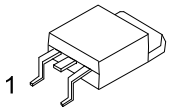
UTT68N03

POWER MOSFET

68A, 30V N-CHANNEL POWER MOSFET



TO-252

■ DESCRIPTION

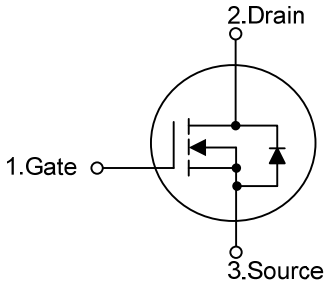
The UTC **UTT68N03** is a N-channel mode power MOSFET using UTC's advanced technology to provide customers with a minimum on-state resistance, low gate charge and high switching speed.

The UTC **UTT68N03** is suitable for high voltage synchronous rectifier and DC/DC converters, etc.

■ FEATURES

* $R_{DS(ON)}$ < 9.2 mΩ @ V_{GS}=10V, I_D=20A
  $R_{DS(ON)}$ < 18 mΩ @ V_{GS}=4.5V, I_D=20A
* High Switching Speed
* High Cell Density Trench Technology

■ SYMBOL



■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UTT68N03L-TN3-R	UTT68N03G-TN3-R	TO-252	G	D	S	Tape Reel

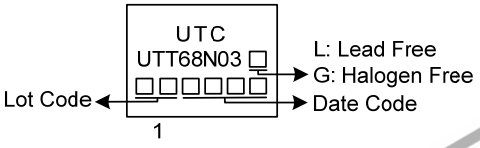
Note: Pin Assignment: G: Gate D: Drain S: Source

UTT68N03G-TN3-R

(1)Packing Type
(2)Package Type
(3)Green Package

(1) R: Tape Reel
(2) TN3: TO-252
(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	30	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current	Continuous	I_D	68	A
	Pulsed (Note 2)	I_{DM}	136	A
Avalanche Energy (Note 3)	Single Pulsed (Note 3)	E_{AS}	21	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	1.9	V/nS
Power Dissipation		P_D	50	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}=20.5A, V_{DD}=50V, R_G = 25Ω, Starting T_J = 25°C
4. I_{SD} ≤30A, di/dt ≤200A/μs, V_{DD} ≤ $V_{(BR)DSS}$, T_J ≤ 25°C

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	110	°C/W
Junction to Case	θ_{JC}	2.5 (Note)	°C/W

Note: The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.

■ 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=250μA, V_{GS}=0V	30			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=68V, 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=1mA	0.8		2.0	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=20A			9.2	mΩ
			V_{GS}=4.5V, I_D=20A			18	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=25V, f=1.0MHz		1802		pF
Output Capacitance		C_{OSS}			275		pF
Reverse Transfer Capacitance		C_{RSS}			225		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 1)		Q_G	V_{DS}=15V, V_{GS}=10V, I_D=1.3A I_G=1mA (Note 1, 2)		77		nC
Gate to Source Charge		Q_{GS}			7.6		nC
Gate to Drain Charge		Q_{GD}			12		nC
Turn-on Delay Time (Note 1)		$t_{D(ON)}$	V_{DS}=15V, V_{GS}=10V, I_D =0.5A, R_G =3Ω (Note 1, 2)		24		ns
Rise Time		t_R			73		ns
Turn-off Delay Time		$t_{D(OFF)}$			386		ns
Fall-Time		t_F			188		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I_S				68	A
Maximum Body-Diode Pulsed Current		I_{SM}				136	A
Drain-Source Diode Forward Voltage (Note 1)		V_{SD}	I_S=68A, V_{GS}=0V			1.4	V
Reverse Recovery Time (Note 1)		t_{rr}	I_S=68A, V_{GS}=0V, dI/dt=30A/μs		118		nS
Reverse Recovery Charge		Q_{rr}			191		nC

