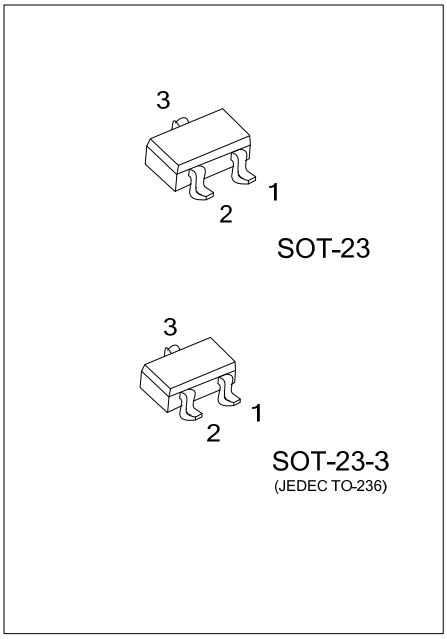
UT2304

Power MOSFET

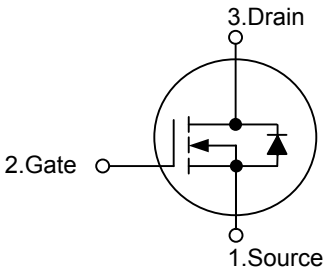
N-CHANNEL ENHANCEMENT MODE



■ DESCRIPTION

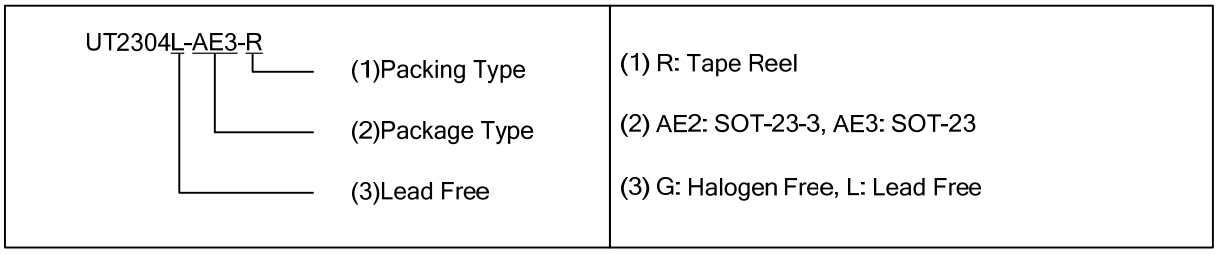
The **UT2304** is an N-Channel Power MOSFET that can achieve the lowest possible on-resistance, extremely and cost- effectiveness device by using advanced trench technology.

■ SYMBOL

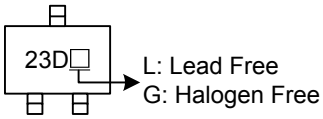


■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT2304L-AE2-R	UT2304G-AE2-R	SOT-23-3	S	G	D	Tape Reel
UT2304L-AE3-R	UT2304G-AE3-R	SOT-23	S	G	D	Tape Reel



■ MARKING



ABSOLUTE MAXIMUM RATINGS (Ta = 25℃, unless otherwise specified)

PARAMETER	SYMBOL	RATING	UNITS
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current (Note 3)	I_D	2.5	A
Pulsed Drain Current (Note 1, 2)	I_{DM}	10	A
Power Dissipation	P_D	1.4	W
Junction Temperature	T_J	+150	°C
Storage Temperature	T_{STG}	-55 ~ +150	°C

Note: 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.

