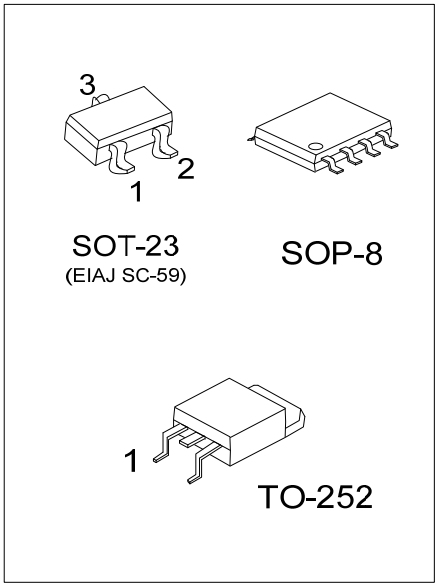
UT4414

Power MOSFET

N-CHANNEL ENHANCEMENT MODE FIELD EFFECT TRANSISTOR



■ DESCRIPTION

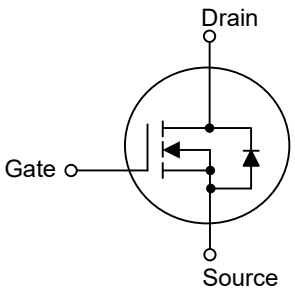
The UTC **UT4414** is an N-channel enhancement mode FET with excellent trench technology to provide customers perfect $R_{DS(ON)}$ and low gate charge. The source leads are separated to allow a Kelvin connection to the source, which may be used to bypass the source inductance.

This device can be applied in a load switch or in PWM applications.

■ FEATURES

* V_{DSS} = 30V
* I_D=8.5A @ V_{GS}=10V
* $R_{DS(ON)}$ ≤ 26mΩ @ V_{GS}=10V,I_D=8.5A
* $R_{DS(ON)}$ ≤ 40mΩ @ V_{GS}=4.5V, I_D=5.0A

■ SYMBOL



■ ORDERING INFORMATION

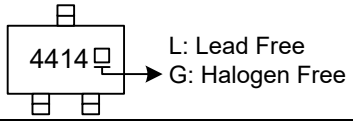
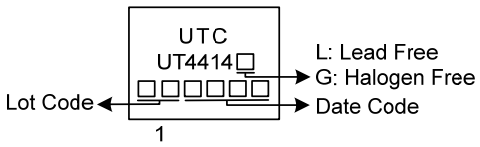
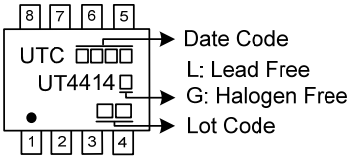
Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UT4414L-AE3-R	UT4414G-AE3-R	SOT-23	G	S	D	-	-	-	-	-	Tape Reel
UT4414L-TN3-R	UT4414G-TN3-R	TO-252	G	D	S	-	-	-	-	-	Tape Reel
UT4414L-S08-R	UT4414G-S08-R	SOP-8	S	S	S	G	D	D	D	D	Tape Reel

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

UT4414G-AE3-R

(1) Packing Type	(1) R: Tape Reel
(2) Package Type	(2) AE3: SOT-23, TN3: TO-252, S08: SOP-8
(3) Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING

PACKAGE	MARKING
SOT-23	
TO-252	
SOP-8	

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain to Source Voltage		V_{DSS}	30	V
Gate to Source Voltage		V_{GSS}	±20	V
Continuous Drain Current		I_D	8.5	A
Pulsed Drain Current		I_{DM}	50	A
Avalanche Energy (Note 3)	Single Pulsed	E_{AS}	11	mJ
Total Power Dissipation	SOT-23	P_D	1.5	W
	TO-252		2.5	W
	SOP-8		2.1	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 = 0.1mH, I_{AS} = 13A, V_{DD} = 25V, R_G = 25Ω, Starting T_J = 25°C

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-23	θ_{JA}	83.3	°C/W
	TO-252		50	°C/W
	SOP-8		59	°C/W

Notes: 1. The value of θ_{JA} is measured with the device mounted on $1in^2$ FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The value in any given application depends on the user's specific boar design. The current rating is based on the t ≤ 10s thermal resistance rating.
2. The θ_{JA} is the sum of the thermal impedance from junction to lead θ_{JL} and lead to ambient.