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

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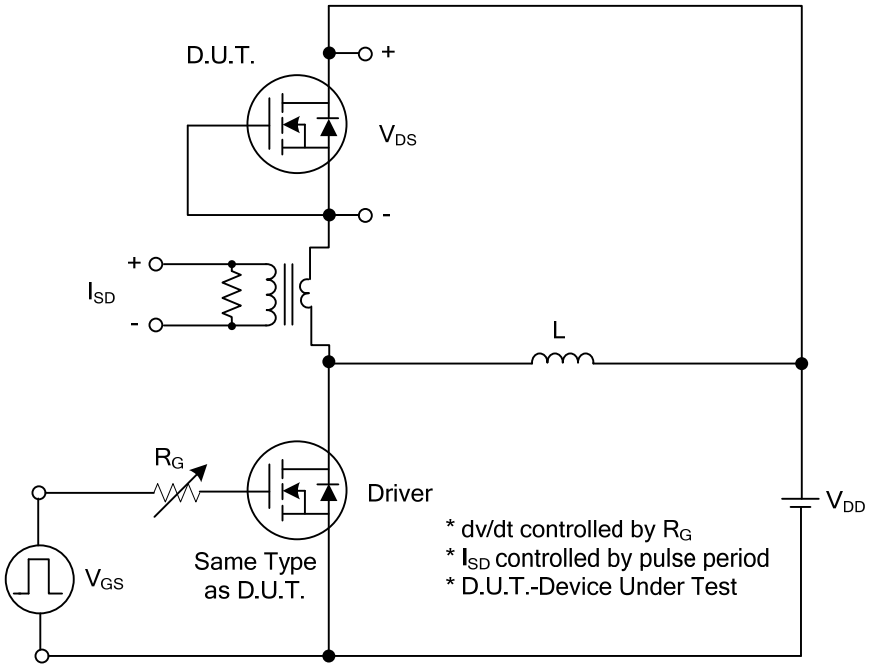
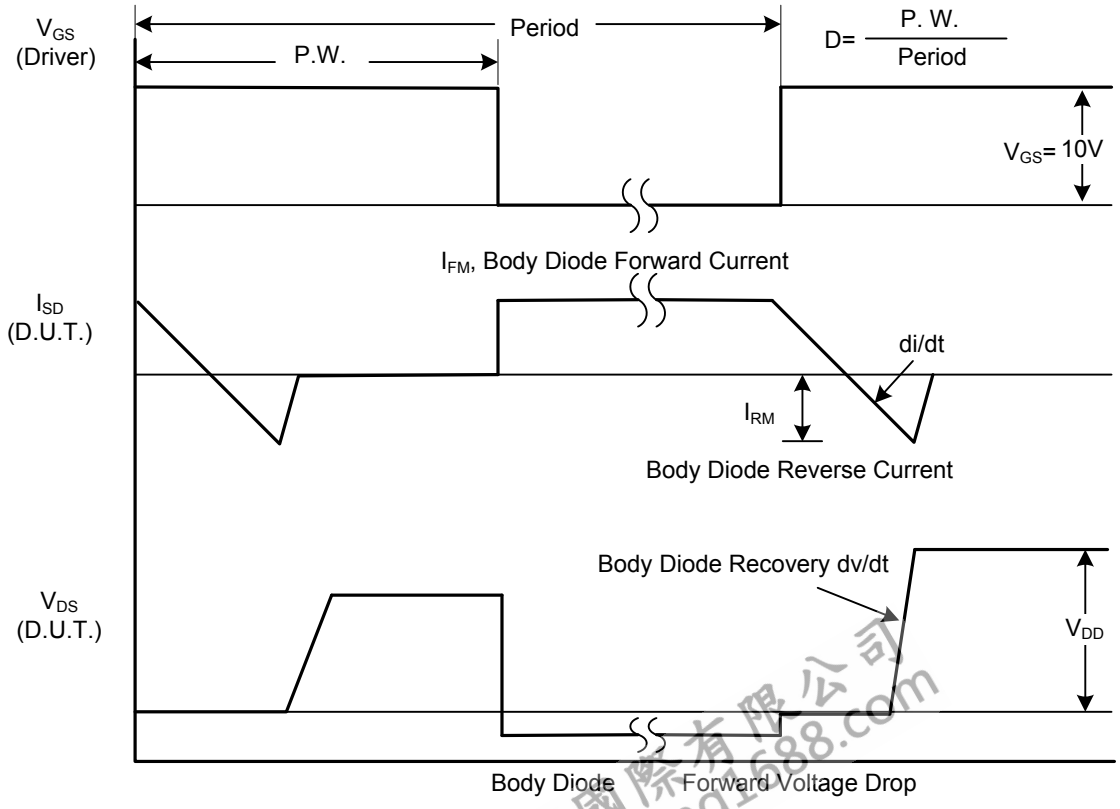
■ TEST CIRCUITS AND WAVEFORMS



