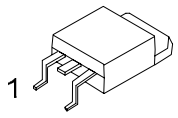
UTP45N02

Power MOSFET

N-CHANNEL ENHANCEMENT MODE



TO-252

*Pb-free plating product number: UTP45N02L

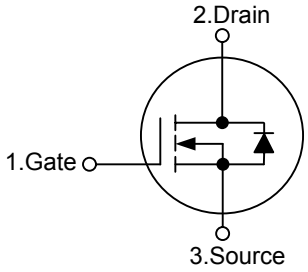
■ DESCRIPTION

As N-Channel power MOSFETs the **UTP45N02** is designed for use in applications such as switching regulators, switching converters, motor drivers and relay drivers.

■ FEATURES

* 45A, 20V
* $R_{DS(ON)}$ = 0.022Ω
* Temperature compensating PSPICE model
* Be driven directly from CMOS, NMOS, and TTL circuits
* Peak current vs. pulse width curve

■ SYMBOL



■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Normal	Lead Free Plating		1	2	3	
UTP45N02-TN3-R	UTP45N02L-TN3-R	TO-252	G	D	S	Tape Reel
UTP45N02-TN3-T	UTP45N02L-TN3-T	TO-252	G	D	S	Tube

UTP45N02L-TN3-R (1)Packing Type (2)Package Type (3)Lead Plating	(1) R: Tape Reel, T: Tube (2) TN3: TO-252 (3) L: Lead Free Plating, Blank: Pb/Sn

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

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	V_{DSS}	20	V
Gate-Source Voltage	V_{GSS}	±10	V
Continuous Drain Current	I_D	45	A
Power Dissipation	P_D	90	W
Derate Above 25°C		0.606	W/°C
Junction Temperature	T_J	+175	°C
Storage Temperature	T_{STG}	-55 ~ +175	°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

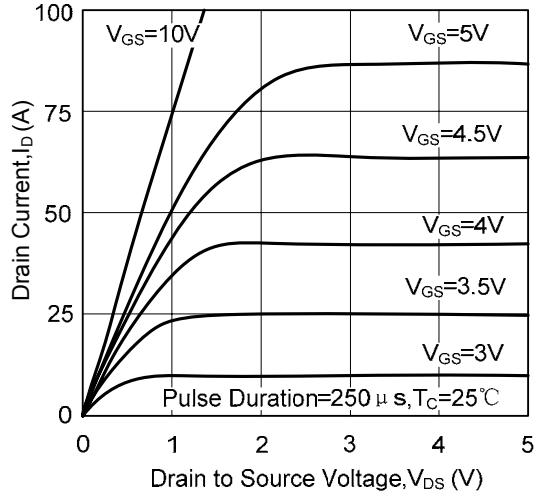
PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Junction to Ambient	θ_{JA}			80	°C/W
Junction to Case	θ_{JC}			1.65	°C/W

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

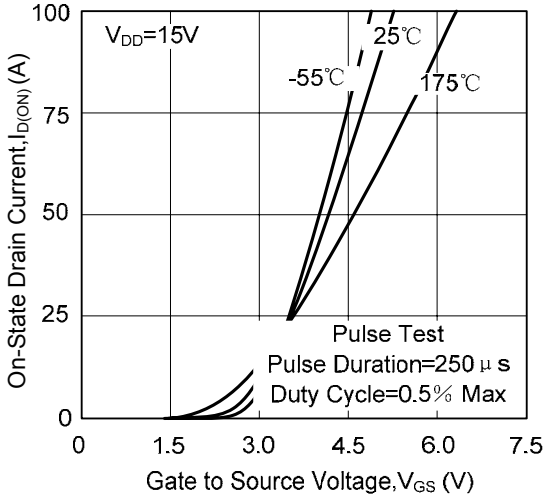
PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-to-Source Breakdown Voltage	BV_{DSS}	V_{GS} =0V, I_D =250 μA		20			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=20V, V_{GS} =0 V				1	μA
Gate-to-Source Leakage Current	I_{GSS}	V_{GS} = ±10 V				±100	nA
ON CHARACTERISTICS							
Gate to Source Threshold Voltage	$V_{GS(TH)}$	V_{DS} =V_{GS}, I_D =250 μA		1		2	V
Drain-to-Source On Resistance	$R_{DS(ON)}$	V_{GS} = 5V, I_D =45 A				0.022	Ω
DYNAMIC PARAMETERS							
Input Capacitance	C_{ISS}	V_{DS} =15 V, V_{GS} =0V, f=1MHz			1300		pF
Output Capacitance	C_{OSS}				724		
Reverse Transfer Capacitance	C_{RSS}				250		
SWITCHING PARAMETERS							
Turn-ON Time	t_{ON}	V_{GS} =5 V, V_{DD} =15 V, I_D≈45 A, R_{GS} = 5Ω, R_L = 0.33Ω				260	ns
Turn-ON Delay Time	$t_{D(ON)}$				15		
Turn-ON Rise Time	t_R				160		
Turn-OFF Delay Time	$t_{D(OFF)}$				20		
Turn-OFF Fall-Time	t_F				20		
Turn-OFF Time	t_{OFF}					60	
Total Gate Charge	Q_G	V_{GS}=0V~10V	V_{DD} = 16V, I_D≈45A, R_L = 0.35Ω		50	60	nC
Gate-Source Charge	Q_{GS}	V_{GS}=0V ~ 5 V			30	36	
Gate-Drain Charge	Q_{GD}	V_{GS}=0V~ 1 V			1.5	1.8	
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS							
Drain-Source Diode Forward Voltage	V_{SD}	I_{SD}=45 A			1.5		V
Reverse Recovery Time	t_{RR}	I_{SD} = 45 A,dI_{SD} /dt = 100 A/μs			125		ns

