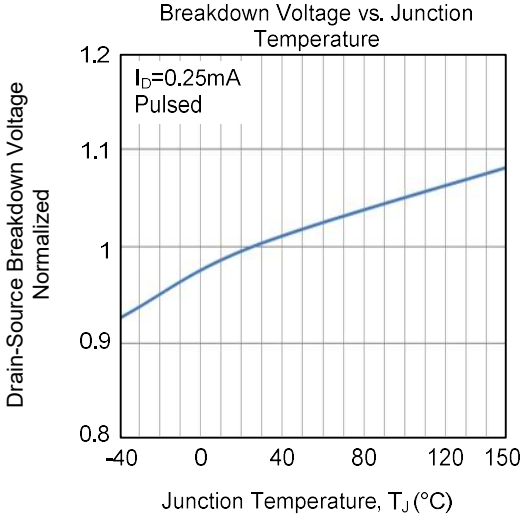




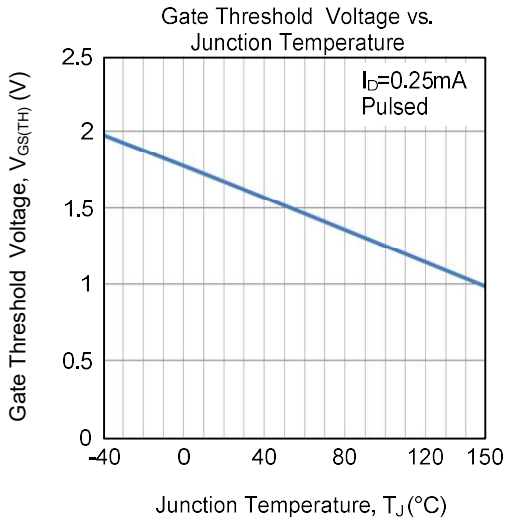


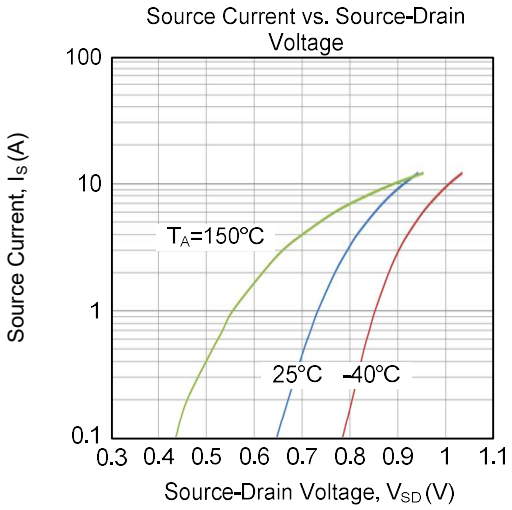


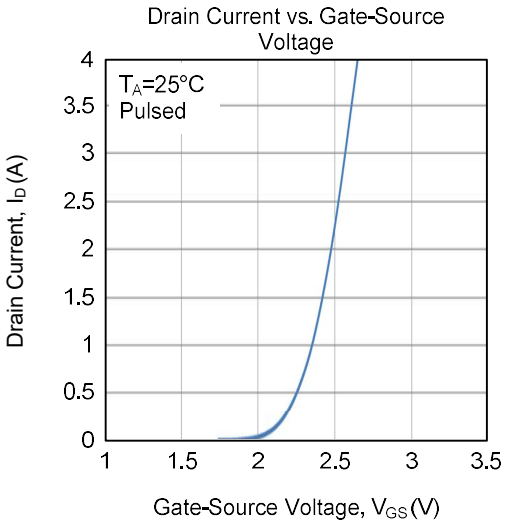


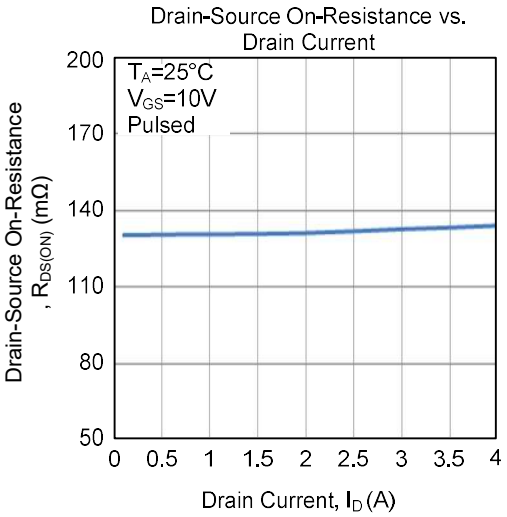


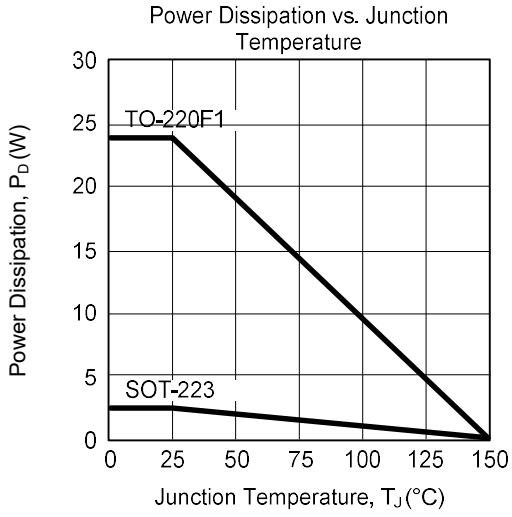
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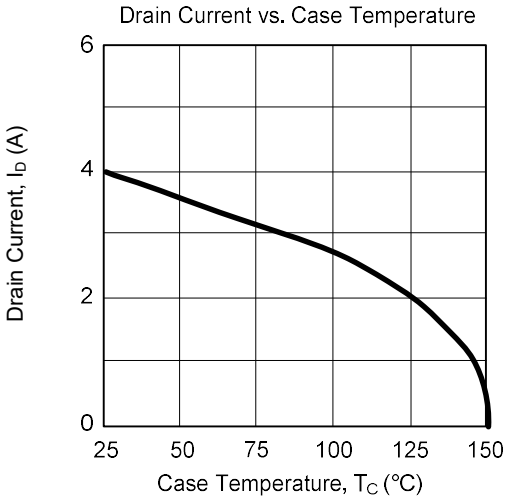




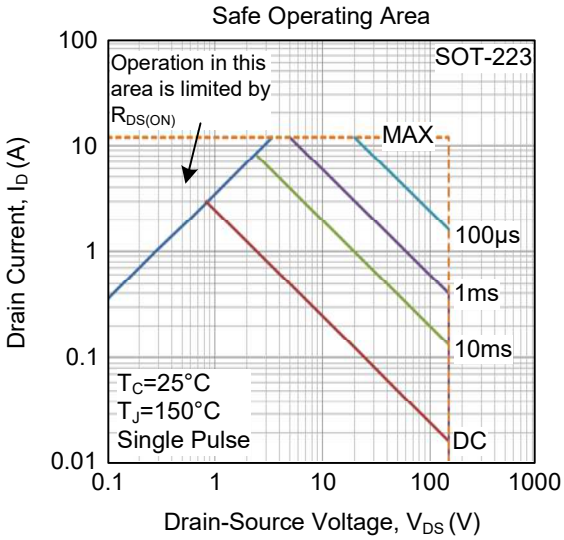








■ TYPICAL CHARACTERISTICS (Cont.)



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