Peak Diode Recovery dv/dt Test Circuit



Peak Diode Recovery dv/dt Waveforms

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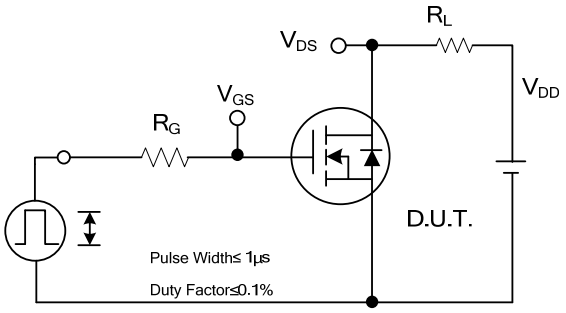
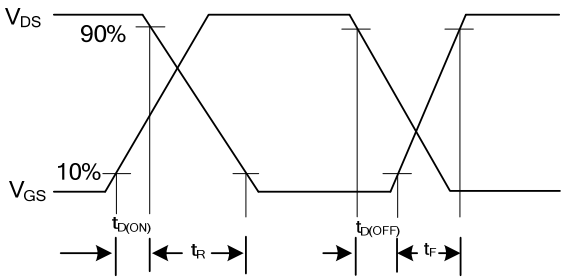
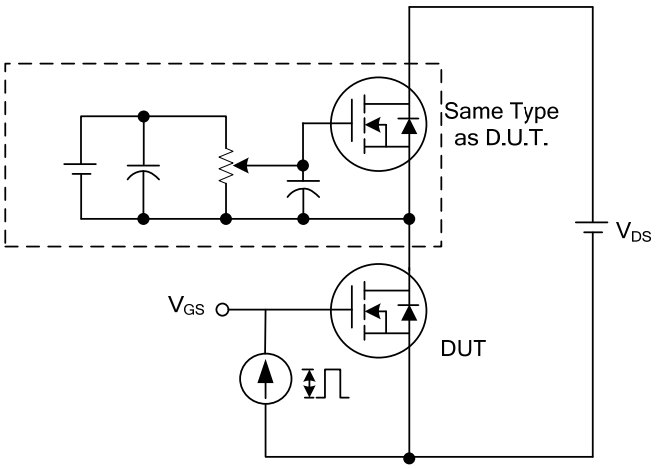
■ TEST CIRCUITS AND WAVEFORMS



