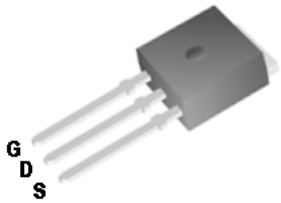
UNIKC Semiconductor

# P2504EI

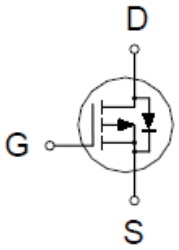
## P-Channel Logic Level Enhancement Mode MOSFET

### PRODUCT SUMMARY

| $V_{(BR)DSS}$ | $R_{DS(ON)}$ | $I_D$ |
|---|---|---|
| -40V | 25.8mΩ @$V_{GS}$ = -10V | -30A |




TO-251




### ABSOLUTE MAXIMUM RATINGS ($T_C$ = 25 °C Unless Otherwise Noted)

| PARAMETERS/TEST CONDITIONS | | SYMBOL | LIMITS | UNITS |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | -40 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±20 | |
| Continuous Drain Current | $T_C$ = 25 °C | $I_D$ | -30 | A |
| | $T_C$ = 70 °C | | -24 | |
| Pulsed Drain Current[1] | | $I_{DM}$ | -65 | |
| Power Dissipation | $T_C$ = 25 °C | $P_D$ | 42 | W |
| | $T_C$ = 70 °C | | 27 | |
| Operating Junction & Storage Temperature Range | | $T_J$, $T_{STG}$ | -55 to 150 | °C |
| Lead Temperature ($^1/_{16}$" from case for 10 sec.) | | $T_L$ | 275 | |

### THERMAL RESISTANCE RATINGS

| THERMAL RESISTANCE | SYMBOL | TYPICAL | MAXIMUM | UNITS |
|---|---|---|---|---|
| Junction-to-Case | $R_{\theta JC}$ | | 3 | °C / W |
| Junction-to-Ambient | $R_{\theta JA}$ | | 75 | |

[1]Pulse width limited by maximum junction temperature.

UNIKC Semiconductor

RoHS Compliant

# P2504EI

## P-Channel Logic Level Enhancement Mode MOSFET

### ELECTRICAL CHARACTERISTICS ($T_C$ = 25 °C, Unless Otherwise Noted)

| PARAMETER | SYMBOL | TEST CONDITIONS | LIMITS | | | UNITS |
|---|---|---|---|---|---|---|
| | | | MIN | TYP | MAX | |
| **STATIC** | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$ = 0V, $I_D$ = -250μA | -40 | | | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = -250μA | -1.2 | -2.2 | -3 | |
| Gate-Body Leakage | $I_{GSS}$ | $V_{DS}$ = 0V, $V_{GS}$ = ±20V | | | ±250 | nA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = -32V, $V_{GS}$ = 0V | | | 1 | μA |
| | | $V_{DS}$ = -30V, $V_{GS}$ = 0V , $T_J$ = 125 °C | | | 10 | |
| On-State Drain Current[1] | $I_{D(ON)}$ | $V_{DS}$ = -5V, $V_{GS}$ = -10V | -65 | | | A |
| Drain-Source On-State Resistance[1] | $R_{DS(ON)}$ | $V_{GS}$ = -7V, $I_D$ = -10A | | 30 | 40 | mΩ |
| | | $V_{GS}$ = -10V, $I_D$ = -18A | | 22 | 25.8 | |
| Forward Transconductance[1] | $g_{fs}$ | $V_{DS}$ = -5V, $I_D$ = -18A | | 20 | | S |
| **DYNAMIC** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{GS}$ = 0V, $V_{DS}$ = -15V, f = 1MHz | | 1570 | | pF |
| Output Capacitance | $C_{oss}$ | | | 320 | | |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 210 | | |
| Total Gate Charge[2] | $Q_g$ | $V_{DS}$ = 0.5$V_{(BR)DSS}$, $V_{GS}$ = -10V, $I_D$ = -18A | | 29 | | nC |
| Gate-Source Charge[2] | $Q_{gs}$ | | | 6 | | |
| Gate-Drain Charge[2] | $Q_{gd}$ | | | 7 | | |
| Turn-On Delay Time[2] | $t_{d(on)}$ | $V_{DS}$ = -20V,$R_L$ = 1Ω, $I_D$ ≅ -1A,$V_{GS}$ = -10V, $R_{GS}$ = 6Ω | | 12 | | nS |
| Rise Time[2] | $t_r$ | | | 29 | | |
| Turn-Off Delay Time[2] | $t_{d(off)}$ | | | 42 | | |
| Fall Time[2] | $t_f$ | | | 33 | | |
| **SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS ($T_C$ = 25 °C)** | | | | | | |
| Continuous Current | $I_S$ | | | | -18 | A |
| Forward Voltage[1] | $V_{SD}$ | $I_F$ = $I_S$, $V_{GS}$ = 0V | | | -1.3 | V |
| Reverse Recovery Time | $t_{rr}$ | $I_F$ = -18A, $dI_F/dt$ = 100A / μS | | 29 | | nS |
| Reverse Recovery Charge | $Q_{rr}$ | | | 21 | | nC |