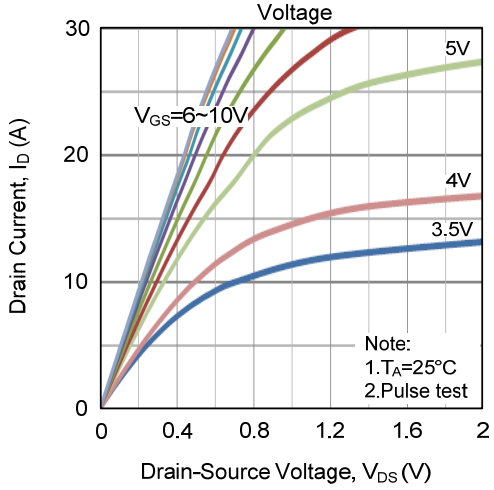
■ ELECTRICAL CHARACTERISTICS (T_J =25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250μA	30			V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=24V, V_{GS}=0V		0.004	1	μA
Gate-Source Leakage Current	I_{GSS}	V_{DS}=0V , V_{GS}=±20V			100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}= V_{GS}, I_D=250μA	1.0	1.9	3.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=8.5A		20	26	mΩ
		V_{GS}=4.5V, I_D=5.0A		31	40	mΩ
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	V_{DS}=15V, V_{GS}=0V, f=1MHz		420		pF
Output Capacitance	C_{OSS}			110		pF
Reverse Transfer Capacitance	C_{RSS}			95		pF
Gate Resistance	R_G	V_{DS}=0V, V_{GS}=0V, f=1MHz			3.6	Ω
SWITCHING PARAMETERS						
Total Gate Charge	Q_G	V_{DS}=24V, V_{GS}=10V, I_D=8.5A		12.4		nC
Gate-Source Charge	Q_{GS}			1.6		nC
Gate-Drain Charge	Q_{GD}			2.7		nC
Turn-ON Delay Time	$t_{D(ON)}$	V_{DS}=15V, V_{GS}=10V, I_D=8.5A R_G=3Ω		3.6		ns
Turn-ON Rise Time	t_R			16		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			15		ns
Turn-OFF Fall Time	t_F			19		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I_S				4.3	A
Drain-Source Diode Forward Voltage	V_{SD}	I_S =1A, V_{GS}=0V		0.76	1	V
Body Diode Reverse Recovery Time	t_{rr}	I_F=8.5A, dI/dt=100A/μs		204		ns
Body Diode Reverse Recovery Charge	Q_{rr}	I_F=8.5A, dI/dt=100A/μs		390		nC

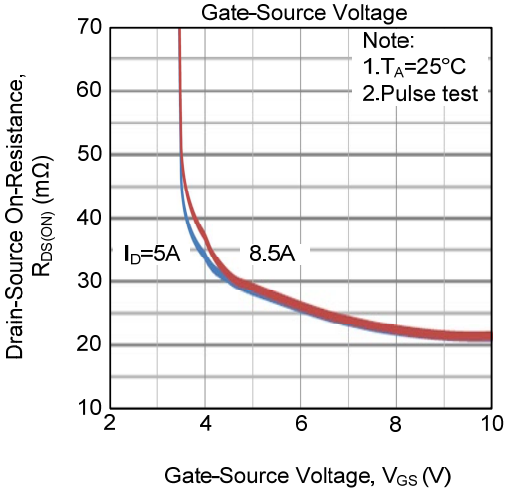
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle≤2%.
2. Essentially independent of operating temperature.