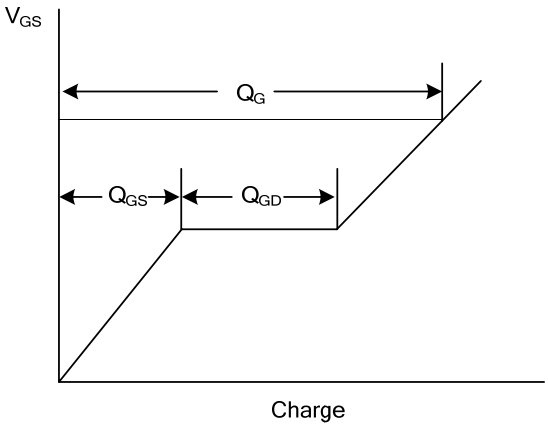
Switching Test Circuit



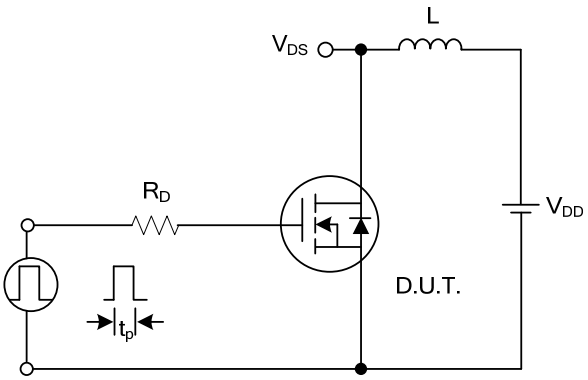
Switching Waveforms



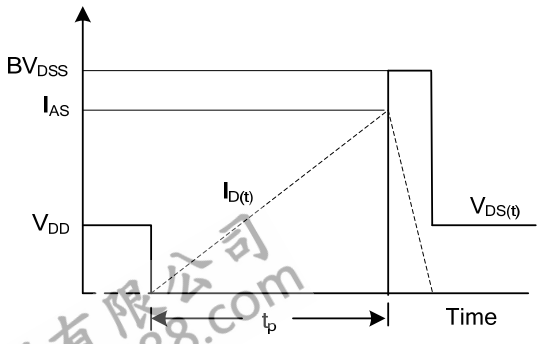
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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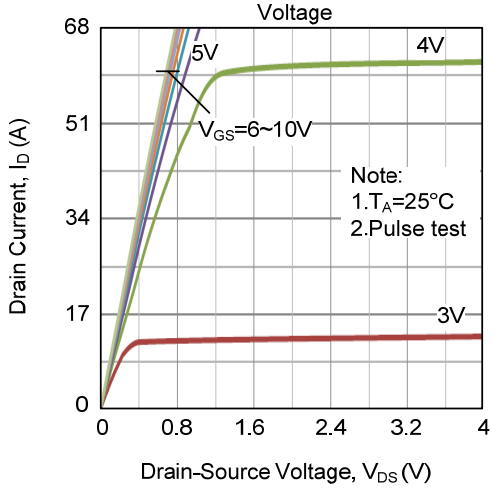
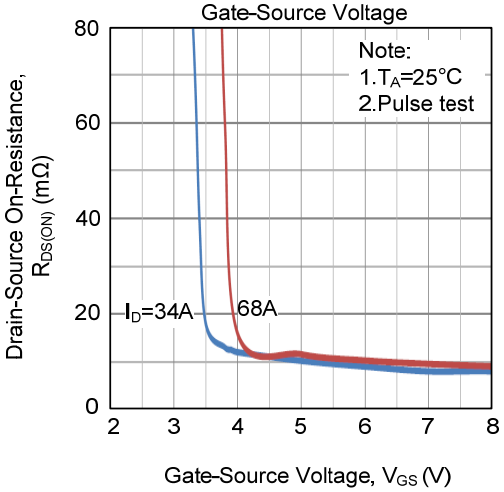
■ TYPICAL CHARACTERISTICS

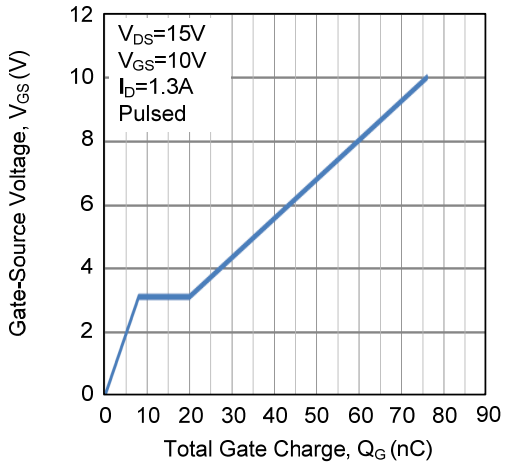
Drain Current vs. Drain-Source Voltage



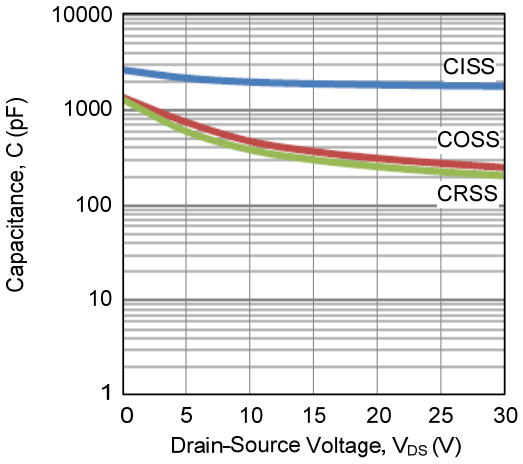
Drain-Source On-Resistance vs. Gate-Source Voltage



