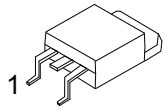
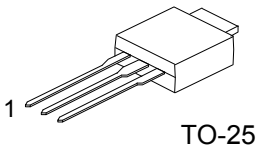
UT50N03

Power MOSFET

45A, 25V N-CHANNEL POWER MOSFET



TO-252

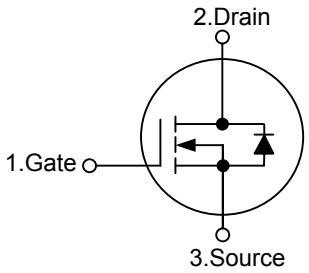


TO-251

■ FEATURES

* $R_{DS(ON)}$ = 14mΩ @V_{GS} = 10 V
* Low capacitance
* Optimized gate charge
* Fast switching capability
* Avalanche energy specified

■ SYMBOL



■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT50N03L-TM3-T	UT50N03G-TM3-T	TO-251	G	D	S	Tube
UT50N03L-TN3-R	UT50N03G-TN3-R	TO-252	G	D	S	Tape Reel
UT50N03L-TN3-T	UT50N03G-TN3-T	TO-252	G	D	S	Tube

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

UT50N03L-TM3-T (1)Packing Type (2)Package Type (3)Lead Free	(1) R: Tape Reel, T: Tube (2) TM3: TO-251, TN3: TO-252 (3) G: Halogen Free, L: Lead Free

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

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	V_{DSS}	25	V
Gate-Source Voltage	V_{GSS}	±20	V
Continuous Drain Current	I_D	45	A
Pulsed Drain Current (Note 3)	I_{DM}	180	A
Single Pulsed Avalanche Energy (Note 4)	E_{AS}	20	mJ
Power Dissipation	P_D	50	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. L = 19.5mH, I_{AS} = 6.3A, V_{DD} = 50V, R_G = 25 Ω, Starting T_J = 25°C
3. Surface-mounted on FR4 board using 1 sq in pad, 1 oz Cu.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient (Note 3)	θ_{JA}	71.4	℃/W
Junction to Case	θ_{JC}	3.0	℃/W

