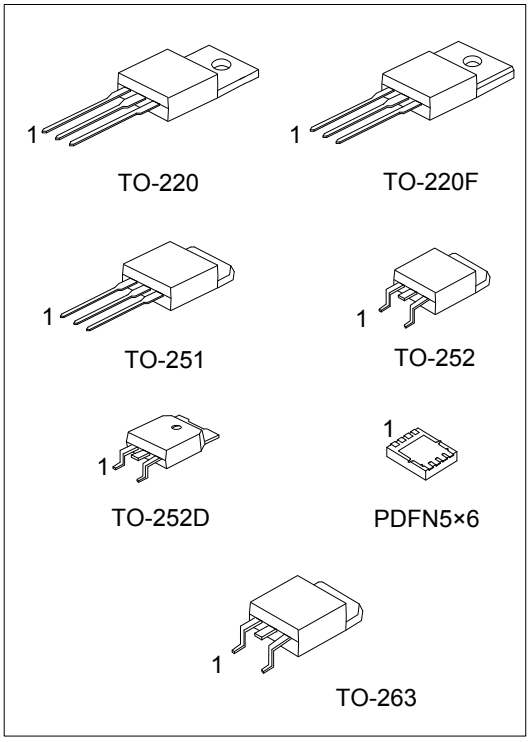
UT100N03

Power MOSFET

100A, 30V N-CHANNEL POWER MOSFET



■ DESCRIPTION

The **UT100N03** uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with low gate voltages. This device is suitable for use as a load switch or in PWM applications.