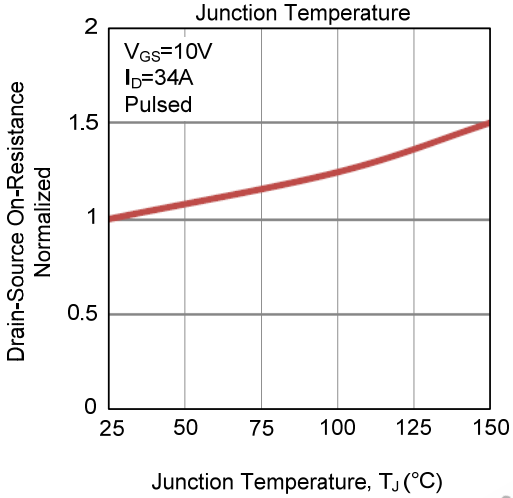
Gate Charge Characteristics



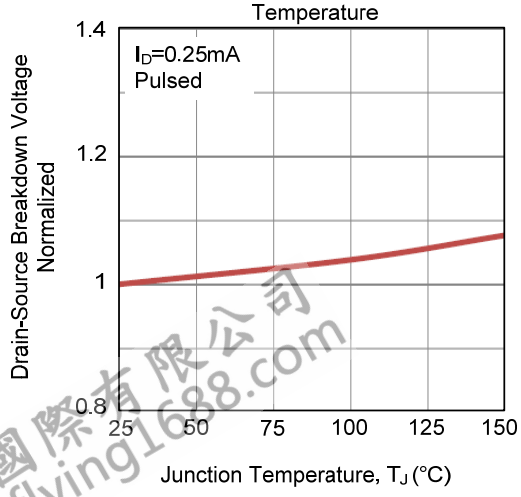
Capacitance Characteristics



Drain-Source On-Resistance vs. Junction Temperature



Breakdown Voltage vs. Junction Temperature



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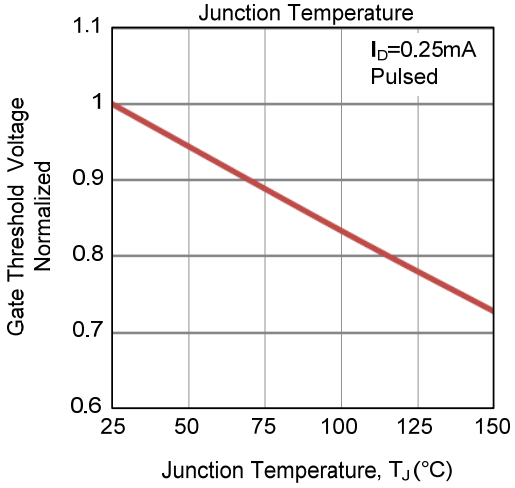
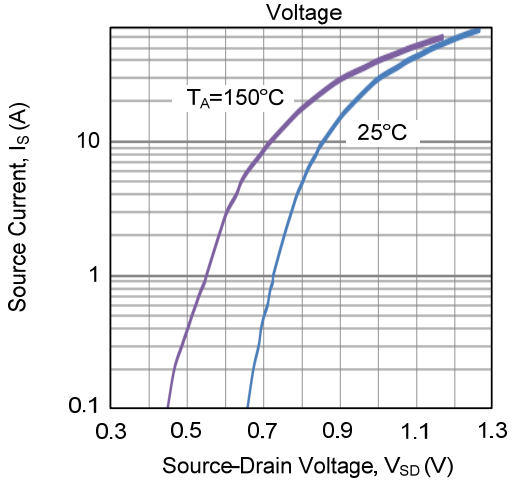
■ TYPICAL CHARACTERISTICS (Cont.)