■ TYPICAL CHARACTERISTICS

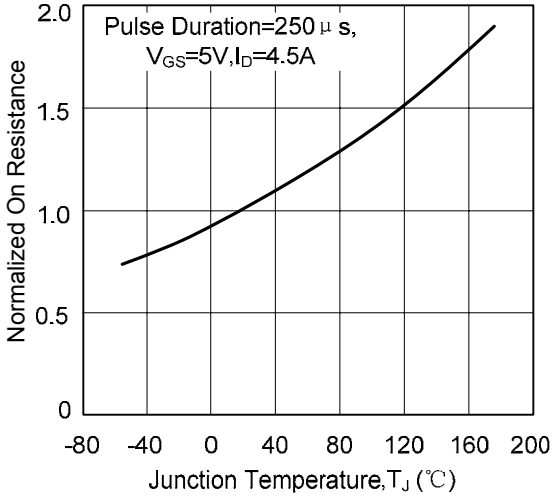
Saturation Characteristics



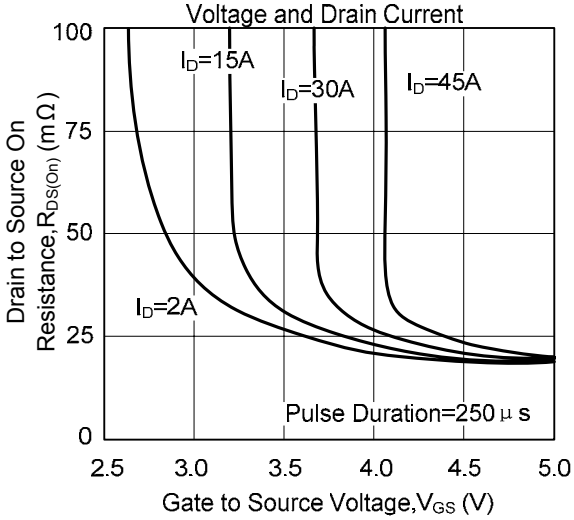
Transfer Characteristics



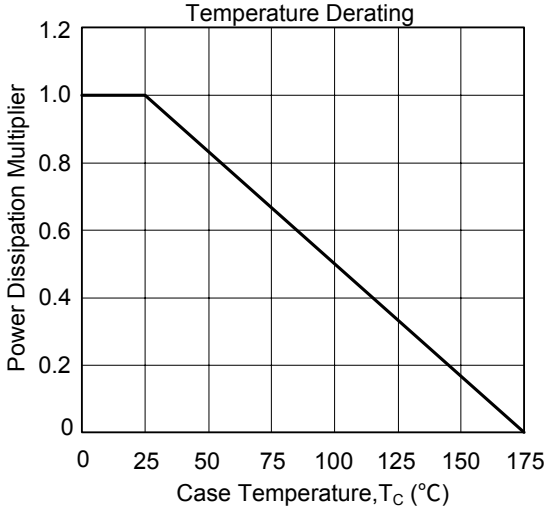
Normalized Drain to Source On Resistance vs. Junction Temperature



