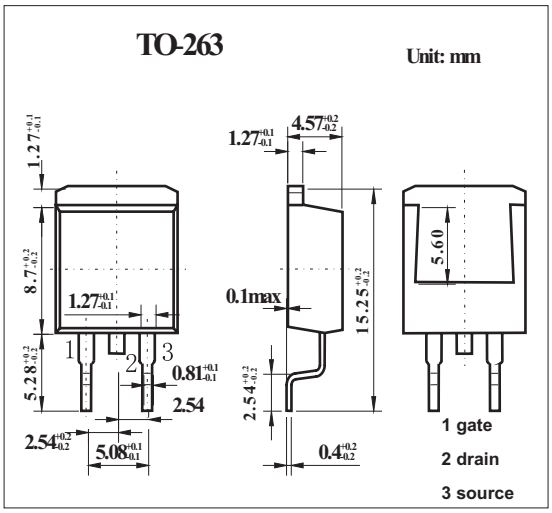
# TrenchPLUS standard level FET

# KUK7105-40ATE




## Features

- Integrated temperature sensor
- Electrostatic discharge protection
- Q101 compliant
- Standard level compatible.

## Absolute Maximum Ratings Ta = 25℃

| Parameter | Symbol | Rating | Unit |
|---|---|---|---|
| Drain-source voltage | $V_{DS}$ | 40 | V |
| Drain-gate voltage | $V_{DGS}$ | 40 | V |
| Gate-source voltage | $V_{GS}$ | ±20 | V |
| Drain current (DC) $T_{mb}$ = 25℃,$V_{GS}$ = 10 V | $I_D$ | 155 | A |
| Drain current (DC) $T_{mb}$ = 100℃,$V_{GS}$ = 10 V | $I_D$ | 75 | A |
| peak drain current *1 | $I_{DM}$ | 620 | A |
| Total power dissipation $T_{mb}$ = 25℃ | $P_{tot}$ | 272 | W |
| gate-source clamping current (continuous) | $I_{GS(CL)}$ | 10 | mA |
| gate-source clamping current *3 | | 50 | mA |
| FET to temperature sense diode isolation voltage | $V_{isol(FET-TSD)}$ | ±100 | V |
| Storage & operating temperature | $T_{stg}$, $T_j$ | -55 to 175 | ℃ |
| reverse drain current (DC) $T_{mb}$ = 25℃ | $I_{DR}$ | 155 | A |
| | | 75 | A |
| pulsed reverse drain current *1 | $I_{DRM}$ | 620 | A |
| non-repetitive avalanche energy *2 | $E_{DS(AL)S}$ | 1.46 | J |
| Thermal resistance junction to mounting base | $R_{th\ j\text{-}mb}$ | 0.55 | K/W |
| Thermal resistance junction to ambient | $R_{th\ j\text{-}a}$ | 50 | K/W |

* 1 Tmb = 25℃; pulsed; tp ≤ 10 μs;

*2 unclamped inductive load; $I_D$ = 75 A;$V_{DS}$ ≤ 40 V; $V_{GS}$ = 10 V; $R_{GS}$ = 50Ω;starting Tj = 25℃

*3 tp = 5 ms; δ = 0.01

# KUK7105-40ATE

■ Electrical Characteristics Ta = 25℃

| Parameter | Symbol | Testconditons | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| drain-source breakdown voltage | $V_{(BR)DSS}$ | $I_D$ = 0.25 mA; $V_{GS}$ = 0 V;$T_j$ = 25℃ | 40 | | | V |
| | | $I_D$ = 0.25 mA; $V_{GS}$ = 0 V;$T_j$ = -55℃ | 36 | | | V |
| gate-source threshold voltage | $V_{GS(th)}$ | $I_D$ = 1 mA; $V_{DS}$ = $V_{GS}$;$T_j$ = 25℃ | 2 | 3 | 4 | V |
| | | $I_D$ = 1 mA; $V_{DS}$ = $V_{GS}$;$T_j$ = 175℃ | 1 | | | V |
| | | $I_D$ = 1 mA; $V_{DS}$ = $V_{GS}$;$T_j$ = -55℃ | | | 4.4 | V |
| Zero gate voltage drain current | $I_{DSS}$ | $V_{DS}$ = 40 V; $V_{GS}$ = 0 V;$T_j$ = 25℃ | | 0.1 | 10 | μA |
| | | $V_{DS}$ = 40 V; $V_{GS}$ = 0 V;$T_j$ = 175℃ | | | 250 | μA |
| gate-source breakdown voltage | $V_{(BR)GSS}$ | $I_G$ = ±1 mA;-55 ℃ < $T_j$ < 175℃ | 20 | 22 | | V |
| gate-source leakage current | $I_{GSS}$ | $V_{GS}$ = ±10 V; $V_{DS}$ = 0 V;$T_j$ = 25℃ | | 22 | 1000 | nA |
| | | $V_{GS}$ = ±10 V; $V_{DS}$ = 0 V;$T_j$ = 175℃ | | | 10 | μA |
| drain-source on-state resistance | $R_{DSon}$ | $V_{GS}$ = 10 V; $I_D$ = 50 A;$T_j$ = 25℃ | . | 4.5 | 5 | mΩ |
| | | $V_{GS}$ = 10 V; $I_D$ = 50 A;$T_j$ = 175℃ | | | 9.5 | mΩ |
| forward voltage, temperature sense diode | $V_F$ | $I_F$ = 250 μA | 648 | 658 | 668 | mV |
| temperature coefficient temperature sense diode | $S_F$ | $I_F$ = 250 μA;-55℃ < $T_j$ <175℃ | -1.4 | -1.54 | -1.68 | mV/K |
| temperature sense diode forward voltage hysteresis | $V_{hys}$ | 125 μA < $I_F$ <250 μA | 25 | 32 | 50 | mV |
| total gate charge | $Q_{g(tot)}$ | $V_{GS}$ = 10 V; $V_{DD}$ = 32 V;$I_D$ = 25 A | | 118 | | nC |
| gate-to-source charge | $Q_{gs}$ | | | 16 | | nC |
| gate-to-drain (Miller) charge | $Q_{gd}$ | | | 57 | | nC |
| input capacitance | $C_{iss}$ | $V_{GS}$ = 0 V; $V_{DS}$ = 25 V;f = 1 MHz | | 4500 | | pF |
| output capacitance | $C_{oss}$ | | | 1500 | | pF |
| reverse transfer capacitance | $C_{rss}$ | | | 960 | | pF |
| turn-on delay time | $t_{d(on)}$ | $V_{DD}$ = 30 V; $R_L$ = 1.2Ω;$V_{GS}$ = 10 V; $R_G$ = 10Ω | | 35 | | ns |
| rise time | $t_r$ | | | 115 | | ns |
| turn-off delay time | $t_{d(off)}$ | | | 155 | | ns |
| fall time | $t_f$ | | | 110 | | ns |
| internal drain inductance | $L_d$ | measured from upper edge of drain mounting base to center of die | | 2.5 | | nH |
| internal source inductance | $L_s$ | measured from source lead to source bond pad | | 7.5 | | nH |
| source-drain (diode forward) voltage | $V_{SD}$ | $I_S$ = 25A; $V_{GS}$ = 0 V | | 0.85 | 1.2 | V |
| reverse recovery time | $t_{rr}$ | $I_S$ = 20 A; $dI_F/dt$ = -100 A/μs; | | 96 | | ns |
| recovered charge | $Q_r$ | $V_{GS}$ = -10 V; $V_{DS}$ = 30 V | | 224 | | nC |