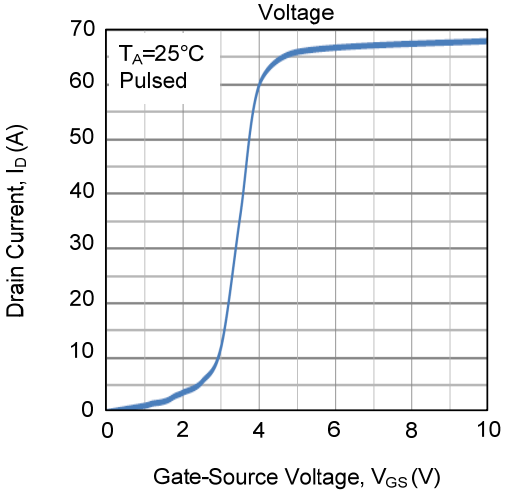
Gate Threshold Voltage vs. Junction Temperature



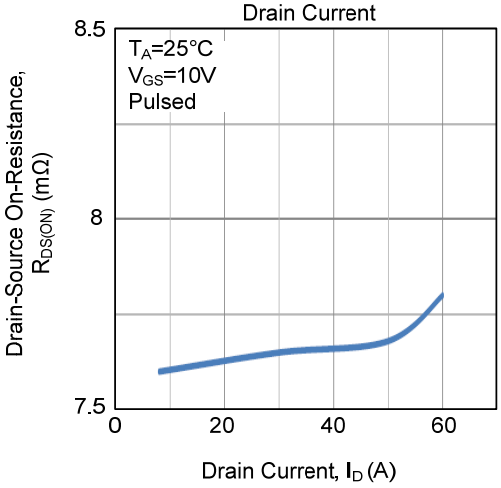
Source Current vs. Source-Drain Voltage



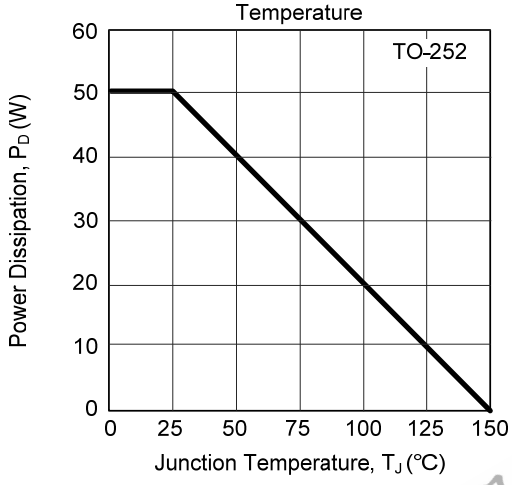
Drain Current vs. Gate-Source Voltage



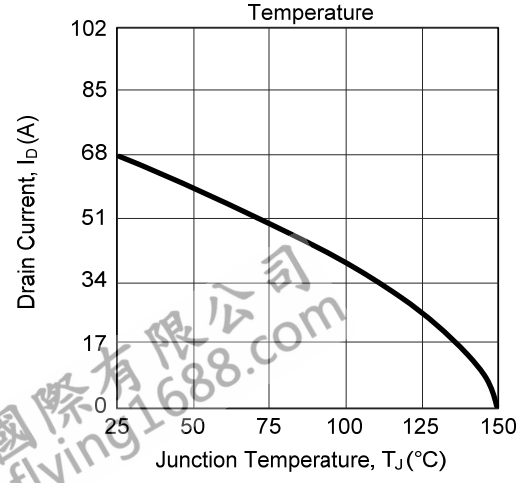
Drain-Source On-Resistance vs. Drain Current



Power Dissipation vs. Junction Temperature



Drain Current vs. Junction Temperature



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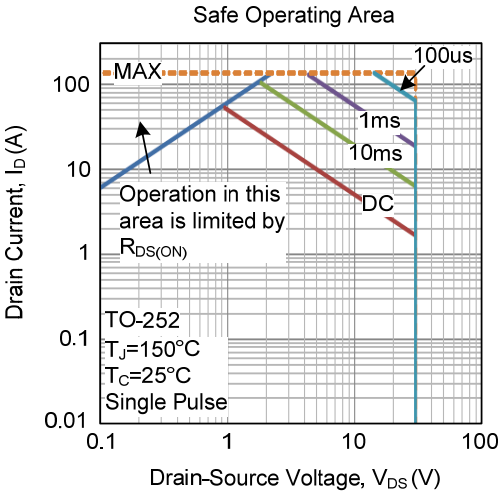
■ TYPICAL CHARACTERISTICS (Cont.)



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