■ TYPICAL CHARACTERISTICS

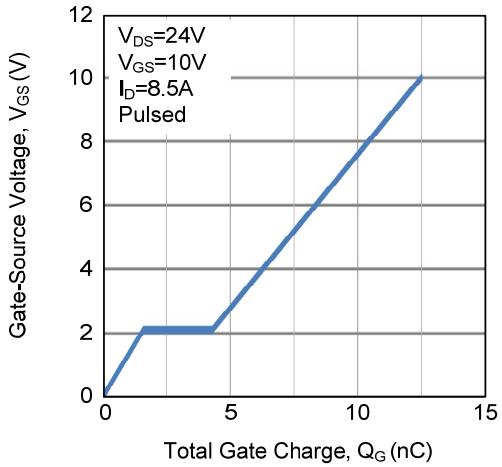
Drain Current vs. Drain-Source Voltage



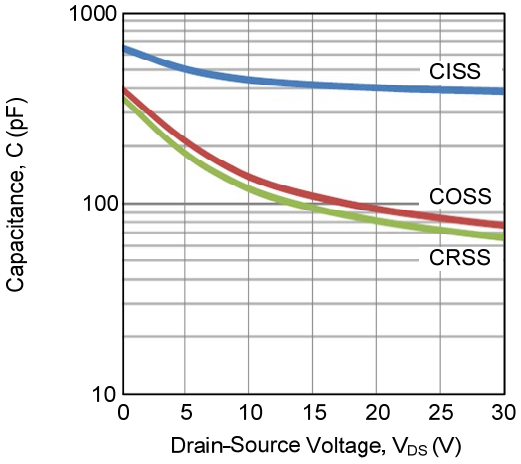
Drain-Source On-Resistance vs. Gate-Source Voltage



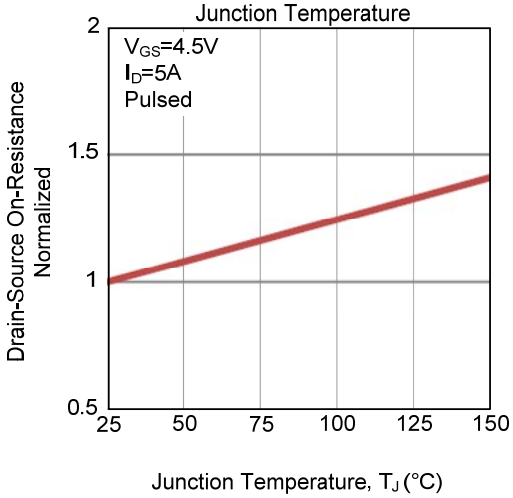
Gate Charge Characteristics



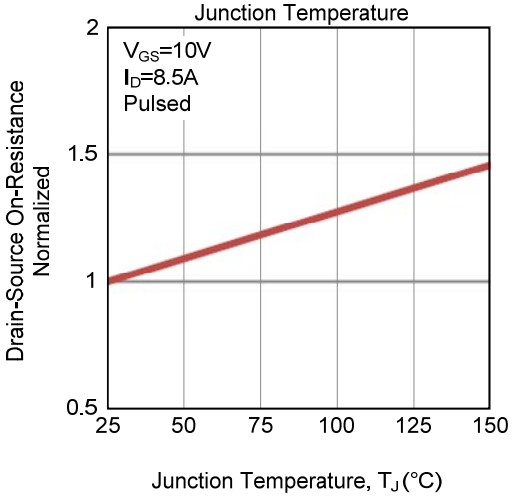
Capacitance Characteristics



Drain-Source On-Resistance vs. Junction Temperature

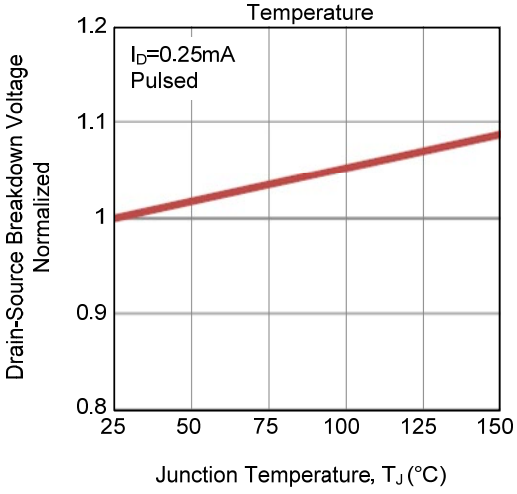


Drain-Source On-Resistance vs. Junction Temperature

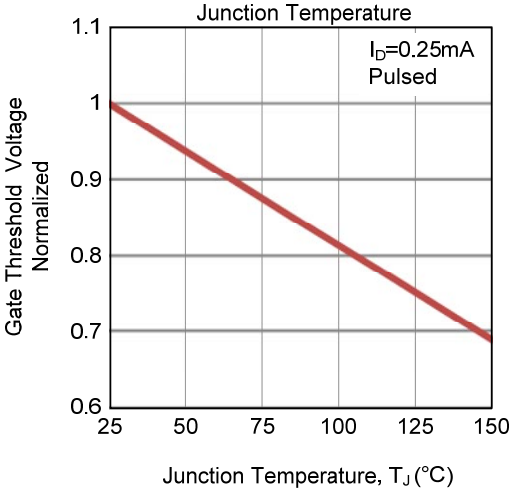


■ TYPICAL CHARACTERISTICS (Cont.)

