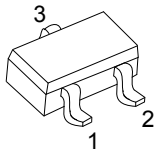
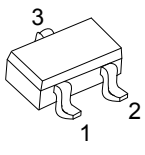
UT2301

Power MOSFET

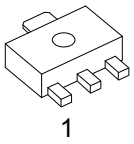
-2.8A, -20V P-CHANNEL ENHANCEMENT MODE POWER MOSFET



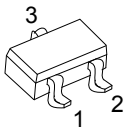
SOT-23
(EIAJ SC-59)



SOT-23-3
(JEDEC TO-236)



SOT-89



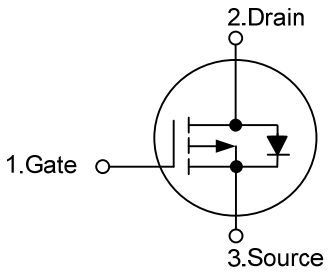
SOT-323

■ DESCRIPTION

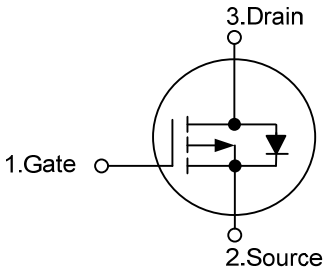
The UTC **UT2301** is P-channel enhancement mode power MOSFET, designed in serried ranks. With fast switching speed, low on-resistance, favorable stabilization.

Used in commercial and industrial surface mount applications and suited for low voltage applications such as DC/DC converters.

■ SYMBOL



SOT-89



SOT-23-3 / SOT-23 / SOT-323

■ ORDERING INFORMATION

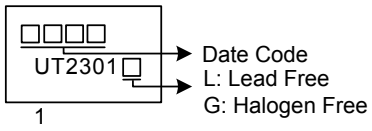
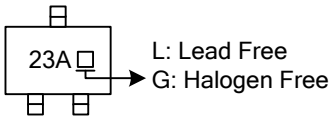
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT2301L-AB3-R	UT2301G-AB3-R	SOT-89	G	D	S	Tape Reel
UT2301L-AE2-R	UT2301G-AE2-R	SOT-23-3	G	S	D	Tape Reel
UT2301L-AE3-R	UT2301G-AE3-R	SOT-23	G	S	D	Tape Reel
UT2301L-AL3-R	UT2301G-AL3-R	SOT-323	G	S	D	Tape Reel

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

UT2301G-AB3-R
(1)Packing Type
(2)Package Type
(3)Green Package

(1) R: Tape Reel
(2) AB3: SOT-89, AE2: SOT-23-3, AE3: SOT-23
AL3: SOT-323
(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING

SOT-89	SOT-23-3 / SOT-23 / SOT-323
	

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

PARAMETER		SYMBOL	RATING	UNIT
Drain-Source Voltage		V_{DSS}	-20	V
Gate-Source Voltage		V_{GSS}	±8	V
Continuous Drain Current	Continuous	I_D	-2.8	A
Pulsed Drain Current	Pulsed (Note 2)	I_{DM}	-8.4	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	20.5	mJ
Total Power Dissipation	SOT-89	P_D	0.8	W
	SOT-23-3/SOT-323		0.5	W
	SOT-23		0.6	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. L=16mH, I_{AS}=-1.6A, V_{DD}= -20V, R_G=25Ω, Starting T_J=25°C.

■ THERMAL DATA

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient	SOT-89	θ_{JA}	156	°C/W
	SOT-23-3/SOT-323		250	°C/W
	SOT-23		208	°C/W

