# UNISONIC TECHNOLOGIES CO., LTD

UT3416 **Power MOSFET** 

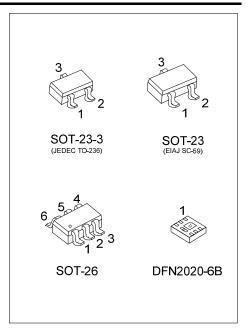
# 6.5A, 20V N-CHANNEL **ENHANCEMENT MODE FIELD EFFECT TRANSISTOR**

#### **DESCRIPTION**

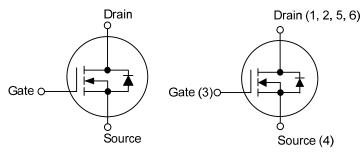
The UTC UT3416 is advanced N-channel enhancement MOSFET which can provide the designer with the best combination of excellent R<sub>DS (ON)</sub>, low gate charge and low gate voltages as low as 1.8V.When it is used as a load switch or in PWM application, the UTC UT3416 can be considered as an ideal.

#### **FEATURES**

\*  $R_{DS(ON)} \le 22 \text{ m}\Omega$  @  $V_{GS}$ =4.5V,  $I_D$  =6.5A  $R_{DS(ON)} \le 26 \text{ m}\Omega$  @  $V_{GS} = 2.5 \text{V}$ ,  $I_D = 5.5 \text{A}$  $R_{DS(ON)} \le 40 \text{ m}\Omega$  @  $V_{GS}$ =1.8V,  $I_D$  =5.0A



#### **SYMBOL**



SOT-23-3/SOT-23/SOT-26

DFN2020-6B

### ORDERING INFORMATION

Ordering Number		Doolsone	Pin Assignment					Daaliaa	
Lead Free	Halogen Free	Package	1	2	3	4	5	6	Packing
UT3416L-AE2-R	UT3416G-AE2-R	SOT-23-3	G	S	D	-	-	-	Tape Reel
UT3416L-AE3-R	UT3416G-AE3-R	SOT-23	G	S	D	-	-	-	Tape Reel
UT3416L-AG6-R	UT3416G-AG6-R	SOT-26	D	D	G	S	D	D	Tape Reel
UT3416L-K06B-2020-R	UT3416G-K06B-2020-R	DFN2020-6B	D	D	G	S	D	D	Tape Reel

Note: Pin Assignment: G: Gate S: Source D: Drain (1) R: Tape Reel UT3416G-AE2-R (1)Packing Type (2) AE2: SOT-23-3, AE3: SOT-23, AG6: SOT-26 (2)Package Type K06B-2020: DFN2020-6B (3)Green Package (3) G: Halogen Free and Lead Free, L: Lead Free

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# **■** MARKING

PACKAGE	MARKING					
SOT-23-3 / SOT-23	☐ L: Lead Free ☐ G: Halogen Free ☐ ☐ ☐					
SOT-26	6 5 4  34S  C: Lead Free  G: Halogen Free  1 2 3					
DFN2020-6	34S ☐ L: Lead Free  G: Halogen Free  Date Code					

UT3416 Power MOSFET

# ■ **ABSOLUTE MAXIMUM RATINGS** (T<sub>A</sub> = 25°C, unless otherwise specified)

PARAMETER		SYMBOL	MBOL RATINGS	
Drain-Source Voltage		$V_{ extsf{DSS}}$	20	>
Gate-Source Voltage		$V_{GSS}$	±8	V
Continuous Drain Current		I <sub>D</sub>	I <sub>D</sub> 6.5	
Pulsed Drain Current (Note 2)		I <sub>DM</sub>	30	Α
	SOT-23-3		1.1	W
Danier Diagination (Nata 2)	SOT-23	P <sub>D</sub>	1.2	W
Power Dissipation (Note 3)	SOT-26		1.15	W
	DFN2020-6B		1.6	W
Junction Temperature		TJ	+150	°C
Storage Temperature		T <sub>STG</sub>	-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. Surface mounted on 1in<sup>2</sup> copper pad of FR4 board.

### **■ THERMAL DATA**

PARAMET	ER	SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-23-3		113	°C/W
	SOT-23		104	°C/W
	SOT-26	$\theta_{JA}$	108	°C/W
	DFN2020-6B		75	°C/W

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

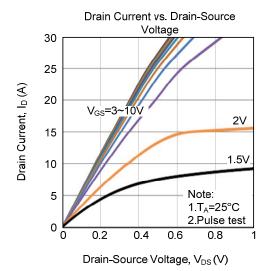
# ■ **ELECTRICAL CHARACTERISTICS** (T<sub>J</sub> =25°C, unless otherwise specified)

