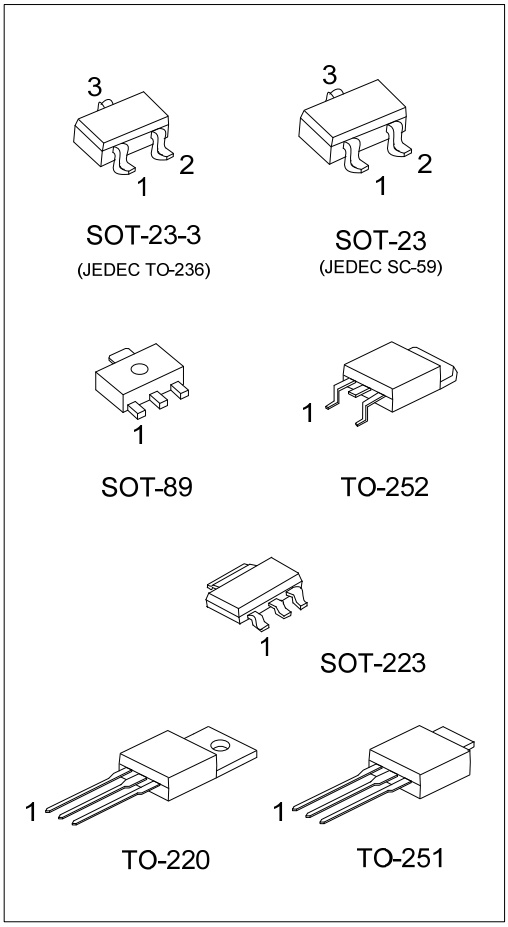
N-CHANNEL ENHANCEMENT MODE POWER MOSFET



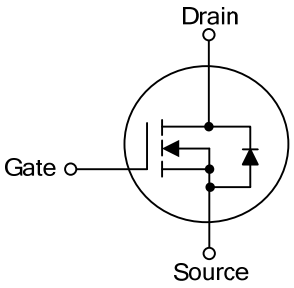
■ DESCRIPTION

The UTC **UT3N06** is an N-channel power MOSFET providing very low on-resistance. It has high efficiency and perfect cost-effectiveness. It can be generally applied in the commercial and industrial fields.

■ FEATURES

* Simple drive requirement

■ SYMBOL



■ ORDERING INFORMATION

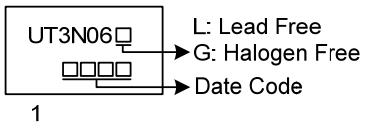
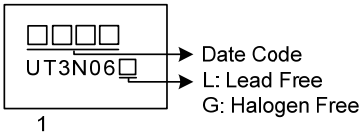
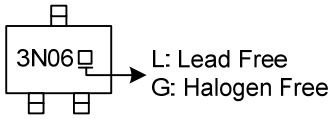
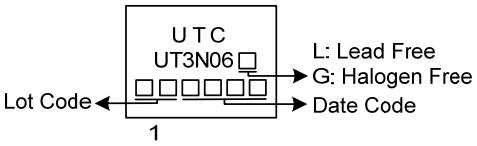
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT3N06L-AA3-R	UT3N06G-AA3-R	SOT-223	G	D	S	Tape Reel
UT3N06L-AB3-R	UT3N06G-AB3-R	SOT-89	G	D	S	Tape Reel
UT3N06L-AE2-R	UT3N06G-AE2-R	SOT-23-3	G	S	D	Tape Reel
UT3N06L-AE3-R	UT3N06G-AE3-R	SOT-23	G	S	D	Tape Reel
UT3N06L-TA3-T	UT3N06G-TA3-T	TO-220	G	D	S	Tube
UT3N06L-TM3-T	UT3N06G-TM3-T	TO-251	G	D	S	Tube
UT3N06L-TN3-R	UT3N06G-TN3-R	TO-252	G	D	S	Tape Reel

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

UT3N06G-AA3-R
(1)Packing Type
(2)Package Type
(3)Green Package

(1) T: Tube, R: Tape Reel
(2) AA3: SOT-223, AB3: SOT-89,
AE2: SOT-23-3, AE3: SOT-23, TA3: TO-220,
TM3: TO-251, TN3: TO-252
(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING

SOT-223	SOT-89
	
SOT-23 / SOT-23-3	**TO-220 / TO-252**
	

■ ABSOLUTE MAXIMUM RATINGS

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	60	V
Gate-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current (V_{GS}=4.5V, T_A= 25°C) (Note 2)		I_D	3	A
Pulsed Drain Current (Note 3, 4)		I_{DM}	12	A
Power Dissipation (T_A= 25°C)	SOT-223	P_D	3	W
	SOT-23-3/SOT-23		1.25	W
	SOT-89		1.4	W
	TO-220		2	W
	TO-251/TO-252		3.13	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. Surface mounted on 1 in^2 copper pad of FR4 board; 270°C/W when mounted on min. copper pad.
3. Repetitive Rating: Pulse width limited by maximum junction temperature.
4. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