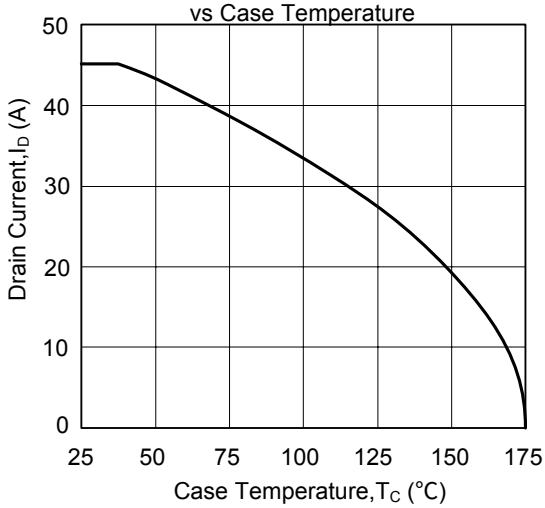
Drain to Source On Resistance vs. Gate Voltage and Drain Current



Normalized Power Dissipation vs Temperature Derating

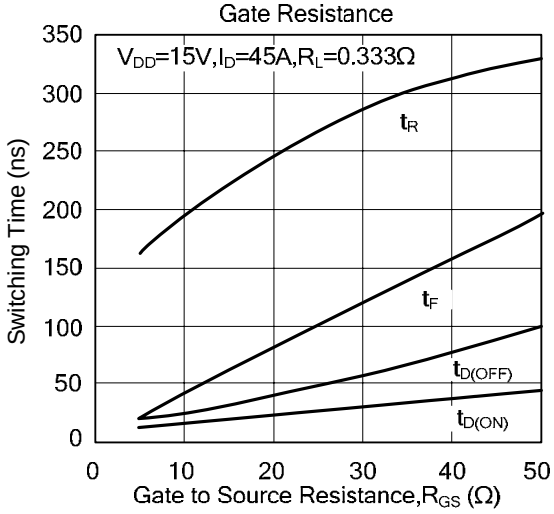


Maximum Continuous Drain Current vs Case Temperature

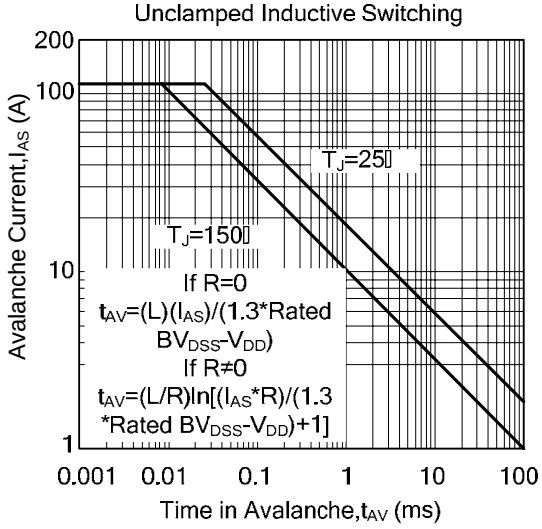


■ TYPICAL CHARACTERISTICS(Cont.)

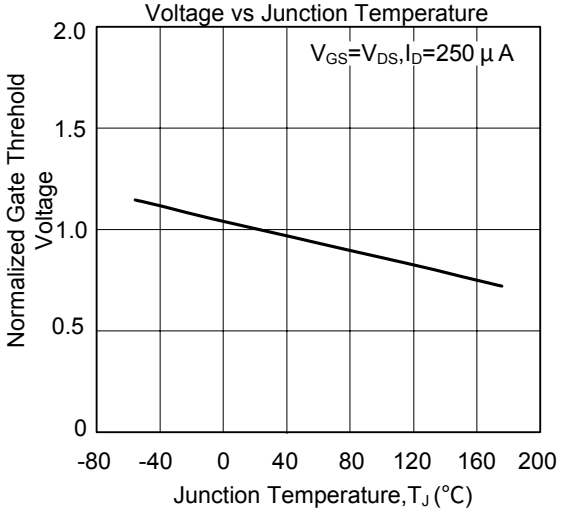
Switching Time as a Function of Gate Resistance