■ FEATURES

TO-220

* $R_{DS(ON)}$ ≤ 4.6 mΩ @ V_{GS}=10 V, I_D=50A
* $R_{DS(ON)}$ ≤ 6.0 mΩ @ V_{GS}=4.5 V, I_D=40A

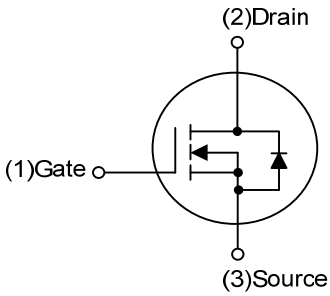
TO-220F/TO-251/TO-252/TO-252D/TO-263

* $R_{DS(ON)}$ ≤ 5.3 mΩ @ V_{GS}=10 V, I_D=50A
* $R_{DS(ON)}$ ≤ 8.0 mΩ @ V_{GS}=4.5 V, I_D=40A

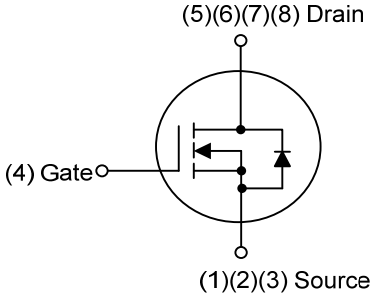
PDFN5x6

* $R_{DS(ON)}$ ≤ 4.0 mΩ @ V_{GS}=10 V, I_D=50A
* $R_{DS(ON)}$ ≤ 5.8 mΩ @ V_{GS}=4.5 V, I_D=40A

■ SYMBOL



TO-220/TO-220F/TO-251
TO-252/TO-252D

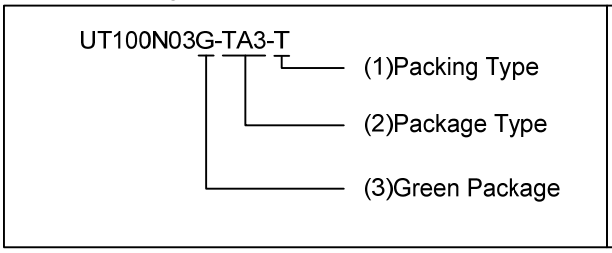


SOP-8/PDFN5×6

■ ORDERING INFORMATION

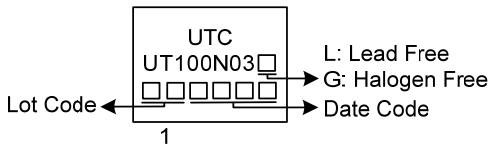
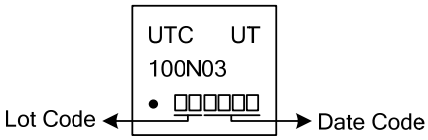
Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UT100N03L-TA3-T	UT100N03G-TA3-T	TO-220	G	D	S	-	-	-	-	-	Tube
UT100N03L-TF3-T	UT100N03G-TF3-T	TO-220F	G	D	S	-	-	-	-	-	Tube
UT100N03L-TM3-T	UT100N03G-TM3-T	TO-251	G	D	S	-	-	-	-	-	Tube
UT100N03L-TN3-R	UT100N03G-TN3-R	TO-252	G	D	S	-	-	-	-	-	Tape Reel
UT100N03L-TND-R	UT100N03G-TND-R	TO-252D	G	D	S	-	-	-	-	-	Tape Reel
UT100N03L-TQ2-T	UT100N03G-TQ2-T	TO-263	G	D	S	-	-	-	-	-	Tube
UT100N03L-TQ2-R	UT100N03G-TQ2-R	TO-263	G	D	S	-	-	-	-	-	Tape Reel
UT100N03L-P5060-R	UT100N03G-P5060-R	PDFN5×6	S	S	S	G	D	D	D	D	Tape Reel

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



(1) T: Tube, R: Tape Reel
(2) TA3: TO-220, TF3: TO-220F, TM3: TO-251, TN3: TO-252, TND: TO-252D, TQ2: TO-263, P5060: PDFN5×6
(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING

TO-220 / TO-220F / TO-251 TO-252 / TO-252D / TO-263	PDFN5×6
	

■ ABSOLUTE MAXIMUM RATINGS (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
Continuous Drain Current		I_D	100	A
Pulsed Drain Current (Note 2)		I_{DM}	400	A
Single Pulsed Avalanche Current (Note 3)		I_{AS}	35	A
Single Pulsed Avalanche Energy (Note 3)		E_{AS}	875	mJ
Power Dissipation	TO-220/TO-263	P_D	100	W
	TO-220F		36	W
	TO-251/TO-252 TO-252D		50	W
	PDFN5×6		21	W
Junction Temperature		T_J	+150	°C
Strong Temperature		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. Pulse width limited by maximum junction temperature