■ THERMAL CHARACTERISTICS

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient	SOT-223	θ_{JA}	42 (Note)	°C/W
	SOT-23-3/SOT-23		100 (Note)	°C/W
	SOT-89		89.3 (Note)	°C/W
	TO-220		62	°C/W
	TO-251/TO-252		40 (Note)	°C/W

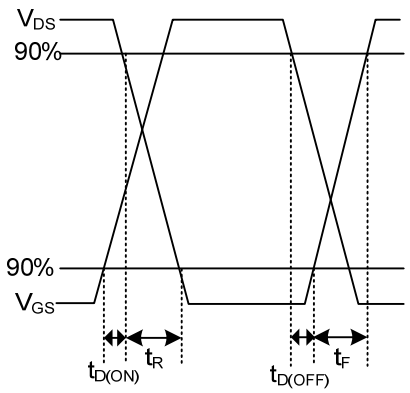
Note: Surface mounted on 1 in^2 copper pad of FR4 board; 270°C/W when mounted on min. copper pad.

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

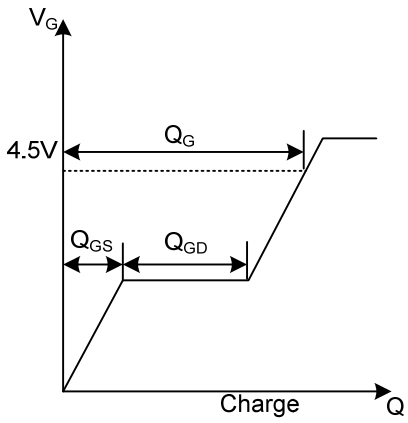
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} =0V, I_D =250μA	60			V
Drain-Source Leakage Current	I_{DSS}	V_{DS} =60V, V_{GS} =0V			1	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS} =±20V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS} =V_{GS}, I_D =250μA	1.0		3.0	V
Drain to Source On-state Resistance	$R_{DS(ON)}$	V_{GS} =10V, I_D =3.0A			90	mΩ
		V_{GS} =4.5V, I_D =2.0A			120	mΩ
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	V_{DS}=25V, V_{GS}=0V, f =1.0MHz		475		pF
Output Capacitance	C_{OSS}			40		pF
Reverse Transfer Capacitance	C_{RSS}			30		pF
SWITCHING PARAMETERS						
Total Gate Charge (Note)	Q_G	V_{GS}=10V, V_{DS}=30V, I_D=3A, I_G=1mA		14.5		nC
Gate Source Charge	Q_{GS}			2.3		nC
Gate Drain Charge	Q_{GD}			2.2		nC
Turn-ON Delay Time (Note)	$t_{D(ON)}$	V_{DD}=30V, I_D=3A, R_{GEN}=25Ω, V_{GS}=10V		4		ns
Turn-ON Rise Time	t_R			15		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			50		ns
Turn-OFF Fall-Time	t_F			25		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Continuous Drain-Source Diode Forward Current	I_S				3	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				12	A
Drain-Source Diode Forward Voltage (Note)	V_{SD}	I_S =1.2A, V_{GS} =0V			1.2	V
Reverse Recovery Time	t_{rr}	I_S=3A,V_{GS}=0V, dI/dt=100A/μs		26		ns
Reverse Recovery Charge	Q_{rr}			13		nC

Note: Pulse width ≤300μs, duty cycle≤2%.