■ THERMAL DATA

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Junction to Ambient (Note 3)	θ_{JA}			90	°C/W

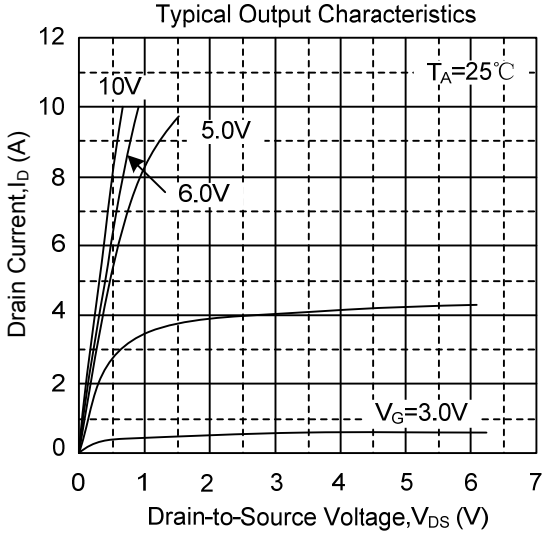
■ ELECTRICAL CHARACTERISTICS (T_J=25℃, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250uA	30			V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=30V,V_{GS}=0V			1	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V			±100	nA
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to 25℃, I_D=1mA		0.1		V/°C
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250uA	1		3	V
Static Drain-Source On-State Resistance (Note 2)	$R_{DS(ON)}$	V_{GS}=10V, I_D=2.5A			117	mΩ
		V_{GS}=4.5V, I_D=2A			190	mΩ
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{ISS}	V_{GS}=0V,V_{DS}=25V, f=1.0MHz		120	190	pF
Output Capacitance	C_{OSS}			62		pF
Reverse Transfer Capacitance	C_{RSS}			24		pF
SWITCHING CHARACTERISTICS						
Turn-ON Delay Time (Note 2)	$t_{D(ON)}$	V_{DS}=15V, V_{GS}=10V, I_D=1A, R_G=3.3Ω, R_D=15 Ω		5		ns
Turn-ON Rise Time	t_R			9		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			11		ns
Turn-OFF Fall Time	t_F			2		ns
Total Gate Charge (Note 2)	Q_G	V_{DS}=24V, V_{GS}=4.5V, I_D=2.5A		3	5	nC
Gate-Source Charge	Q_{GS}			0.8		nC
Gate-Drain Charge	Q_{GD}			1.8		nC
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS						
Forward On Voltage (Note 2)	V_{SD}	V_{GS}=0V, I_S=1.2A			1.2	V
Reverse Recovery Time (Note 2)	t_{RR}	I_S=2A, V_{GS}=0V, dI/dt=100A/μs		24		ns
Reverse Recovery Charge	Q_{RR}			23		nC

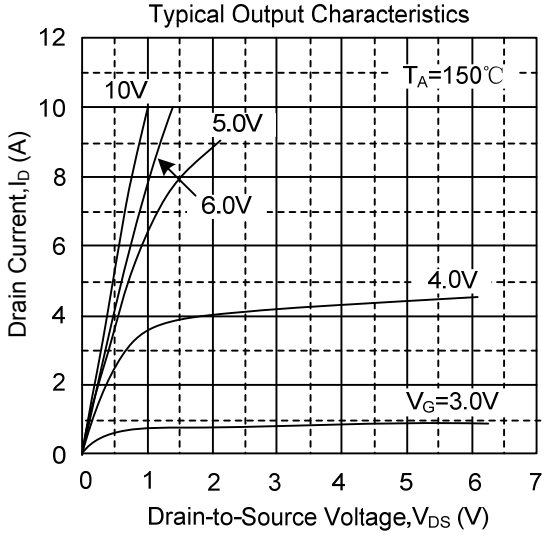
Notes: 1. Pulse width limited by $T_{J(MAX)}$
2. Pulse width ≤300μs, duty cycle ≤2%.
3. Surface mounted on 1 in^2 copper pad of FR4 board