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

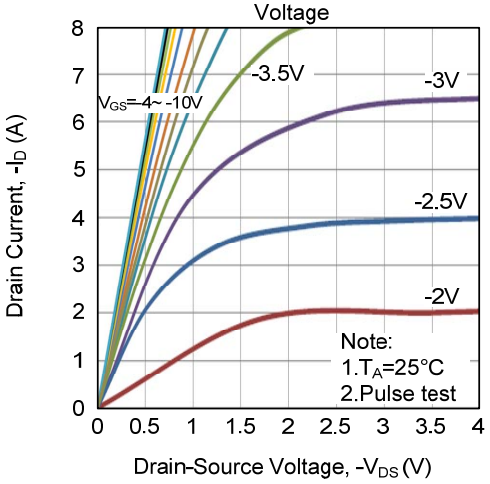
■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS}=0V, I_D=-250uA	-20			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=-16V, V_{GS}=0V			-1	μA
Gate-Source Leakage Current		I_{GSS}	V_{GS}=±8V, V_{DS}=0V			±100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=-250uA	-0.45			V
Static Drain-Source On-State Resistance (Note 1)	SOT-23-3/SOT-23 SOT-89	$R_{DS(ON)}$	V_{GS}=-4.5V, I_D=-2.8A			130	mΩ
			V_{GS}=-2.5V, I_D=-2.0A			190	mΩ
	SOT-323		V_{GS}=-4.5V, I_D=-2.8A			160	mΩ
			V_{GS}=-2.5V, I_D=-2.0A			281	mΩ
DYNAMIC CHARACTERISTICS							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=-10V, f=1.0MHz		255		pF
Output Capacitance		C_{OSS}			66		pF
Reverse Transfer Capacitance		C_{RSS}			56		pF
SWITCHING CHARACTERISTICS							
Total Gate Charge (Note 1)		Q_G	V_{DS}=-16V, V_{GS}=-10V, I_D=-2.8A, I_D=-1mA		12		nC
Gate-Source Charge		Q_{GS}			1		nC
Gate-Drain Charge		Q_{GD}			2		nC
Turn-ON Delay Time (Note 1)		$t_{D(ON)}$	V_{DS}=-10V, V_{GS}=-10V, I_D=-2.8A, R_G=6Ω		3		ns
Turn-ON Rise Time		t_R			15		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			15		ns
Turn-OFF Fall Time		t_F			21		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Continuous Drain-Source Diode Forward Current		I_S				-1.6	A
Maximum Body-Diode Pulsed Current		I_{SM}				-8.4	A
Drain-Source Diode Forward Voltage (Note 1)		V_{SD}	V_{GS}=0V, I_S=-1.6A		-0.8	-1.2	V

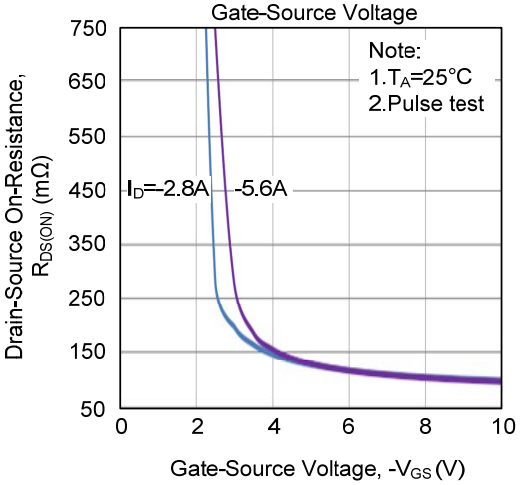
Notes: 1. Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%.
2. Essentially independent of operating temperature.