[1]Pulse test : Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.

[2]Independent of operating temperature.

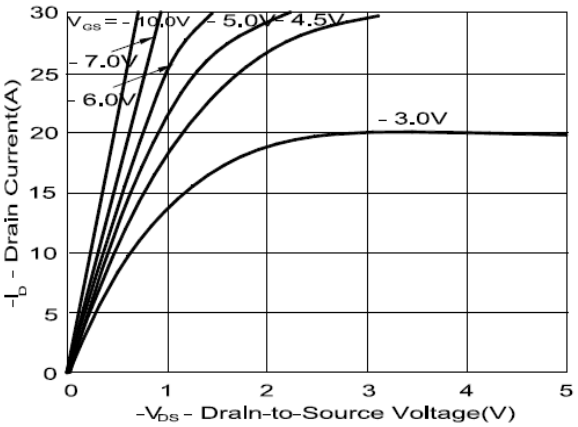
UNIKC Semiconductor

RoHS Compliant

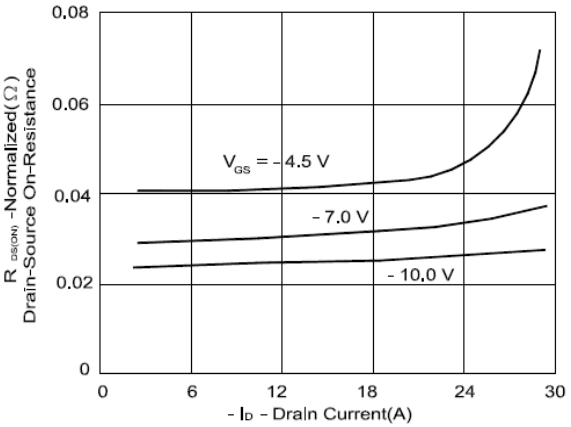
# P2504EI

## P-Channel Logic Level Enhancement Mode MOSFET

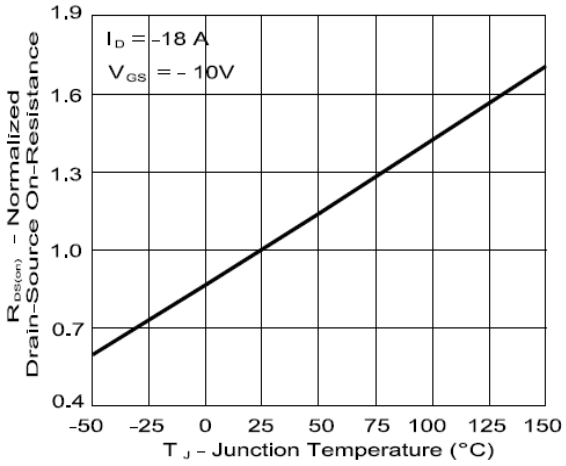
On-Region Characteristics



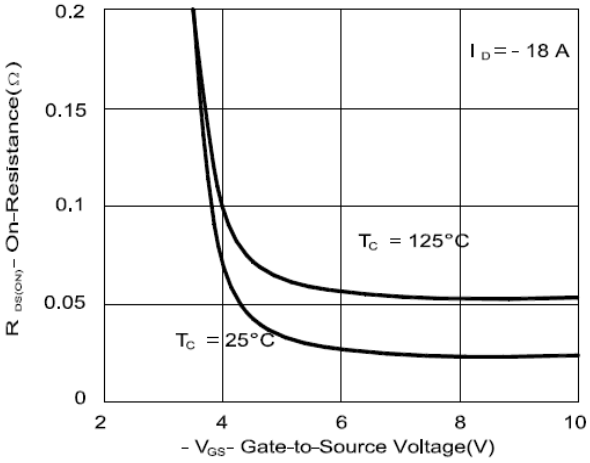

On-Resistance Variation with Drain Current and Gate Voltage



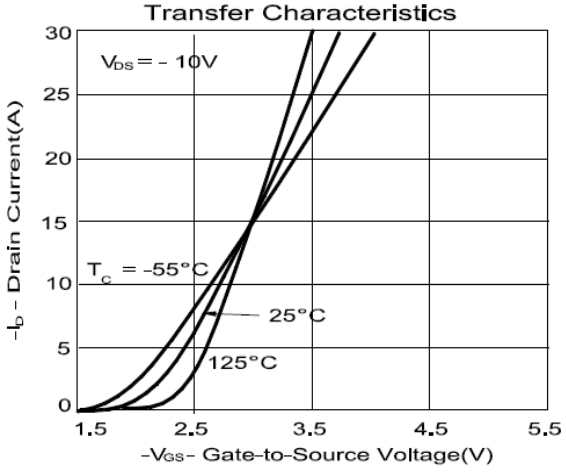

On-Resistance Variation with Temperature



