



# POWER MOSFET 12 AMPS, 60 VOLTS N-CHANNEL DPAK

### DESCRIPTION

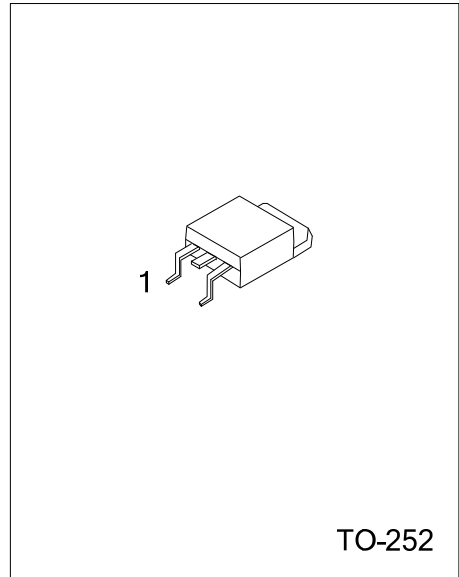
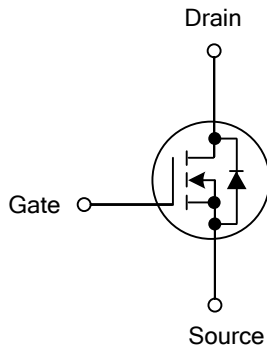
The UTC **UTD3055** is an N-channel Power MOSFET, and it can withstand high energy in the avalanche and commutation modes.

The UTC **UTD3055** is needed for applications, such as power supplies, converters and power motor controls which require low voltage and high speed switching. These devices are particularly well suited for bridge circuits where diode speed and commutating safe operating areas are critical and offer additional safety margin against unexpected voltage transients.

### FEATURES

- \*  $I_{DSS}$  and  $V_{DS(on)}$  Specified At Elevated Temperature
- \* Avalanche Energy Specified

### SYMBOL



### ORDERING INFORMATION

Ordering Number	Package	Pin Assignment			Packing
		1	2	3	
UTD3055G-TN3-R	TO-252	G	D	S	Tape Reel

Note: D; Drain, G: Gate, S: Source

UTD3055G-TN3-R (1)Packing Type (2)Package Type (3)Halogen Free	(1) R: Tape Reel (2) TN3: TO-252 (3) G: Halogen Free
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■ ABSOLUTE MAXIMUM RATINGS ( $T_C = 25^\circ\text{C}$  unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		$V_{DSS}$	60	V
Drain-Gate Voltage ( $R_{GS}=1.0\text{M}\Omega$ )		$V_{DGR}$	60	V
Gate-Source Voltage	Continuous	$V_{GS}$	$\pm 20$	V
	Non-Repetitive ( $t_p \leq 10\mu\text{s}$ )	$V_{GSM}$	$\pm 25$	V
Drain Current	Continuous @ $25^\circ\text{C}$	$I_D$	12	A
	Continuous @ $100^\circ\text{C}$	$I_D$	7.3	A
	Single Pulse ( $t_p \leq 10\mu\text{s}$ )	$I_{DM}$	37	A
Single Pulse Drain-to-Source Avalanche Energy – Starting $T_J = 25^\circ\text{C}$ ( $V_{DD} = 25\text{V}$ , $V_{GS} = 10\text{V}$ , $I_L = 12\text{A}$ , $L = 1.0\text{mH}$ , $R_G = 25\Omega$ )		$E_{AS}$	72	mJ
Total Power Dissipation @ $25^\circ\text{C}$		$P_D$	48	W
Total Power Dissipation @ $T_A = 25^\circ\text{C}$ , when mounted to minimum recommended pad size			1.75	W
Operating Junction Temperature		$T_J$	-55~175	$^\circ\text{C}$
Storage Temperature		$T_{STG}$	-55~175	$^\circ\text{C}$

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	RATINGS	UNIT
Junction to Ambient	$\theta_{JA}$	100	$\text{W}/^\circ\text{C}$
Junction to Case	$\theta_{JC}$	3.13	$\text{W}/^\circ\text{C}$

■ ELECTRICAL CHARACTERISTICS ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$I_D=250\mu\text{A}$ , $V_{GS}=0\text{V}$	60			V
		Temperature Coefficient (Positive)		65		$\text{mV}/^\circ\text{C}$
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=60\text{V}$ , $V_{GS}=0\text{V}$			10	$\mu\text{A}$
		$V_{DS}=60\text{V}$ , $V_{GS}=0\text{V}$ , $T_J=150^\circ\text{C}$			100	$\mu\text{A}$
Gate- Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20\text{V}$ , $V_{DS}=0$			100	nA
<b>ON CHARACTERISTICS (Note)</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}$ , $I_D=250\mu\text{A}$	2.0	2.7	4.0	V
		Temperature Coefficient (Negative)		5.4		$\text{mV}/^\circ\text{C}$
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$ , $I_D=6.0\text{A}$		0.10	0.15	$\Omega$
Drain-Source On-Voltage ( $V_{GS}=10\text{V}$ )	$V_{DS(on)}$	$I_D=12\text{A}$		1.3	2.2	V
		$I_D=6.0\text{A}$ , $T_J=150^\circ\text{C}$			1.9	V
Forward Transconductance	$g_{FS}$	$V_{DS}=7.0\text{V}$ , $I_D=6.0\text{A}$	4.0	5.0		S
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	$C_{ISS}$	$V_{GS}=0\text{V}$ , $V_{DS}=25\text{V}$ , $f=1.0\text{MHz}$		410	500	pF
Output Capacitance	$C_{OSS}$			130	180	pF
Reverse Transfer Capacitance	$C_{RSS}$			25	50	pF

Note: Pulse Test: Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$ .

■ ELECTRICAL CHARACTERISTICS (Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>SWITCHING PARAMETERS (Note 2)</b>						
Gate Charge	$Q_T$	$V_{GS}=10V, V_{DS}=48V, I_D=12A$		12.2	17	nC
	$Q_1$			3.2		nC
	$Q_2$			5.2		nC
	$Q_3$			5.5		nC
Turn-ON Delay Time	$t_{D(ON)}$	$V_{DD}=30V, V_{GS}=10V, I_D=12A, R_G=9.1\Omega$		7.0	10	ns
Rise Time	$t_R$			34	60	ns
Turn-OFF Delay Time	$t_{D(OFF)}$			17	30	ns
Fall-Time	$t_F$			18	50	ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Drain-Source Diode Forward Voltage (Note 1)	$V_{SD}$	$I_S=12A, V_{GS}=0V$		1.0	1.6	V
		$I_S=12A, V_{GS}=0V, T_J=150^\circ C$		0.91		
Reverse Recovery Time	$t_{RR}$	$I_S=12A, V_{GS}=0V, dI_S/dt=100A/\mu s$		56		ns
	$t_A$			40		ns
	$t_B$			16		ns
Reverse Recovery Charge	$Q_{RR}$		0.128			$\mu C$
<b>INTERNAL PACKAGE INDUCTANCE</b>						
Internal Drain Inductance (Measured from the drain lead 0.25" from package to center of die)	$L_D$			4.5		nH
Internal Source Inductance (Measured from the source lead 0.25, from package to source bond pad)	$L_S$			7.5		nH

Note: 1. Pulse Test: Pulse Width $\leq$ 300 $\mu s$ , Duty Cycles $\leq$ 2%.

2. Switching characteristics are independent of operating junction temperature.

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