

## 40V P-Channel MOSFET

### Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	$I_D$
-40V	11m $\Omega$ @-10V	-40A

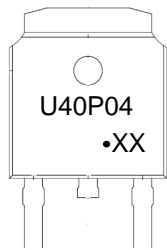
### Feature

- Trench Technology Power MOSFET
- Low  $R_{DS(on)}$
- Low Gate Charge
- Low Gate Resistance
- 100% UIS Tested

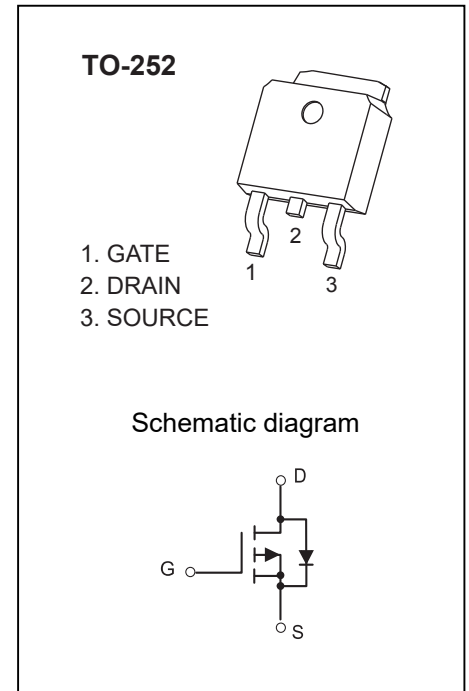
### Application

- Power Switching Application

### MARKING:



U40P04 = Device Code  
 XX = Date Code  
 Solid Dot = Green Indicator



### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain - Source Voltage	$V_{DS}$	-40	V
Gate - Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current <sup>1</sup>	$T_C = 25^\circ\text{C}$	$I_D$	-40 A
	$T_C = 100^\circ\text{C}$	$I_D$	-28 A
Pulsed Drain Current <sup>2</sup>	$I_{DM}$	-160	A
Single Pulsed Avalanche Current <sup>3</sup>	$I_{AS}$	-32	A
Single Pulsed Avalanche Energy <sup>3</sup>	$E_{AS}$	512	mJ
Power Dissipation <sup>5</sup>	$T_C = 25^\circ\text{C}$	$P_D$	52 W
Thermal Resistance from Junction to Ambient <sup>6</sup>	$R_{\theta JA}$	50	$^\circ\text{C}/\text{W}$
Thermal Resistance from Junction to Case	$R_{\theta JC}$	2.4	$^\circ\text{C}/\text{W}$
Junction Temperature	$T_J$	150	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-55~ +150	$^\circ\text{C}$