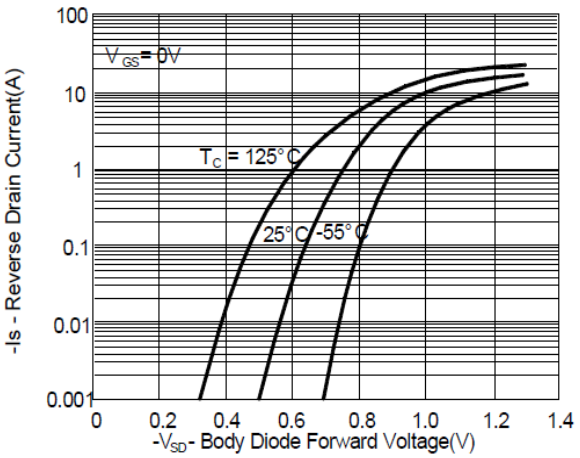

On-Resistance Variation with Gate-to-Source Voltage




Transfer Characteristics




Body Diode Forward Voltage Variation with Source Current and Temperature

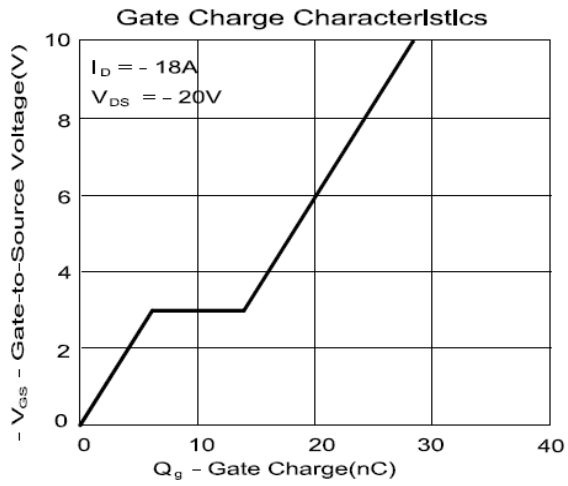


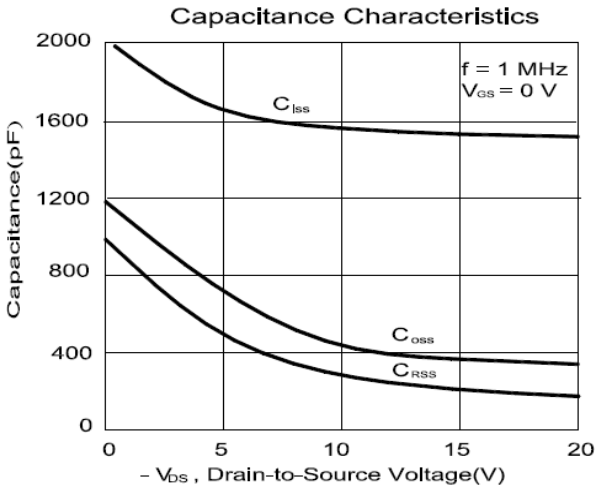
UNIKC Semiconductor

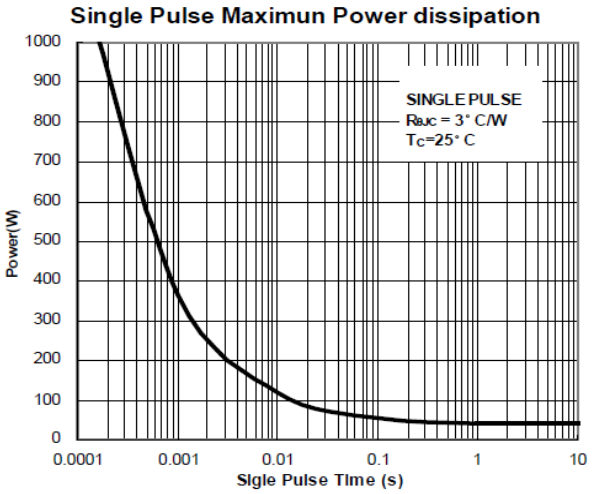
RoHS Compliant

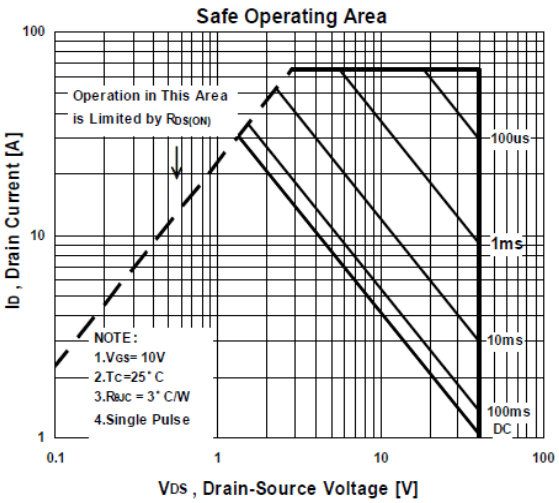
# P2504EI

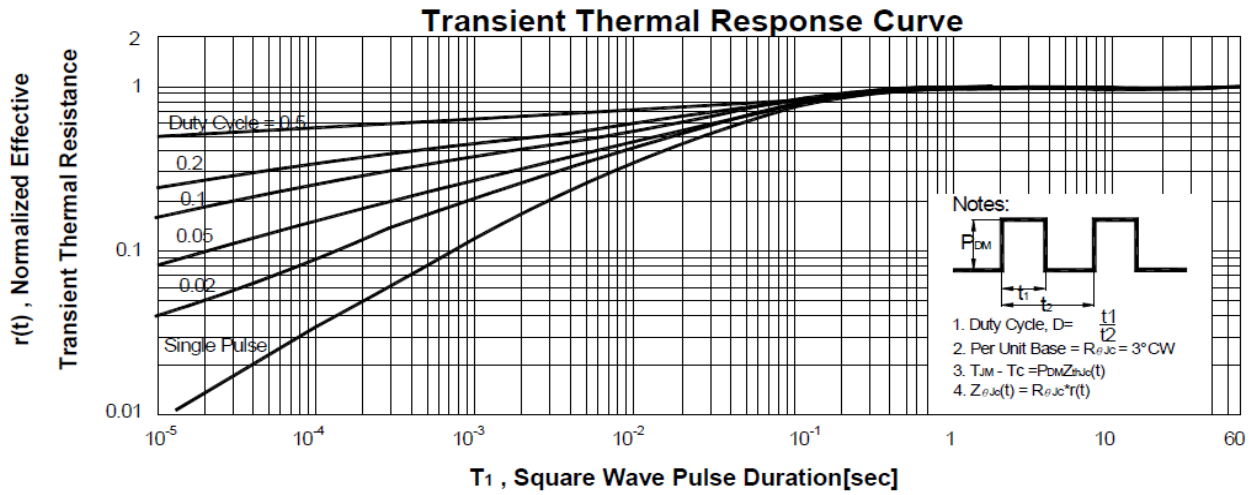
## P-Channel Logic Level Enhancement Mode MOSFET



UNIKC Semiconductor

RoHS Compliant

# P2504EI

## P-Channel Logic Level Enhancement Mode MOSFET

### Package Dimension

## TO-251 MECHANICAL DATA

| Dimension | mm | | | Dimension | mm | | |
|---|---|---|---|---|---|---|---|
| | Min. | Typ. | Max. | | Min. | Typ. | Max. |
| A | 14 | 15 | 17.14 | H | 0.89 | | 1.7 |
| B | 2.1 | 2.3 | 2.5 | I | 6.3 | | 6.8 |
| C | 0.4 | 0.5 | 0.6 | J | 4.8 | | 5.5 |
| D | 0.35 | 0.5 | 0.65 | K | 0.5 | 0.84 | 1.14 |
| E | 0.9 | 1.1 | 1.5 | L | 0.4 | 0.76 | 0.912 |
| F | 7 | | 9.65 | M | | 2.3 | |
| G | 5.3 | | 6.22 | N | 1.4 | 2.16 | 2.23 |