■ TYPICAL CHARACTERISTICS

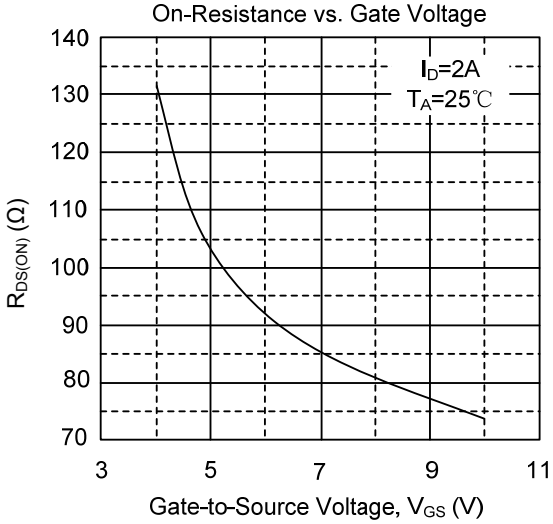
Typical Output Characteristics



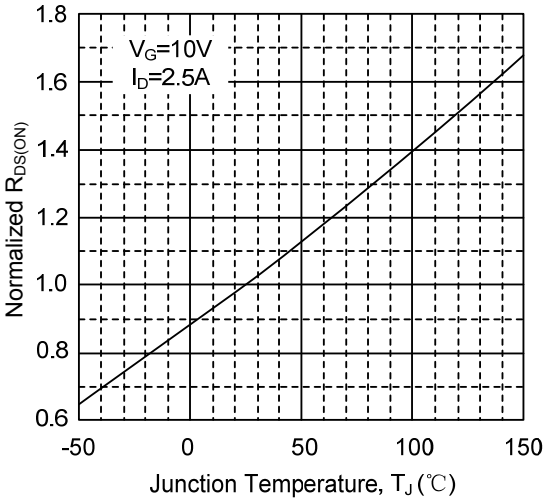
Typical Output Characteristics



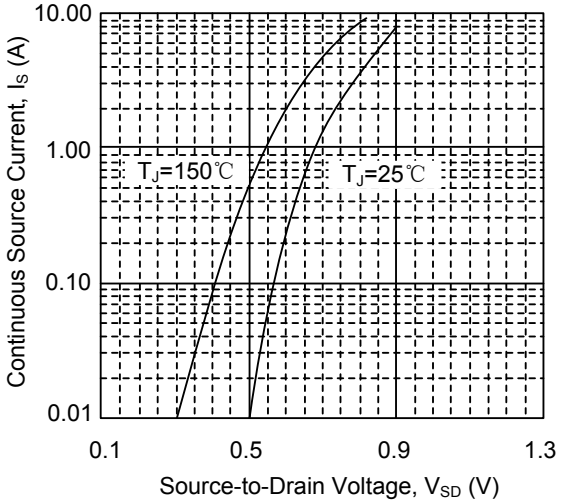
On-Resistance vs. Gate Voltage



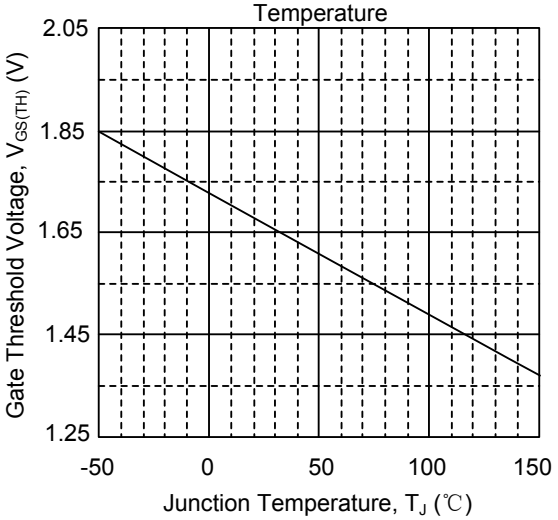
Normalized On-Resistance



Forward Characteristic of Reverse Diode

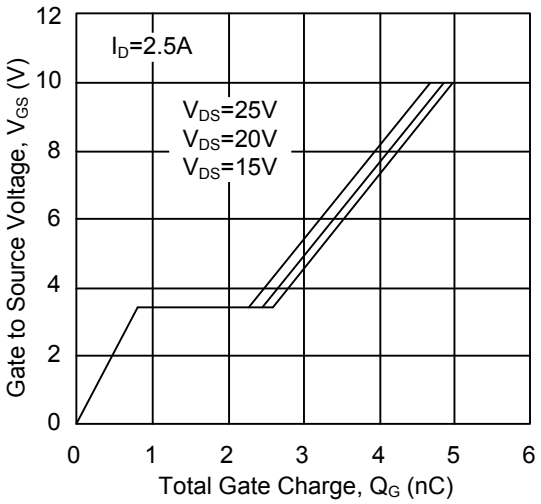