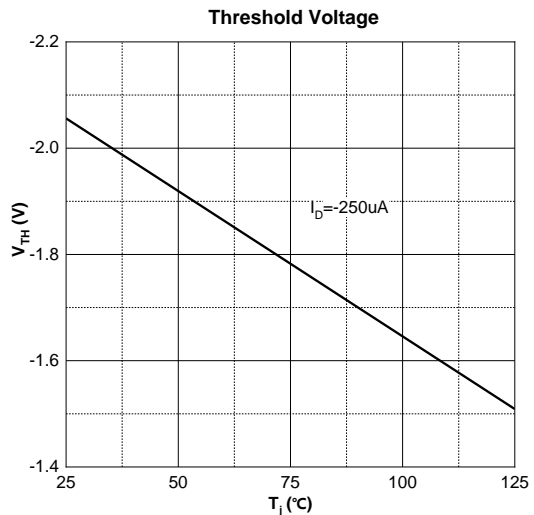
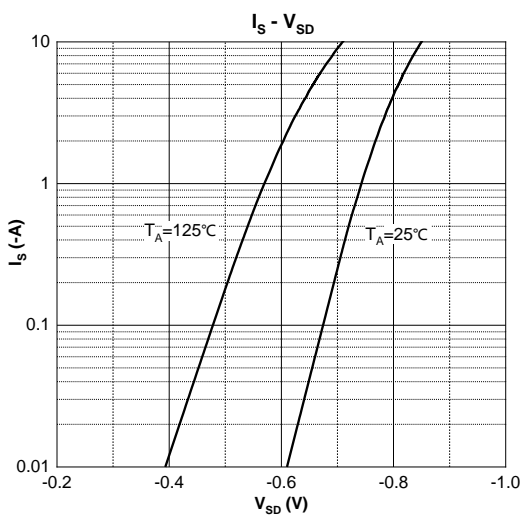
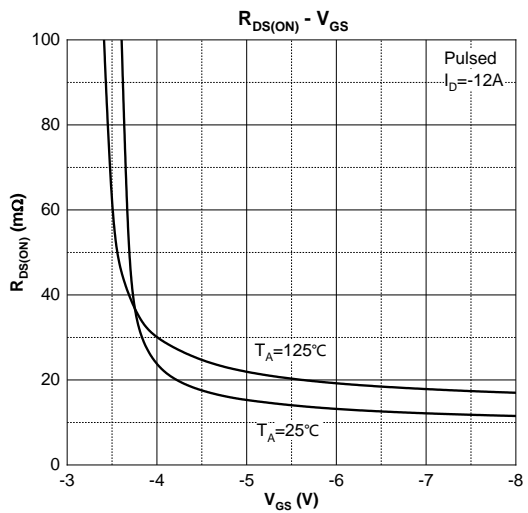
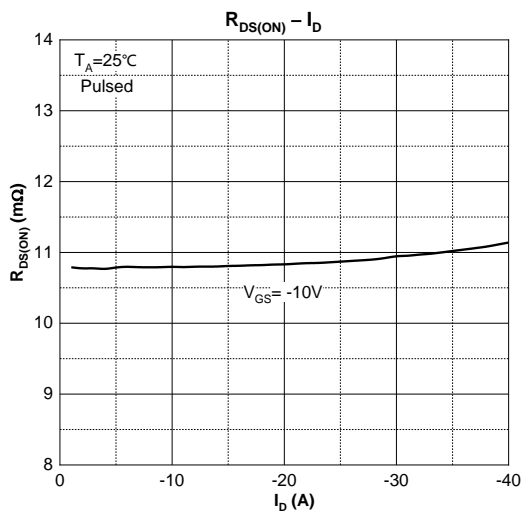
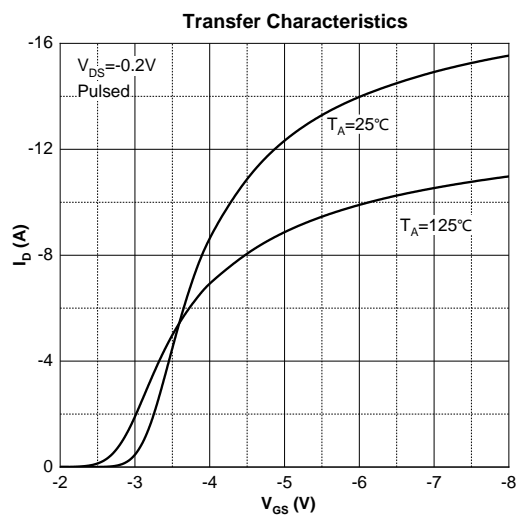
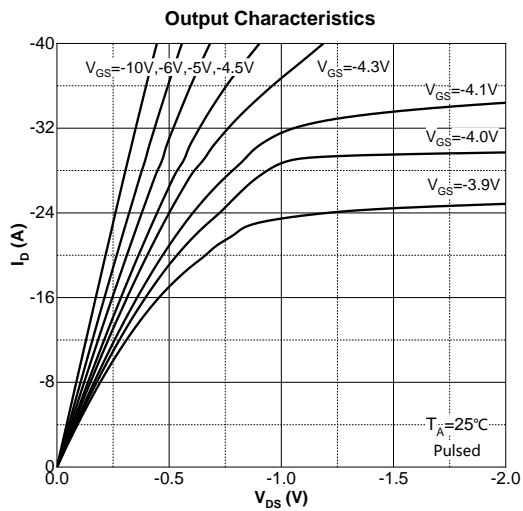
## Electrical Characteristics ( $T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
<b>Off Characteristics</b>						
Drain - Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	-40			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -40V, V_{GS} = 0V$			-1	$\mu A$
Gate - Body Leakage Current	$I_{GSS}$	$V_{GS} = \pm 20V, V_{DS} = 0V$			$\pm 100$	nA
<b>On Characteristics<sup>4</sup></b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	-1.0	-2.0	-3.0	V
Drain-source On-resistance	$R_{DS(on)}$	$V_{GS} = -10V, I_D = -12A$		11	14	m $\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS} = -5V, I_D = -12A$	24			S
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS} = -20V, V_{GS} = 0V, f = 1MHz$		4155		pF
Output Capacitance	$C_{oss}$			321		
Reverse Transfer Capacitance	$C_{rss}$			300		
Gate Resistance	$R_g$	$V_{DS} = 0V, V_{GS} = 0V, f = 1MHz$		4.4		$\Omega$
<b>Switching Characteristics</b>						
Total Gate Charge	$Q_g$	$V_{DS} = -20V, V_{GS} = -10V, I_D = -12A$		83		nC
Gate-source Charge	$Q_{gs}$			18		
Gate-drain Charge	$Q_{gd}$			14		
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = -20V, V_{GS} = -10V, I_D = -20A,$ $R_G = 3\Omega$		11		ns
Turn-on Rise Time	$t_r$			19		
Turn-off Delay Time	$t_{d(off)}$			40		
Turn-off Fall Time	$t_f$			26		
<b>Source - Drain Diode Characteristics</b>						
Diode Forward Voltage <sup>4</sup>	$V_{SD}$	$V_{GS} = 0V, I_S = -10A$			-1.2	V