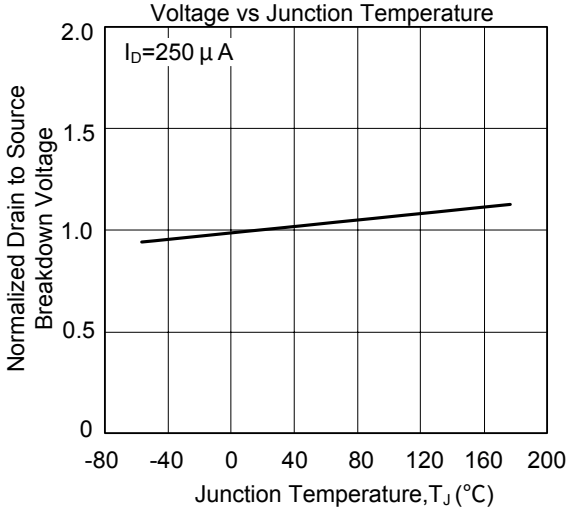
Unclamped Inductive Switching



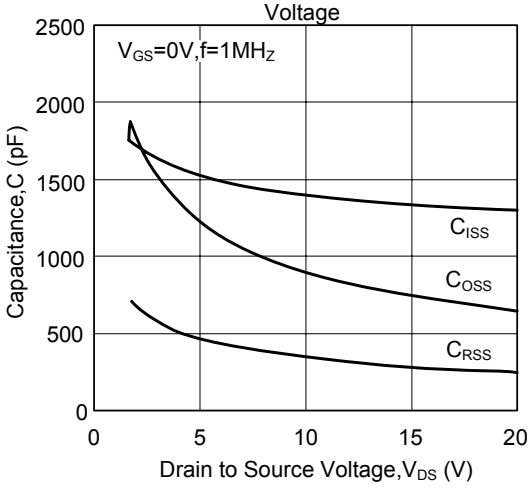
Normalized Gate Threshold Voltage vs Junction Temperature



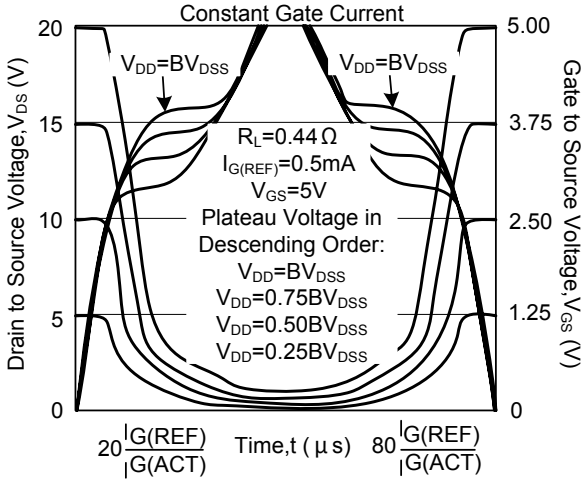
Normalized Drain to Source Breakdown Voltage vs Junction Temperature



Capacitance vs. Drain to Source Voltage

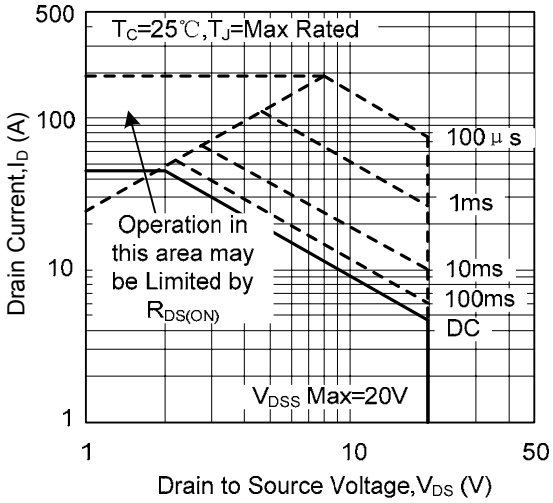


Normalized Switching Waveforms for Constant Gate Current

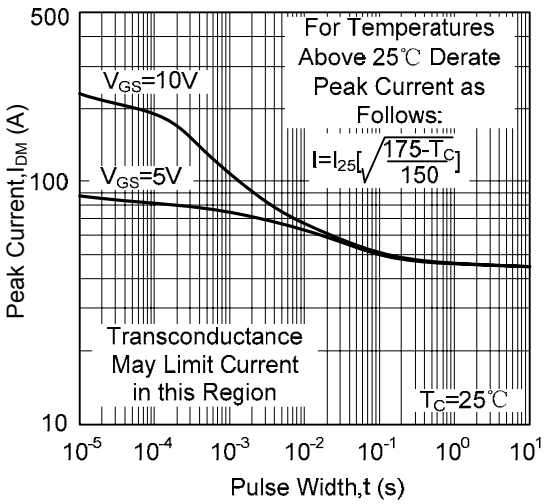


■ TYPICAL CHARACTERISTICS(Cont.)

Forward Bias Safe Operating Area



Peak Current Capability



Normalized Maximum Transient Thermal Impedance