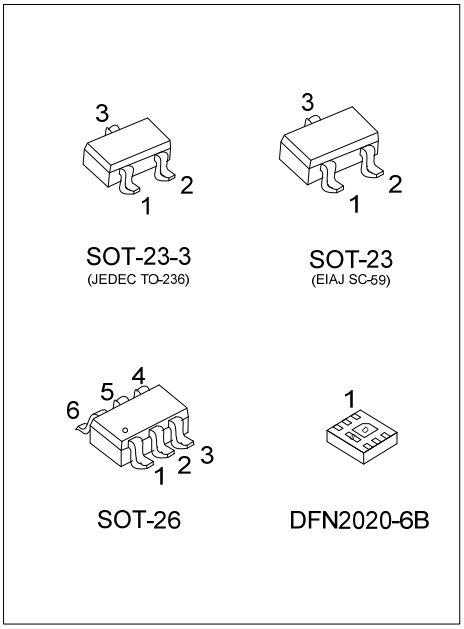
UT3416

Power MOSFET

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



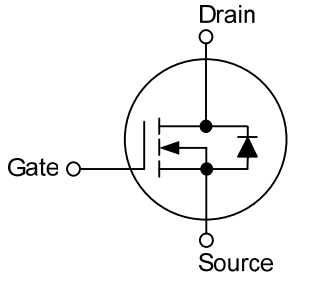
■ DESCRIPTION

The UTC **UT3416** is advanced N-channel enhancement MOSFET which can provide the designer with the best combination of excellent $R_{DS\ (ON)}$, 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.

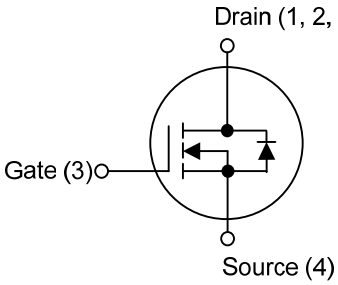
■ FEATURES

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

■ SYMBOL



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

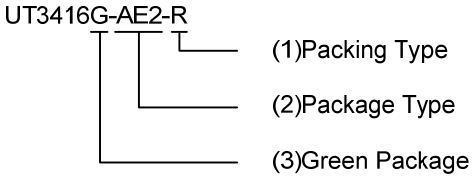


DFN2020-6B

■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment						Packing
Lead Free	Halogen Free		1	2	3	4	5	6	
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



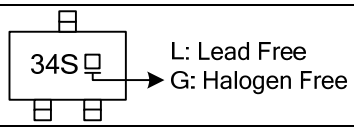
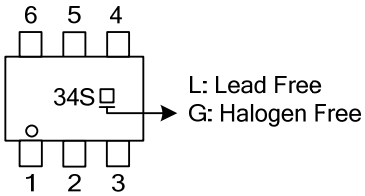
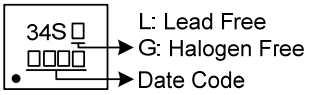
(1) R: Tape Reel

(2) AE2: SOT-23-3, AE3: SOT-23, AG6: SOT-26

K06B-2020: DFN2020-6B

(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING

PACKAGE	MARKING
SOT-23-3 / SOT-23	
SOT-26	
DFN2020-6	

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	20	V
Gate-Source Voltage		V_{GSS}	±8	V
Continuous Drain Current		I_D	6.5	A
Pulsed Drain Current (Note 2)		I_{DM}	30	A
Power Dissipation (Note 3)	SOT-23-3	P_D	1.1	W
	SOT-23		1.2	W
	SOT-26		1.15	W
	DFN2020-6B		1.6	W
Junction Temperature		T_J	+150	°C
Storage 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. Repetitive Rating: Pulse width limited by maximum junction temperature.
3. Surface mounted on 1in^2 copper pad of FR4 board.