■ TYPICAL CHARACTERISTICS

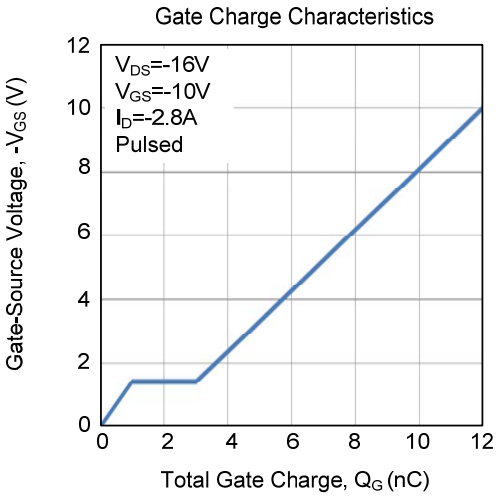
Drain Current vs. Drain-Source Voltage



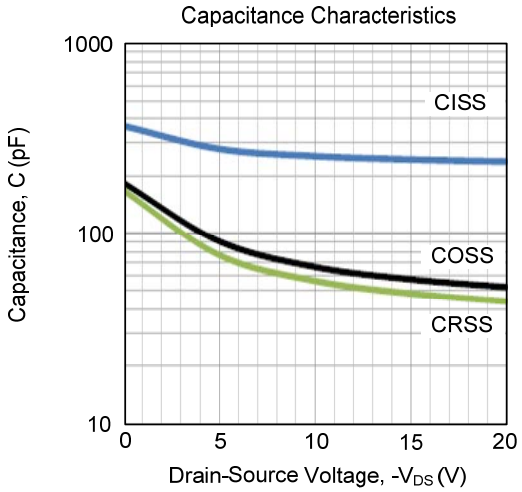
Drain-Source On-Resistance vs. Gate-Source Voltage



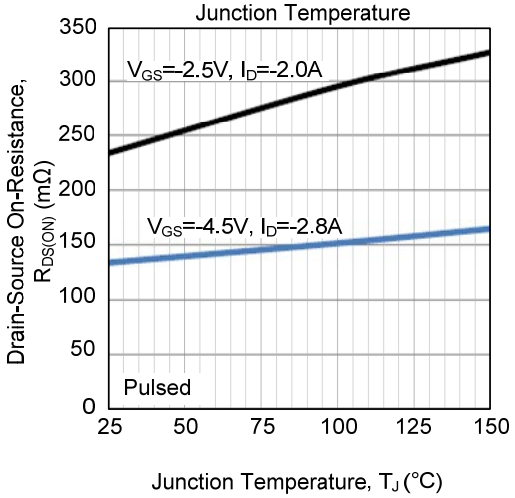
Gate Charge Characteristics



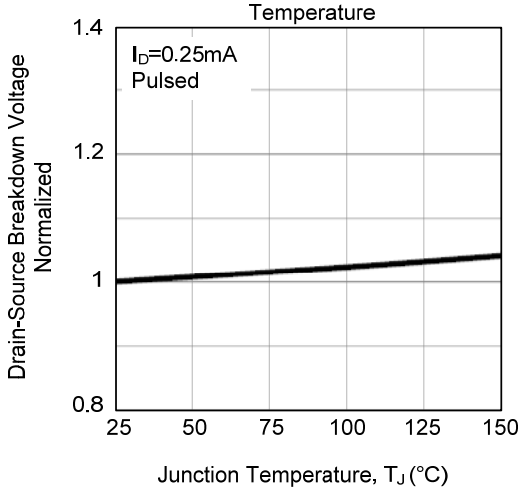
Capacitance Characteristics



Drain-Source On-Resistance vs. Junction Temperature

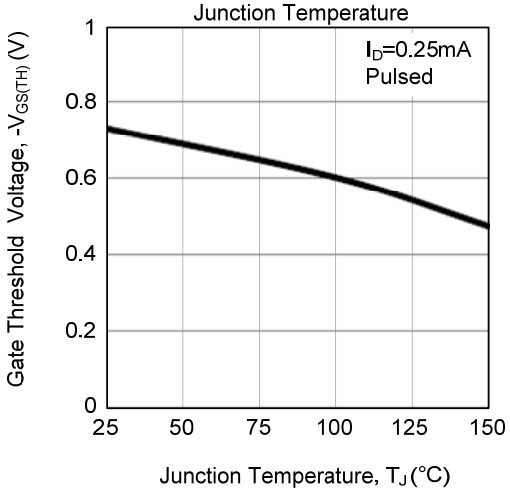


Breakdown Voltage vs. Junction Temperature

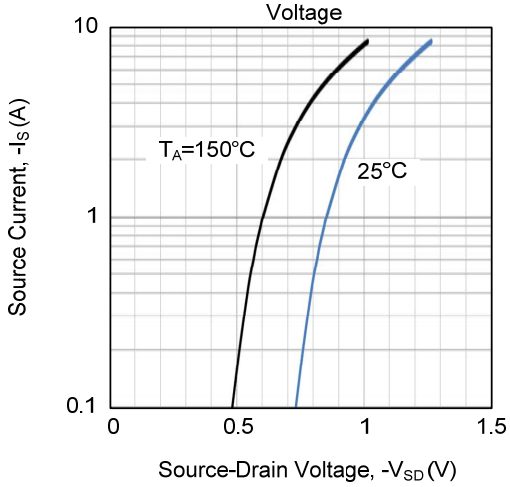


■ TYPICAL CHARACTERISTICS (Cont.)