■ TEST WAVEFORMS



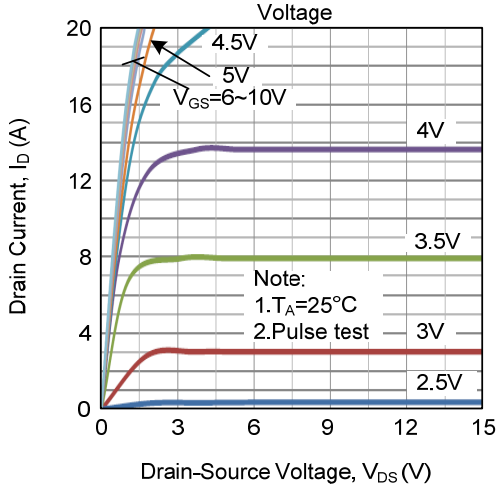
Switching Time Waveform



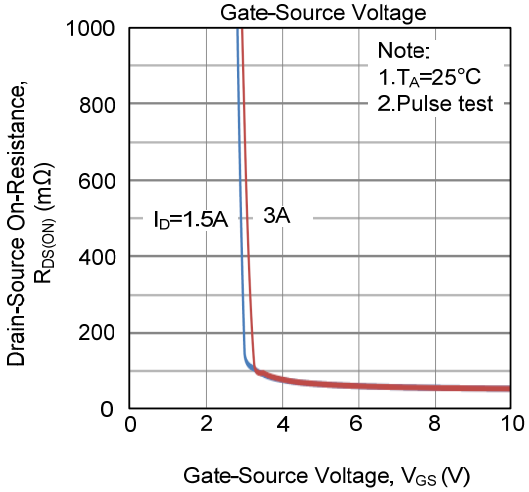
Gate Charge Waveform

■ TYPICAL CHARACTERISTICS

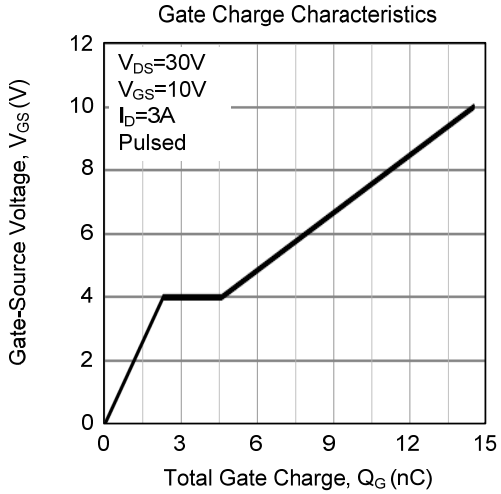
Drain Current vs. Drain-Source Voltage



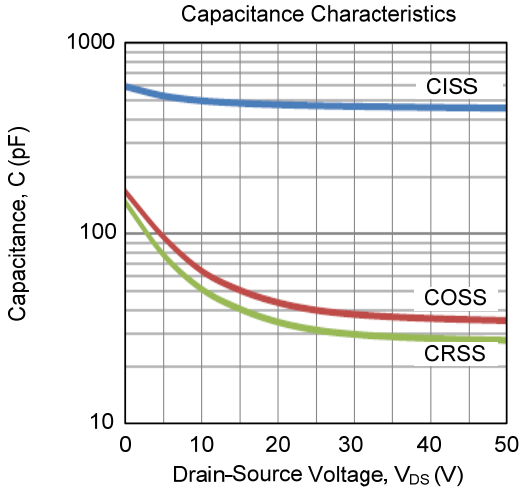
Drain-Source On-Resistance vs. Gate-Source Voltage