3. L = 0.5mH, I_{AS} = 35A, V_{DD} = 25V, R_G = 25Ω, Starting T_J = 25°C.

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/TO-220F TO-263	θ_{JA}	62.5	°C/W
	TO-251/TO-252 TO-252D		110	°C/W
	PDFN5×6		40.3 (Note 1, 2)	°C/W
Junction to Case	TO-220/TO-263	θ_{JC}	1.5	°C/W
	TO-220F		3.47	°C/W
	TO-251/TO-252 TO-252D		3	°C/W
	PDFN5×6		6 (Note 1, 2)	°C/W

Notes: 1. Maximum under Steady State conditions is 90 °C/W.
2. Surface Mounted on 1" x 1" FR4 board.

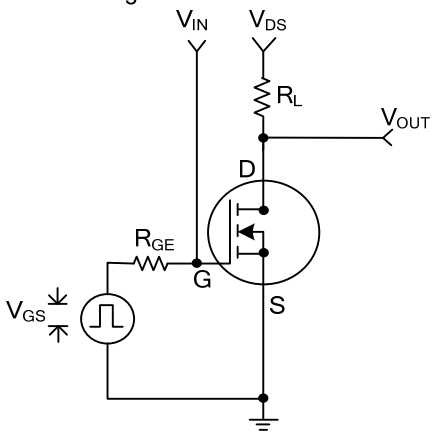
■ ELECTRICAL CHARACTERISTICS (T_J =25°C, unless otherwise noted)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS}=0V, I_D=250μA	30			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=30V, V_{GS}=0V			1	μA
Gate-Source Leakage Current		I_{GSS}	V_{DS}=0V, V_{GS}=±20V			±100	nA
ON CHARACTERISTICS(Note2)							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	1.0		3.0	V
Static Drain-Source On-Resistance	TO-220	$R_{DS(ON)}$	V_{GS}=10V, I_D=50A		3.6	4.6	mΩ
			V_{GS}=4.5V, I_D=40A		4.4	6.0	mΩ
	TO-220F TO-251 TO-252 TO-252D TO-263		V_{GS}=10V, I_D=50A		3.05	5.3	mΩ
			V_{GS}=4.5V, I_D=40A		4.2	8.0	mΩ
	PDFN5×6		V_{GS}=10V, I_D=50A		3.0	4.0	mΩ
			V_{GS}=4.5V, I_D=40A		4.2	5.8	mΩ
DYNAMIC PARAMETERS(Note3)							
Input Capacitance		C_{ISS}	V_{DS}=15V, V_{GS}=0V, f=1.0MHz		4900		pF
Output Capacitance		C_{OSS}			1040		
Reverse Transfer Capacitance		C_{RSS}			900		
SWITCHING PARAMETERS(Note3)							
Total Gate Charge		Q_G	V_{DS}=15V, V_{GS}=5V, I_D=16A (Note 1, 2)		65		nC
Gate Source Charge		Q_{GS}			10		
Gate Drain Charge		Q_{GD}			27		
Turn-ON Delay Time		$t_{D(ON)}$	V_{DD}=15V, I_D=16A, R_G=6Ω V_{GS}=10V (Note 1, 2)		40		ns
Turn-ON Rise Time		t_R			37		
Turn-OFF Delay Time		$t_{D(OFF)}$			132		
Turn-OFF Fall-Time		t_F			65		
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Drain-Source Diode Forward Current		I_S				90	A
Maximum Body-Diode Pulsed Current		I_{SM}				180	A
Drain-Source Diode Forward Voltage		V_{SD}	I_S=20A, V_{GS}=0V			1.5	V