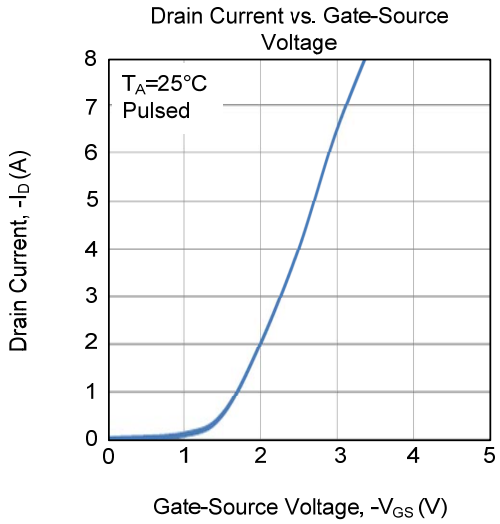
Gate Threshold Voltage vs. Junction Temperature



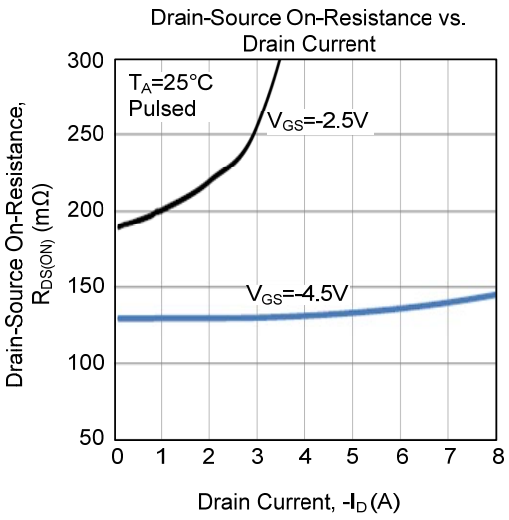
Source Current vs. Source-Drain Voltage



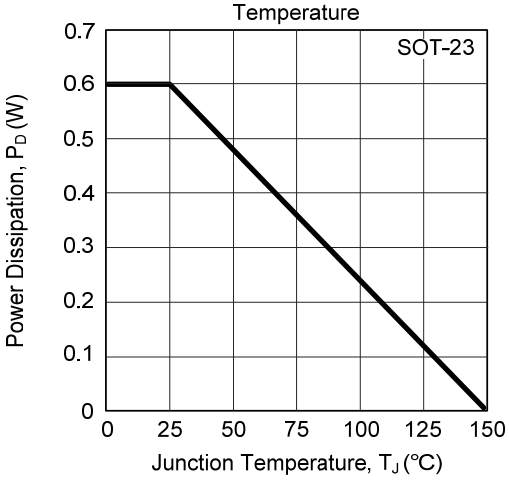
Drain Current vs. Gate-Source Voltage



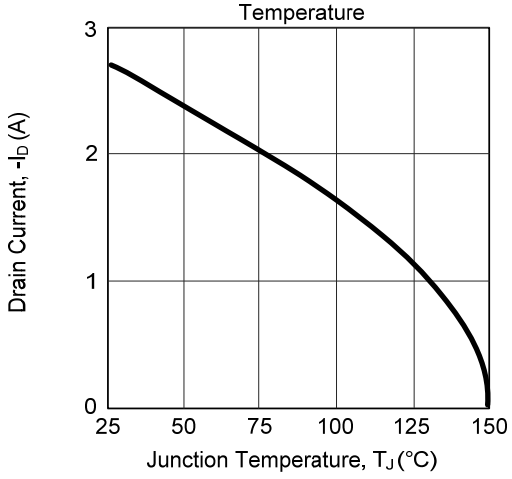
Drain-Source On-Resistance vs. Drain Current



Power Dissipation vs. Junction Temperature



Drain Current vs. Junction Temperature



■ TYPICAL CHARACTERISTICS (Cont.)