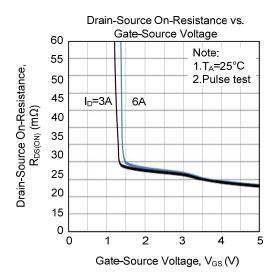
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT		
OFF CHARACTERISTICS								
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	20			V		
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =16V			1	μA		
Cata Sauras Laskaga Current		$V_{GS}$ =±4.5V, $V_{DS}$ =0V			±1	μΑ		
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}$ =±8 $V$ , $V_{DS}$ =0 $V$			±10	μΑ		
ON CHARACTERISTICS								
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS} = V_{GS}$ , $I_D = 250 \mu A$	0.4	0.6	1.0	V		
	R <sub>DS(ON)</sub>	V <sub>GS</sub> =4.5V, I <sub>D</sub> =6.5A		18	22	mΩ		
Static Drain-Source On-Resistance		V <sub>GS</sub> =2.5V, I <sub>D</sub> =5.5A		21	26	mΩ		
		V <sub>GS</sub> =1.8V, I <sub>D</sub> =5.0A		34	40	mΩ		
DYNAMIC PARAMETERS			-			-		
Input Capacitance	C <sub>ISS</sub>			600		pF		
Output Capacitance	Coss	$V_{GS}$ =0V, $V_{DS}$ =10V, f =1MHz		158		pF		
Reverse Transfer Capacitance	$C_{RSS}$			142		pF		
SWITCHING PARAMETERS			-	<u>.</u>		-		
Total Gate Charge	$Q_G$	\/ -16\/ \/ -4.5\/ \ -6.5A		25		nC		
Gate Source Charge	$Q_GS$	$-V_{DS}$ =16V, $V_{GS}$ =4.5V, $I_{D}$ =6.5A $-I_{G}$ =1mA		2.2		nC		
Gate Drain Charge	$Q_GD$	IG- IIIIA		4		nC		
Turn-ON Delay Time	$t_{D(ON)}$			5		ns		
Turn-ON Rise Time	t <sub>R</sub>	$V_{DS}$ =10V, $V_{GS}$ =10V, $I_{D}$ =6.5A,		17		ns		
Turn-OFF Delay Time	t <sub>D(OFF)</sub>	$R_G=3\Omega$		21		ns		
Turn-OFF Fall-Time	t <sub>F</sub>			32		ns		
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS								
Diode Forward Voltage	$V_{SD}$	I <sub>S</sub> =1.0A, V <sub>GS</sub> =0V		0.76	1	V		

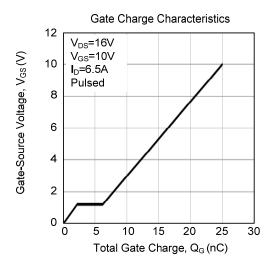
Notes: 1. Pulse Test: Pulse width  $\leq$  300 $\mu$ s, Duty cycle  $\leq$  2%.

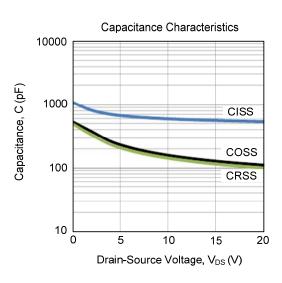
<sup>2.</sup> Essentially independent of operating temperature.

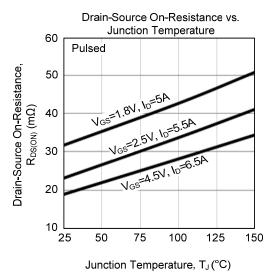
### **■ TYPICAL CHARACTERISTICS**

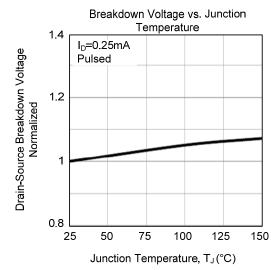




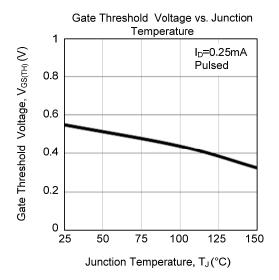


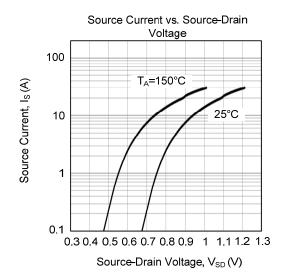


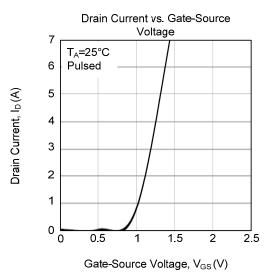


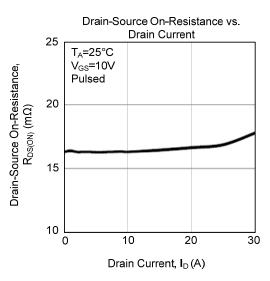


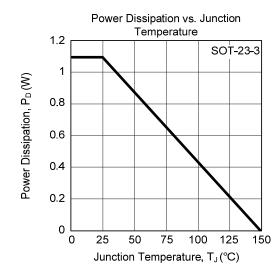
# **■ TYPICAL CHARACTERISTICS (Cont.)**

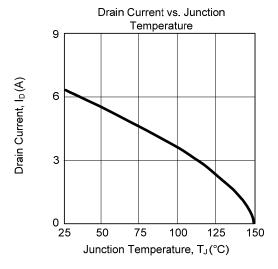




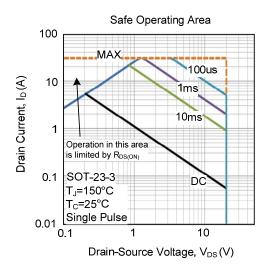








## **■ TYPICAL CHARACTERISTICS (Cont.)**



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