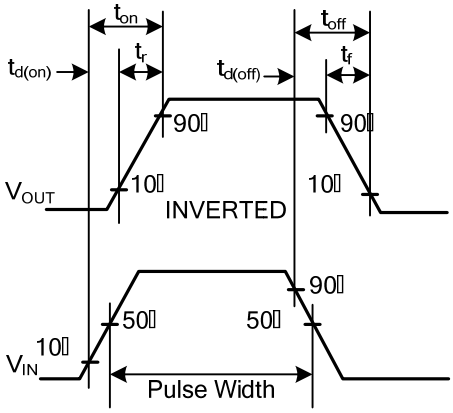
Notes: 1. Pulse Test : Pulse Width < 300μs, Duty Cycle < 2%.
2. Guaranteed by design, not subject to production testing.

■ TEST CIRCUIT AND WAVEFORM

Switching Time Test Circuit

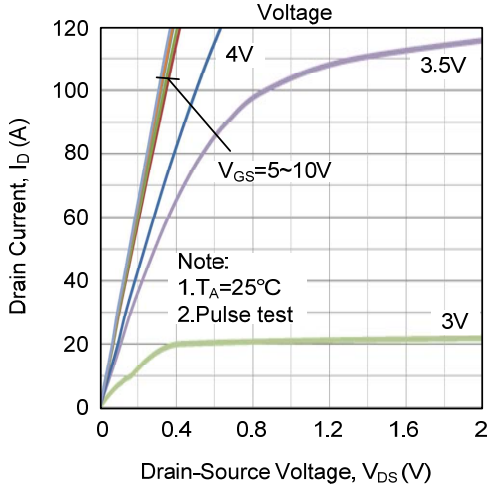


Switching Waveforms

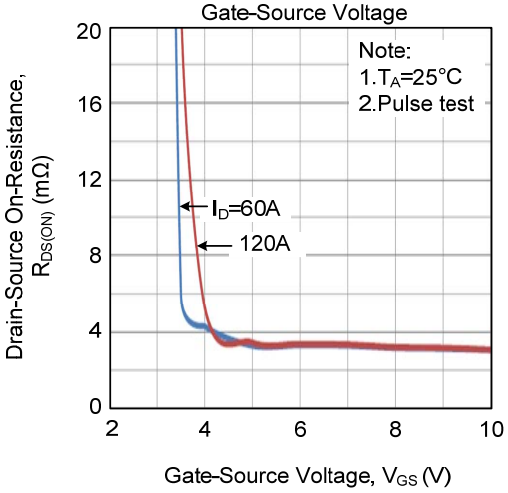


■ TYPICAL CHARACTERISTICS

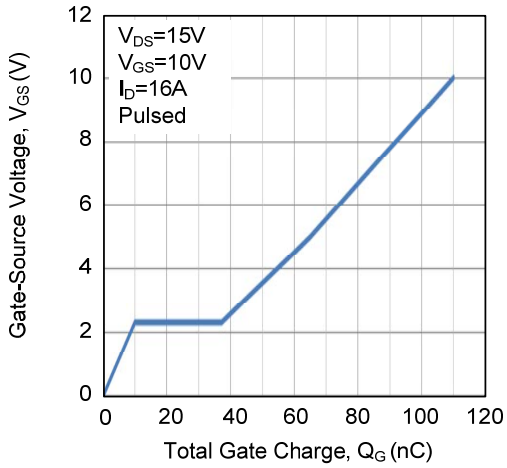
Drain Current vs. Drain-Source Voltage



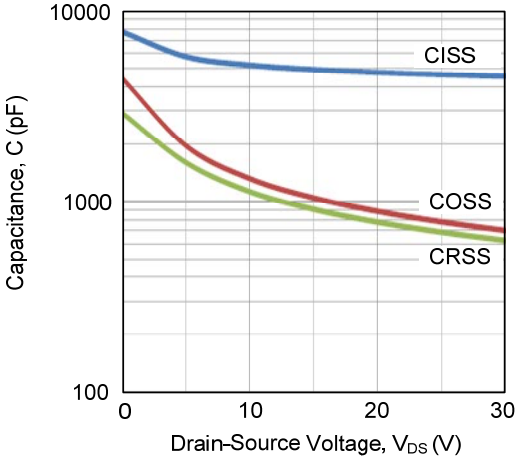
Drain-Source On-Resistance vs. Gate-Source Voltage



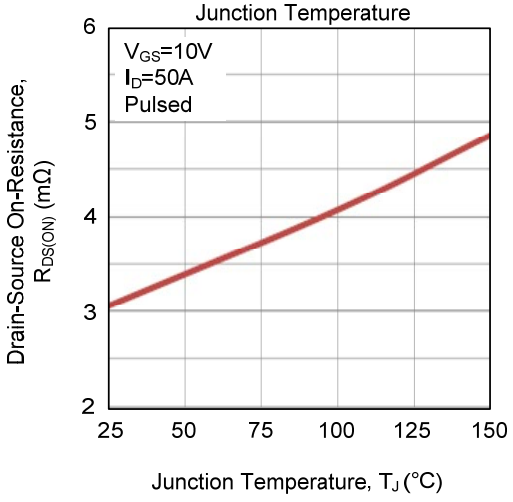
Gate Charge Characteristics



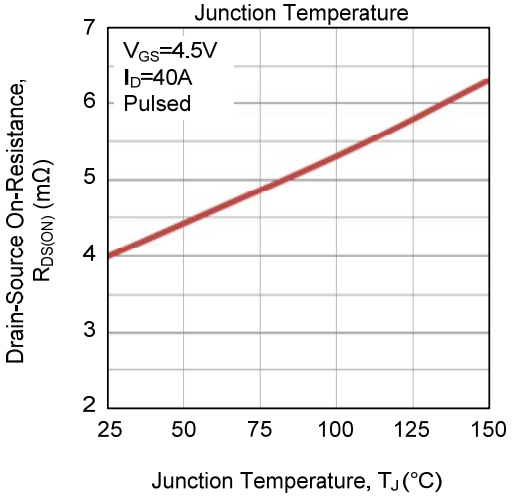
Capacitance Characteristics



Drain-Source On-Resistance vs. Junction Temperature

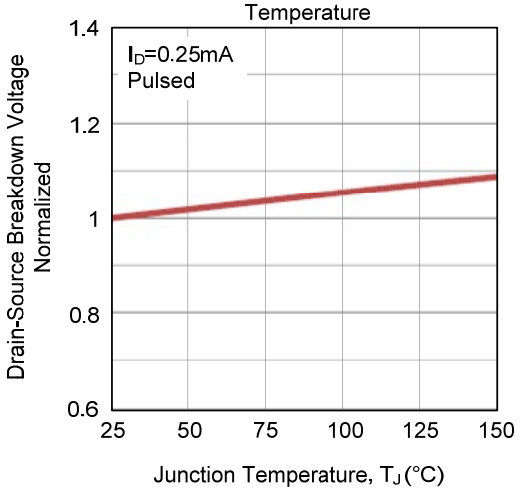


Drain-Source On-Resistance vs. Junction Temperature

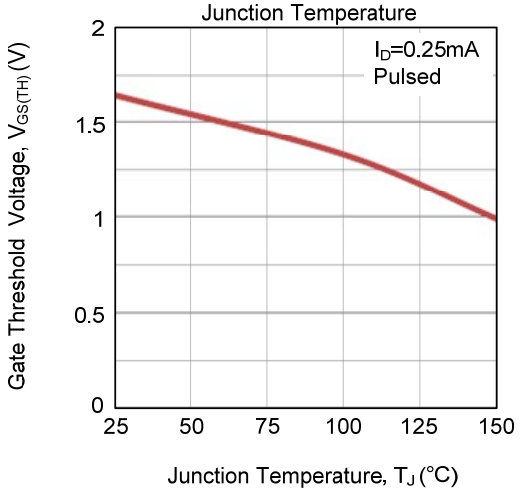


■ TYPICAL CHARACTERISTICS (Cont.)