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-23-3	θ_{JA}	113	°C/W
	SOT-23		104	°C/W
	SOT-26		108	°C/W
	DFN2020-6B		75	°C/W

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

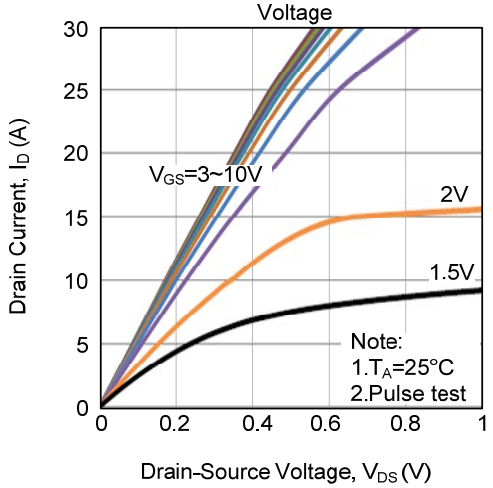
■ ELECTRICAL CHARACTERISTICS (T_J =25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D =250μA	20			V
Drain-Source Leakage Current	I_{DSS}	V_{GS}=0V, V_{DS}=16V			1	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±4.5V, V_{DS}=0V			±1	μA
		V_{GS}=±8V, V_{DS}=0V			±10	μA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS} =V_{GS}, I_D=250μA	0.4	0.6	1.0	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=6.5A		18	22	mΩ
		V_{GS}=2.5V, I_D=5.5A		21	26	mΩ
		V_{GS}=1.8V, I_D=5.0A		34	40	mΩ
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	V_{GS}=0V, V_{DS} =10V, f =1MHz		600		pF
Output Capacitance	C_{OSS}			158		pF
Reverse Transfer Capacitance	C_{RSS}			142		pF
SWITCHING PARAMETERS						
Total Gate Charge	Q_G	V_{DS}=16V, V_{GS}=4.5V,I_D=6.5A I_G=1mA		25		nC
Gate Source Charge	Q_{GS}			2.2		nC
Gate Drain Charge	Q_{GD}			4		nC
Turn-ON Delay Time	$t_{D(ON)}$	V_{DS}=10V, V_{GS}=10V, I_D=6.5A, R_G=3Ω		5		ns
Turn-ON Rise Time	t_R			17		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			21		ns
Turn-OFF Fall-Time	t_F			32		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Diode Forward Voltage	V_{SD}	I_S =1.0A, V_{GS} =0V		0.76	1	V

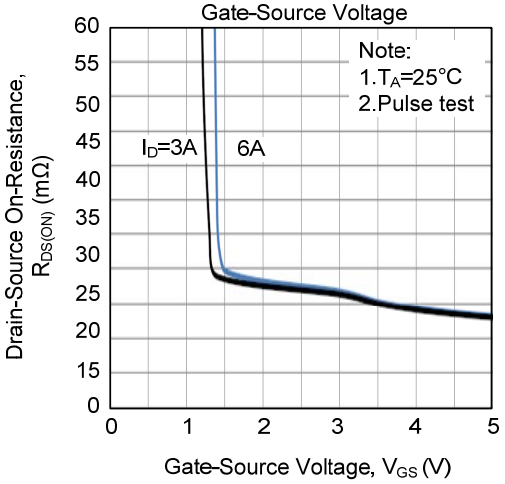
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.
2. Essentially independent of operating temperature.