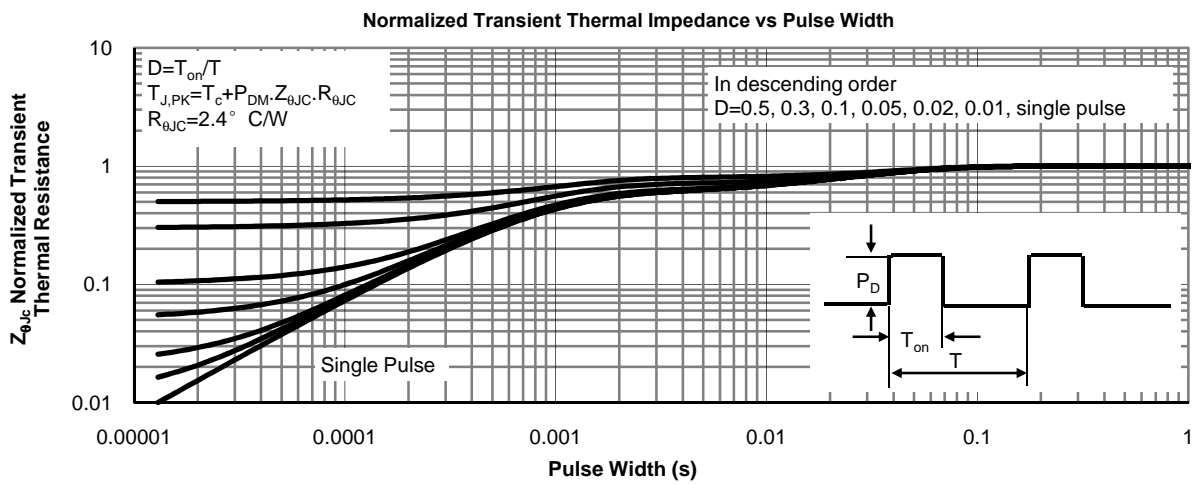
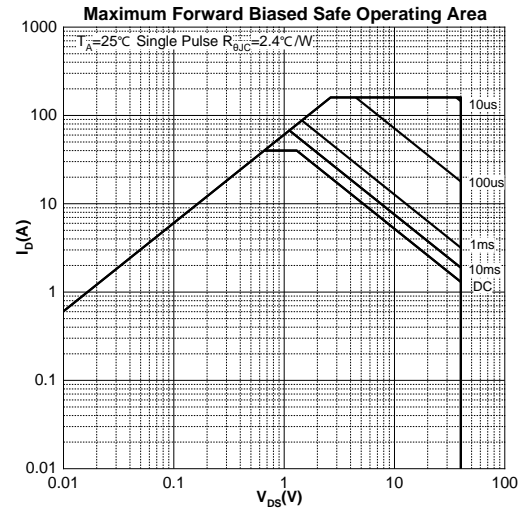
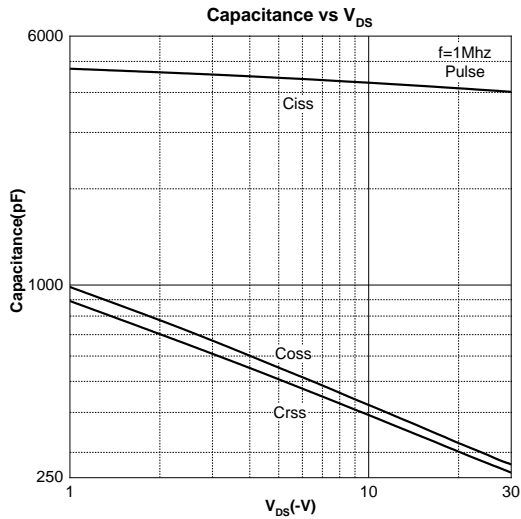
Notes :