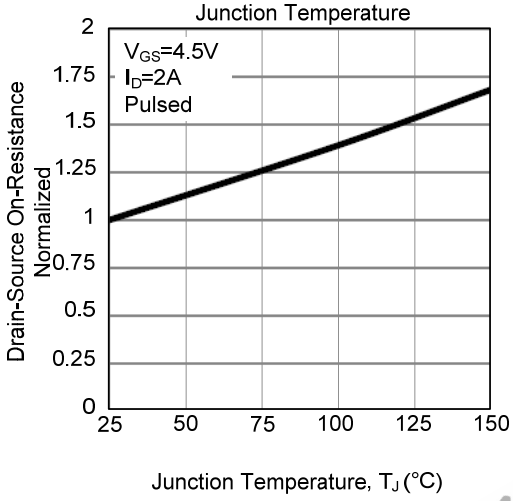
Gate Charge Characteristics



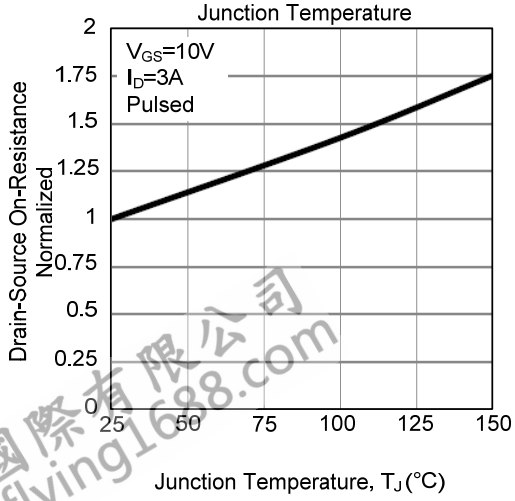
Capacitance Characteristics



Drain-Source On-Resistance vs. Junction Temperature

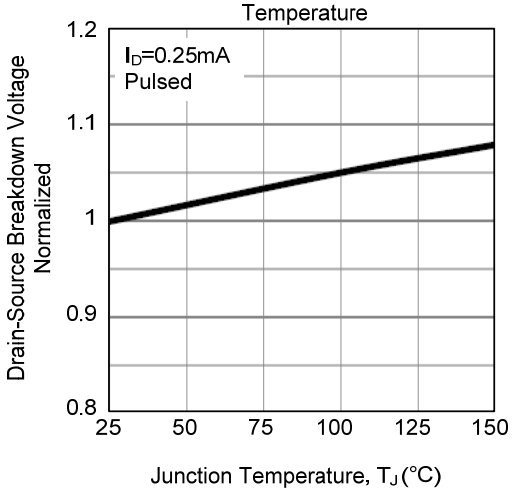


Drain-Source On-Resistance vs. Junction Temperature

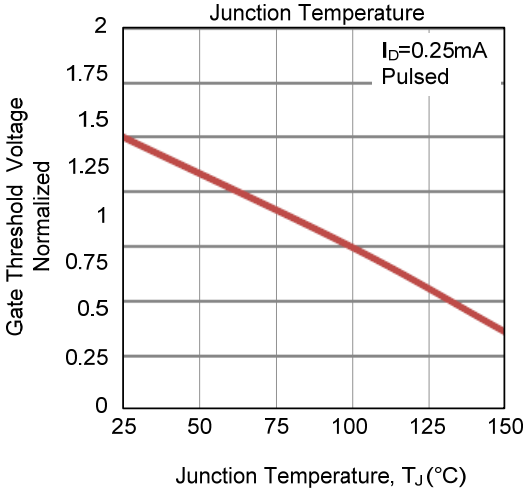


■ TYPICAL CHARACTERISTICS (Cont.)

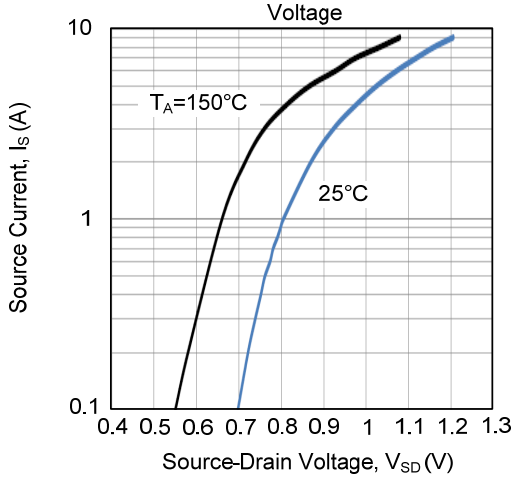
Breakdown Voltage vs. Junction Temperature



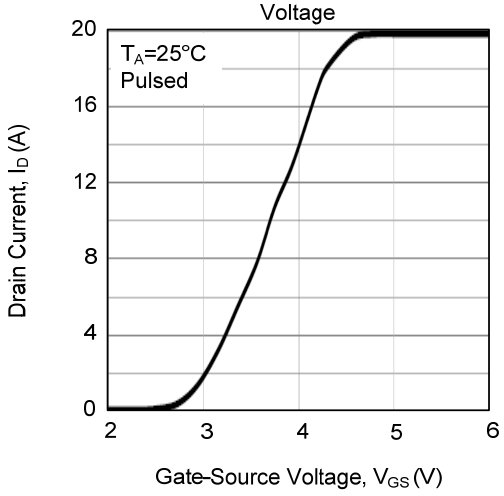
Gate Threshold Voltage vs. Junction Temperature



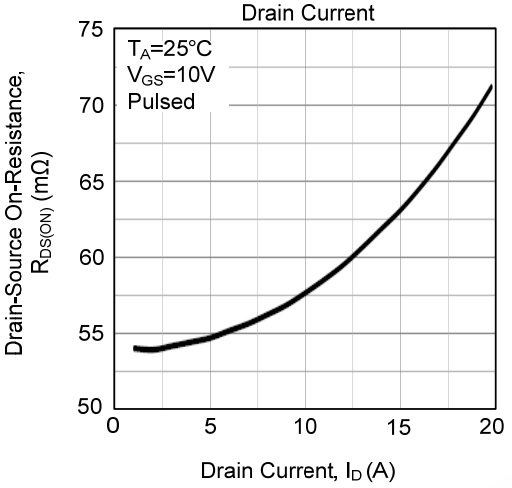
Source Current vs. Source-Drain Voltage



Drain Current vs. Gate-Source Voltage



Drain-Source On-Resistance vs. Drain Current



Drain-Source Breakdown Voltage