■ TYPICAL CHARACTERISTICS

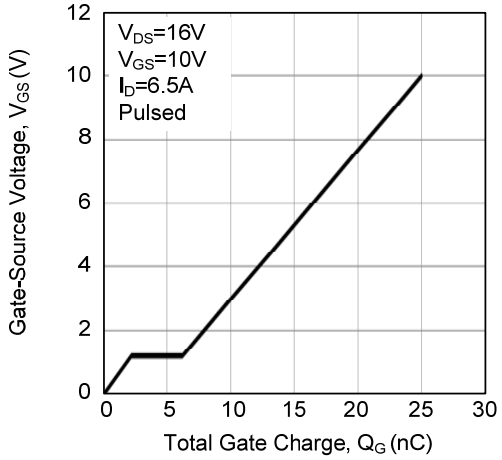
Drain Current vs. Drain-Source Voltage



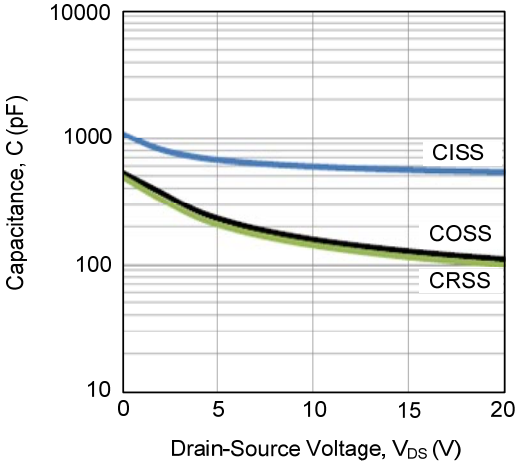
Drain-Source On-Resistance vs. Gate-Source Voltage



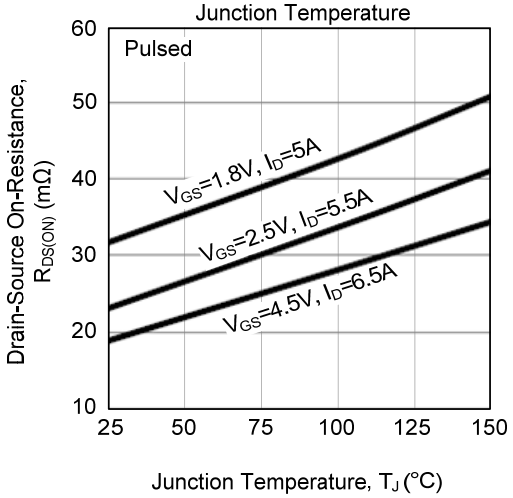
Gate Charge Characteristics



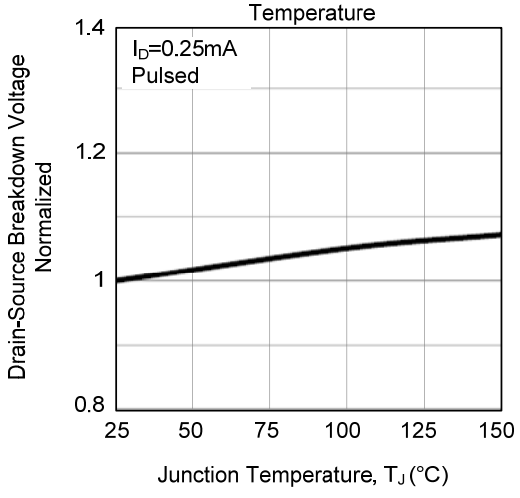
Capacitance Characteristics



Drain-Source On-Resistance vs. Junction Temperature

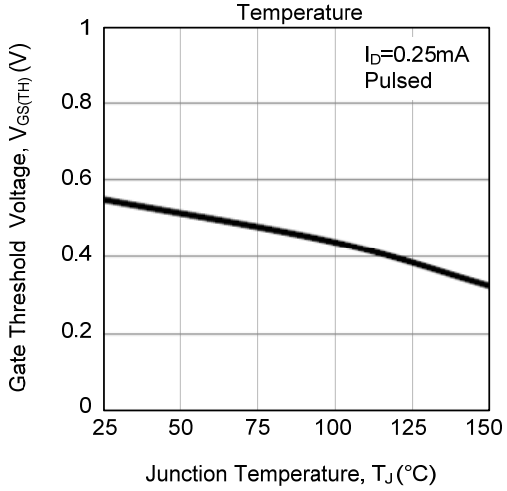


Breakdown Voltage vs. Junction Temperature

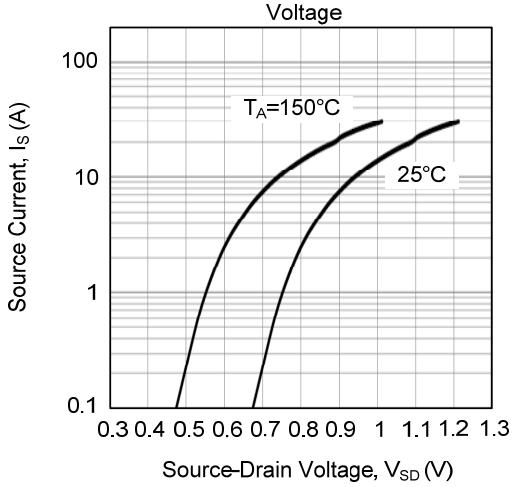


■ TYPICAL CHARACTERISTICS (Cont.)