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

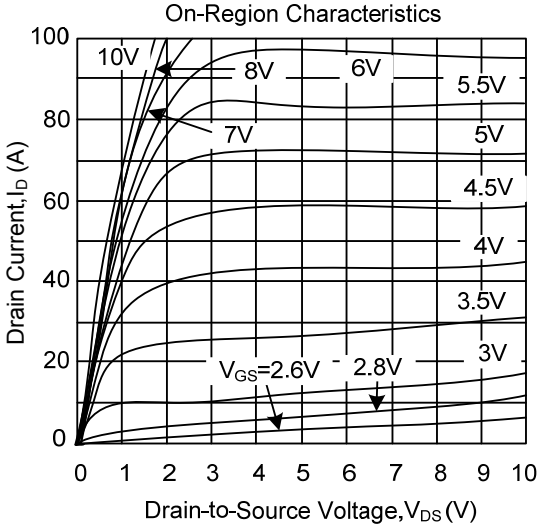
PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} =0V, I_D =250 μA		25			V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=20V, V_{GS} =0V				1.5	μA
Gate-Source Leakage Current	I_{GSS}	V_{DS} =0V, V_{GS} = ±20V				±100	nA
ON CHARACTERISTICS							
Gate-Threshold Voltage	$V_{GS(TH)}$	V_{DS} =V_{GS}, I_D =250 μA		1.0	1.7	2.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS} = 11.5V	I_D = 30 A		12		mΩ
			I_D = 15 A		11.7		
		V_{GS} = 10 V	I_D = 30 A		12.5	14	
		V_{GS} = 4.5V	I_D = 30 A		21		
			I_D = 15 A		19	23	
DYNAMIC PARAMETERS							
Input Capacitance	C_{ISS}	V_{DS}=12V, V_{GS} =0V, f=1MHz			610	750	pF
Output Capacitance	C_{OSS}				300		
Reverse Transfer Capacitance	C_{RSS}				125		
SWITCHING PARAMETERS							
Turn-ON Delay Time	$t_{D(ON)}$	V_{GS} = 4.5 V, V_{DS} =15 V, I_D = 30 A, R_G = 3.0 Ω			8.2		ns
Turn-ON Rise Time	t_R				9.6		
Turn-OFF Delay Time	$t_{D(OFF)}$				11.2		
Turn-OFF Fall-Time	t_F				6.8		
Turn-ON Delay Time	$t_{D(ON)}$	V_{GS} = 11.5 V, V_{DS} =15 V, I_D = 30 A, R_G = 3.0 Ω			5.0		ns
Turn-ON Rise Time	t_R				84		
Turn-OFF Delay Time	$t_{D(OFF)}$				15		
Turn-OFF Fall-Time	t_F				4.0		
Total Gate Charge	Q_G	V_{DS} =15V,V_{GS} =4.5V, I_D =30 A			6.0	10	nC
Gate-to-Source Charge	Q_{GS}				1.9		
Gate-to-Drain Charge	Q_{GD}				3.7		
Total Gate Charge	Q_G	V_{DS} =15V,V_{GS} =11.5V, I_D =30 A			15		nC
Gate-to-Source Charge	Q_{GS}				1.9		
Gate-to-Drain Charge	Q_{GD}				3.9		
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Drain-Source Diode Forward Voltage	V_{SD}	I_S=30 A, V_{GS} =0V			0.85	1.1	V
Maximum Continuous Drain-Source Diode Forward Current	I_S					45	A
Reverse Recovery Time	t_{rr}	I_S = 30 A, V_{GS} = 0 V, dI /dt = 100 A/μs			24		ns
Reverse Recovery Charge	Q_{RR}				14		nC

Note: 1. Pulse width limited by $T_{J(MAX)}$

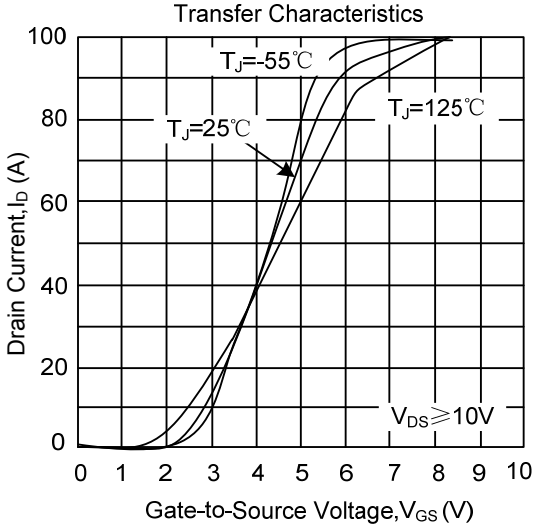
2. Pulse Test: Pulse Width≤300μs, Duty Cycle≤2%.