Gate Threshold Voltage vs. Junction Temperature

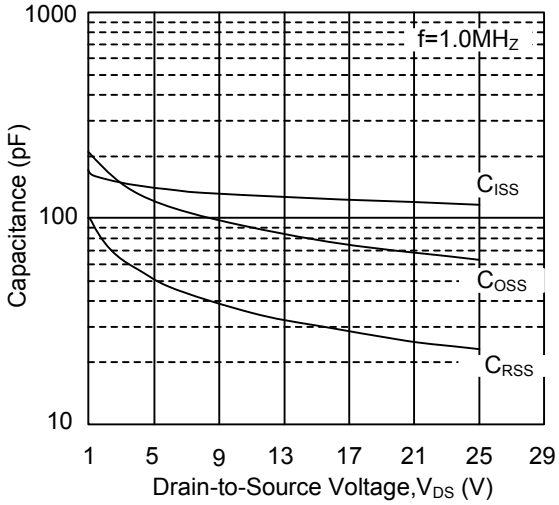


■ TYPICAL CHARACTERISTICS(Cont.)

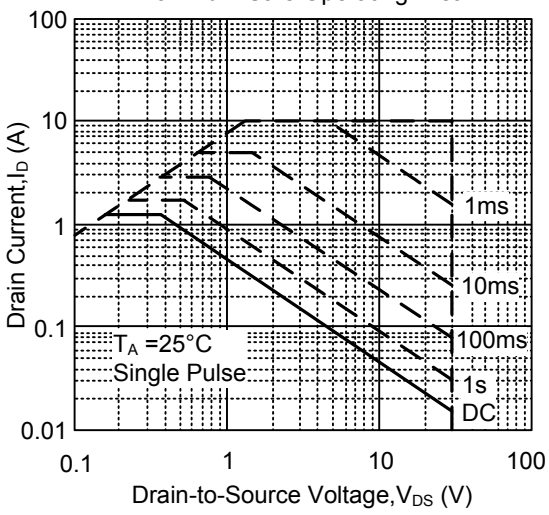
Gate Charge Characteristics



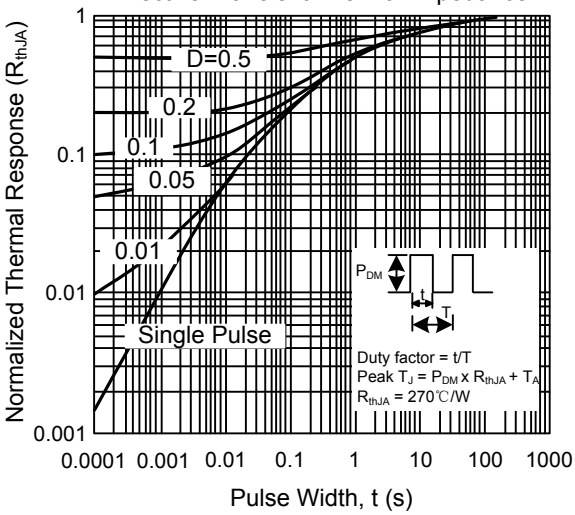
Typical Capacitance Characteristics



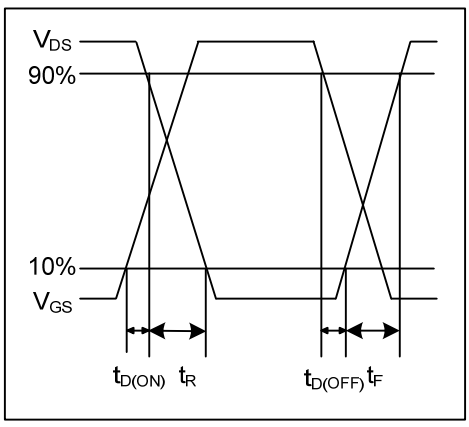
Maximum Safe Operating Area



Effective Transient Thermal Impedance



Switching Time Waveform



Gate Charge Waveform