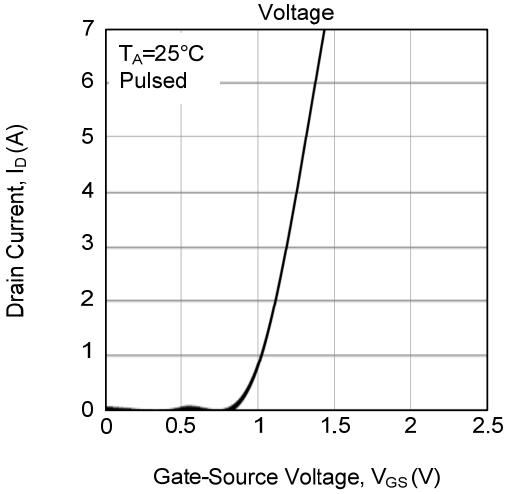
Gate Threshold Voltage vs. Junction Temperature



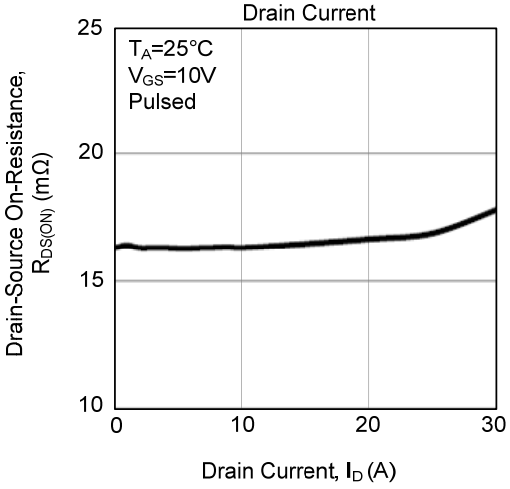
Source Current vs. Source-Drain Voltage



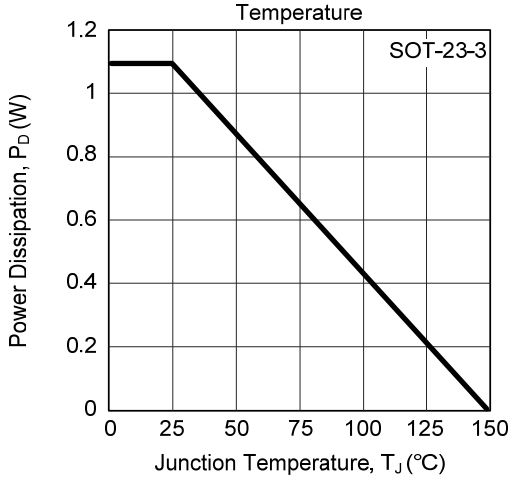
Drain Current vs. Gate-Source Voltage



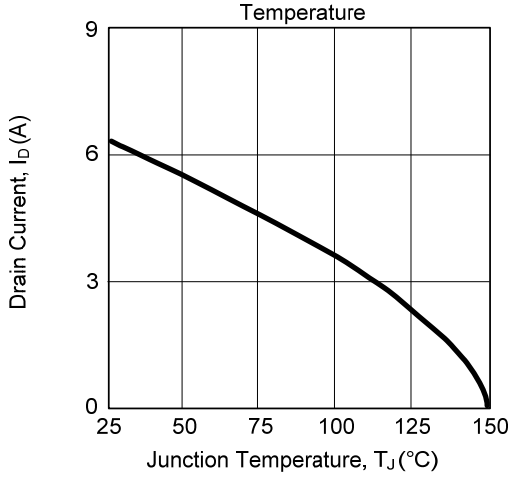
Drain-Source On-Resistance vs. Drain Current



Power Dissipation vs. Junction Temperature



Drain Current vs. Junction Temperature



■ TYPICAL CHARACTERISTICS (Cont.)