■ TYPICAL CHARACTERISTICS

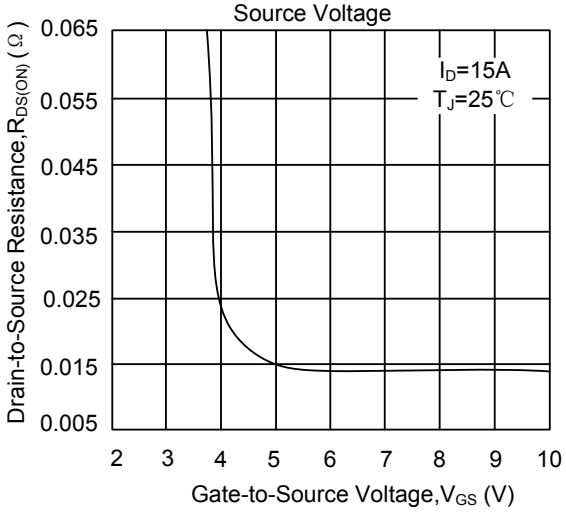
On-Region Characteristics



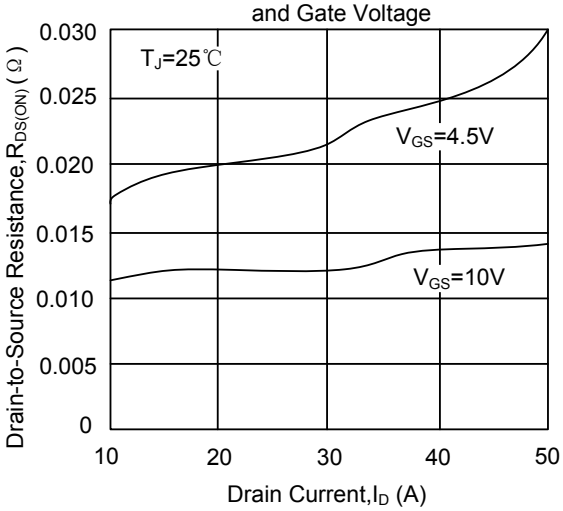
Transfer Characteristics



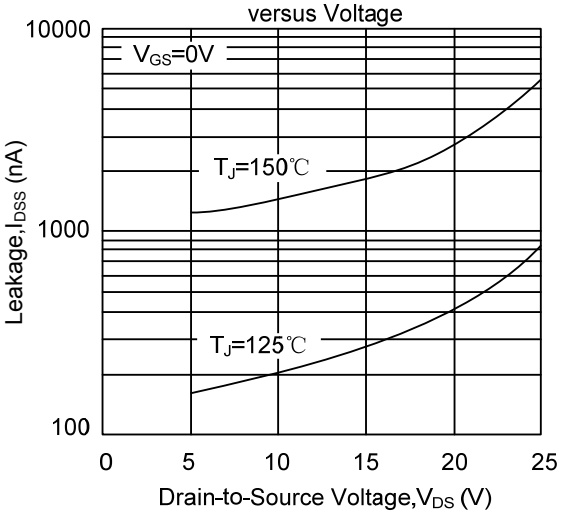
On-Resistance versus Gate-to-Source Voltage



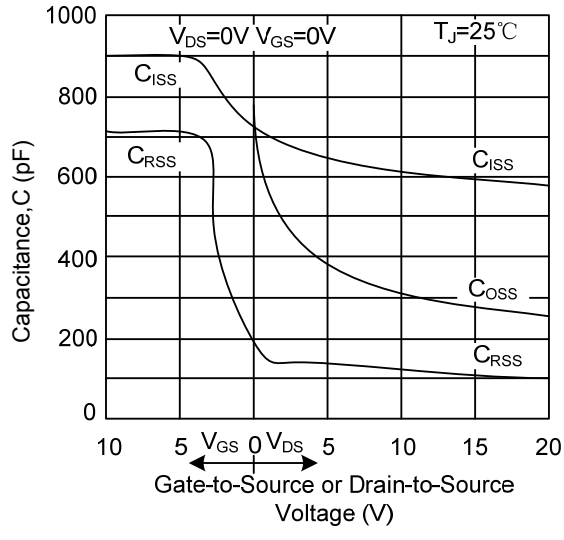
On-Resistance versus Drain Current and Gate Voltage