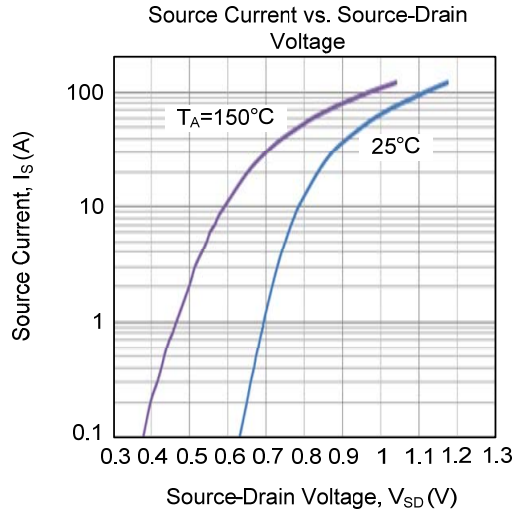
Breakdown Voltage vs. Junction Temperature



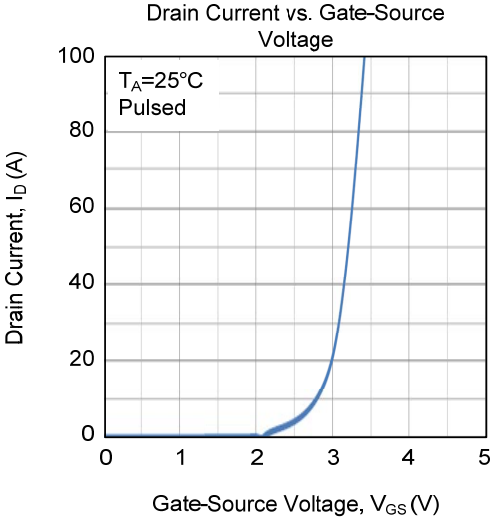
Gate Threshold Voltage vs. Junction Temperature



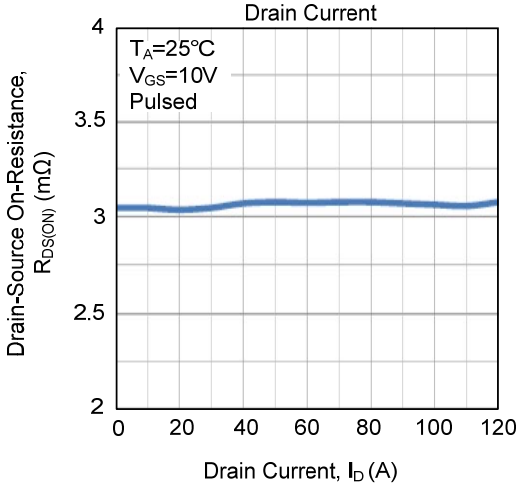
Source Current vs. Source-Drain Voltage



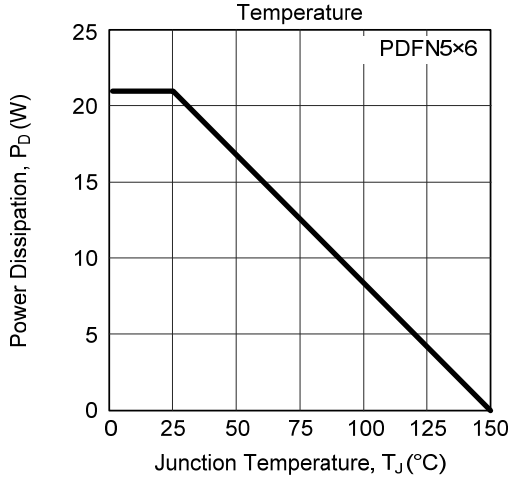
Drain Current vs. Gate-Source Voltage



Drain-Source On-Resistance vs. Drain Current



Power Dissipation vs. Junction Temperature



■ TYPICAL CHARACTERISTICS (Cont.)