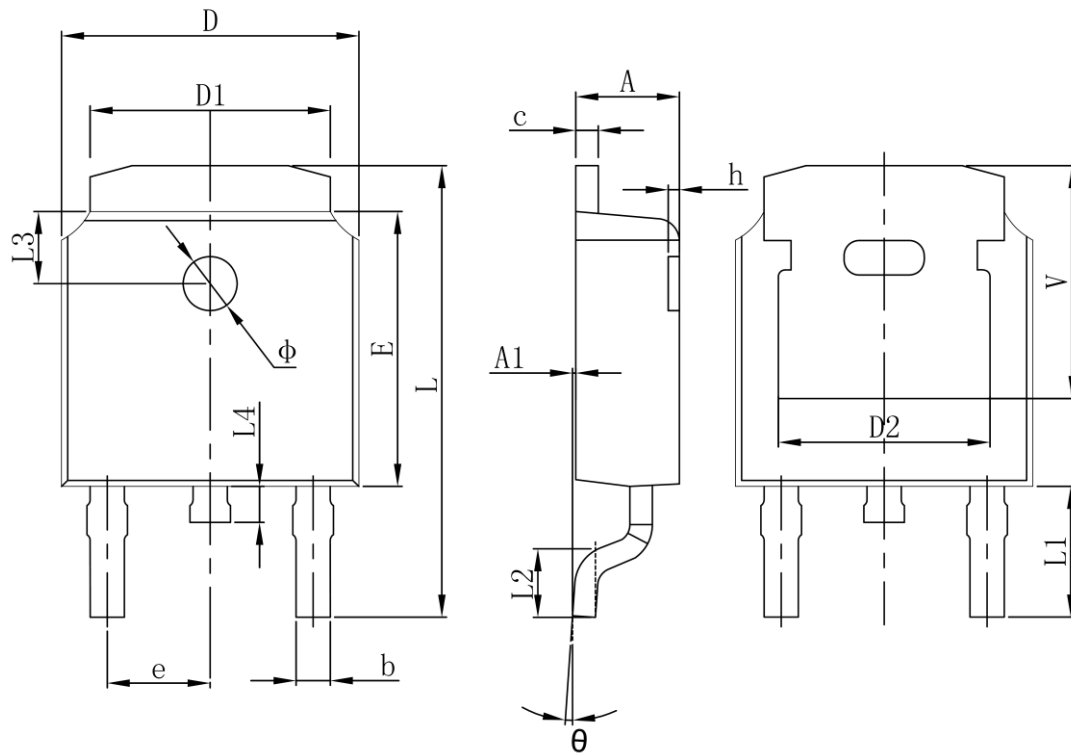
- 1.The maximum current rating is limited by package.And device mounted on a large heatsink
- 2.Pulse Test : Pulse Width  $\leq 10\mu s$ , duty cycle  $\leq 1\%$ .
- 3.EAS condition:  $V_{DD} = -20V, V_{GS} = -10V, L = 1mH, R_G = 25\Omega$  Starting  $T_J = 25^\circ\text{C}$ .
- 4.Pulse Test : Pulse Width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
- 5.The power dissipation  $P_D$  is limited by  $T_{J(MAX)} = 150^\circ\text{C}$ .And device mounted on a large heatsink
- 6.Device mounted on  $1in^2$  FR-4 board with 2oz. Copper, in a still air environment with  $T_A = 25^\circ\text{C}$ .

# Typical Characteristics



# Typical Characteristics





Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.635	0.770	0.025	0.030
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830REF		0.190REF	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.712	10.312	0.382	0.406
L1	2.900REF		0.114REF	
L2	1.400	1.700	0.055	0.067
L3	1.600REF		0.063REF	
L4	0.600	1.000	0.024	0.039
φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.250REF		0.207REF	