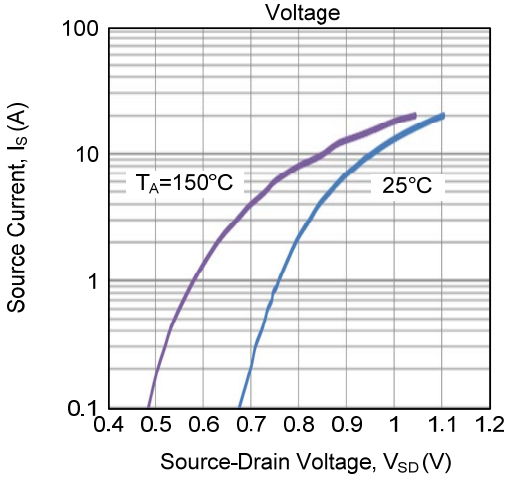
Breakdown Voltage vs. Junction Temperature



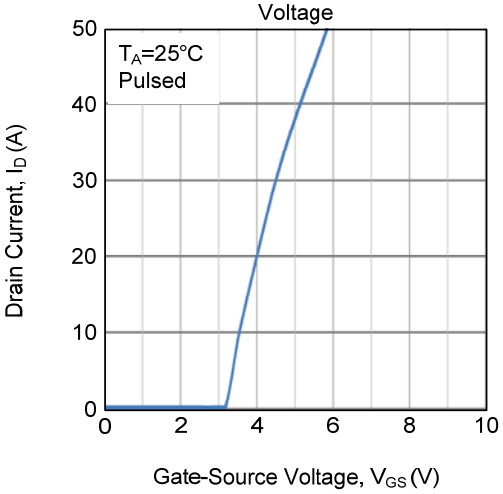
Gate Threshold Voltage vs. Junction Temperature



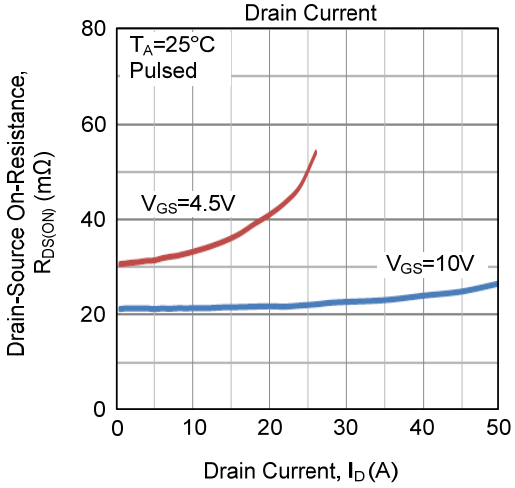
Source Current vs. Source-Drain Voltage



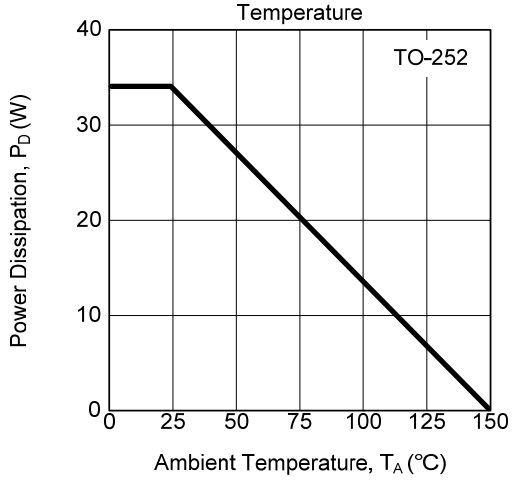
Drain Current vs. Gate-Source Voltage



Drain-Source On-Resistance vs. Drain Current



Power Dissipation vs. Ambient Temperature



■ TYPICAL CHARACTERISTICS (Cont.)