Drain-to-Source Leakage Current versus Voltage

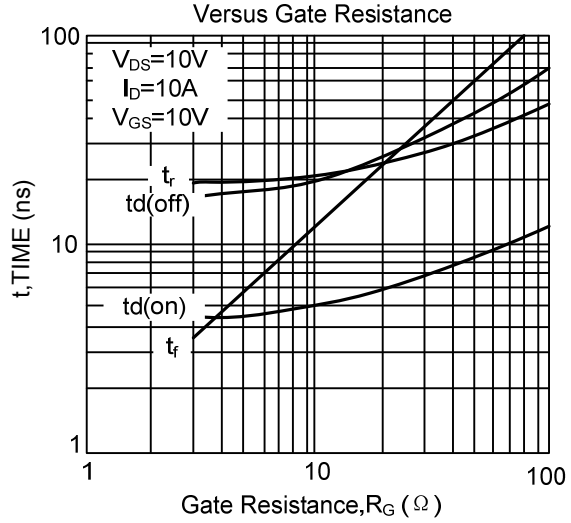


Capacitance Variation

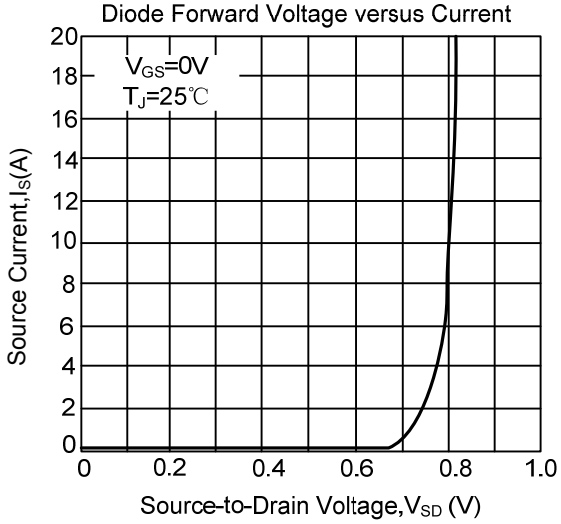


■ TYPICAL CHARACTERISTICS(Cont.)

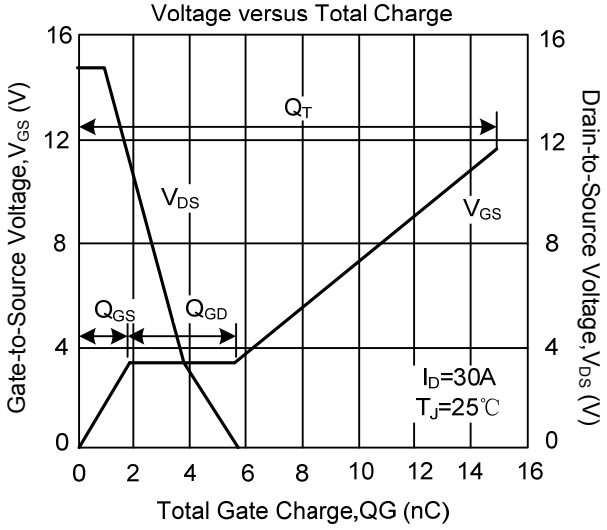
Resistive Switching Time Variation Versus Gate Resistance



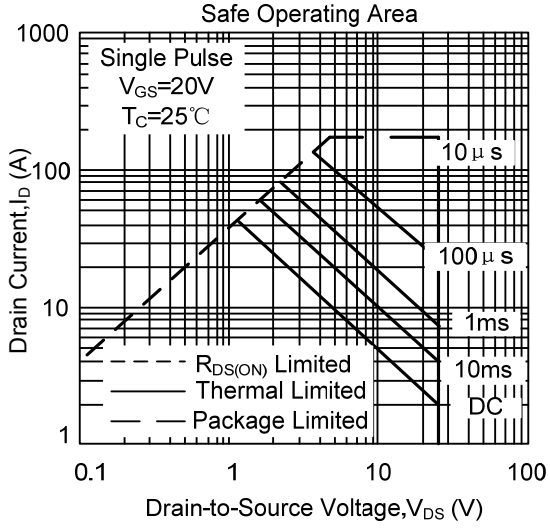
Diode Forward Voltage versus Current



Gate-to-Source and Drain-to-Source Voltage versus Total Charge



Maximum Rated Forward Biased Safe Operating Area



Thermal Responce