

40V N-Channel MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
40V	2.0m Ω @10V	120A
	2.7m Ω @4.5V	

Feature

- Split Gate Trench Technology
- Low $R_{DS(ON)}$
- Low Gate Charge
- Low Gate Resistance
- 100% UIS Tested

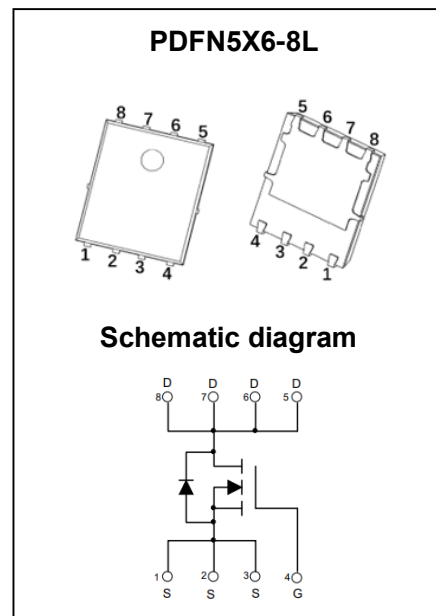
Application

- Power Switching Application

MARKING:



T023N04L = 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}	± 20	V	
Continuous Drain Current ¹	$T_C = 25^\circ\text{C}$	I_D	120	A
	$T_C = 100^\circ\text{C}$	I_D	84	A
Pulsed Drain Current ²	I_{DM}	480	A	
Single Pulsed Avalanche Current ³	I_{AS}	38	A	
Single Pulsed Avalanche Energy ³	E_{AS}	361	mJ	
Power Dissipation ⁵	$T_C = 25^\circ\text{C}$	P_D	132	W
Thermal Resistance from Junction to Ambient ⁶	$R_{\theta JA}$	50	$^\circ\text{C/W}$	
Thermal Resistance from Junction to Case	$R_{\theta JC}$	0.95	$^\circ\text{C/W}$	
Junction Temperature	T_J	150	$^\circ\text{C}$	
Storage Temperature	T_{STG}	-55~ +150	$^\circ\text{C}$	

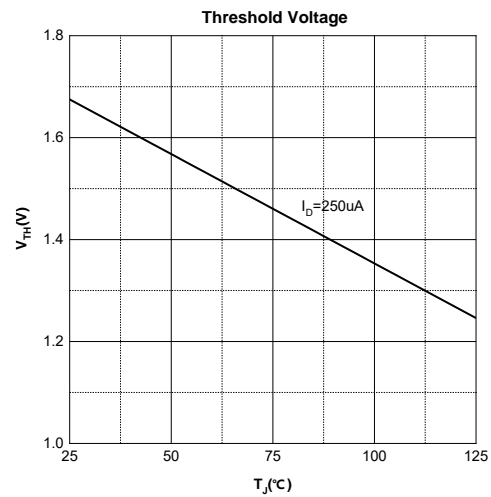
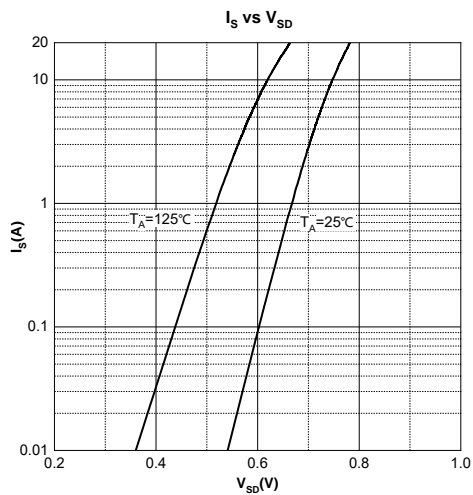
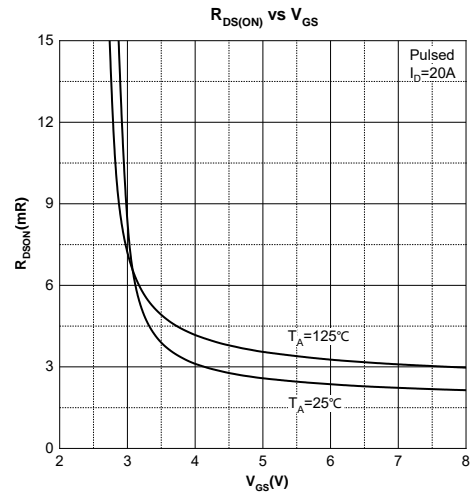
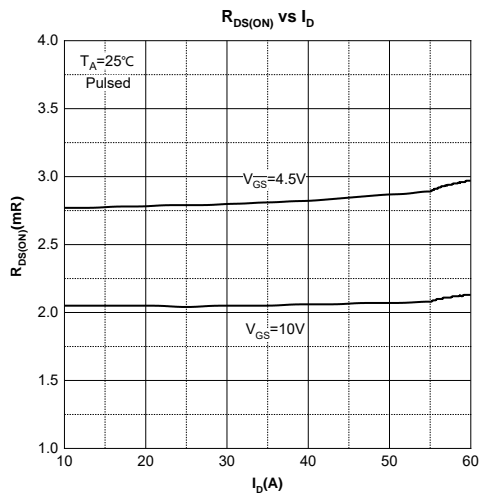
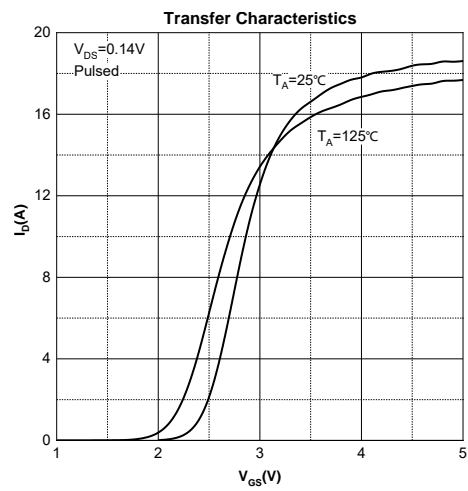
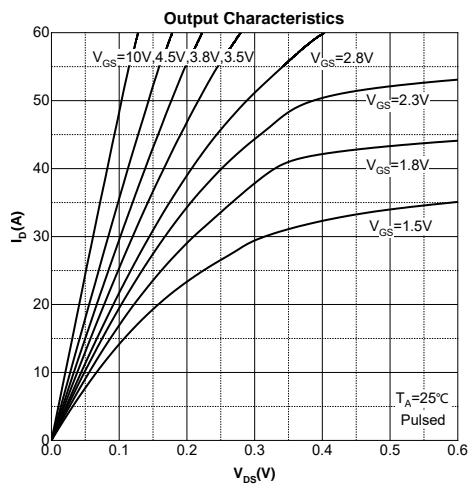
Electrical Characteristics ($T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Off Characteristics						
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	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$			± 100	nA
On Characteristics⁴						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.0	1.7	3.0	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 20A$		2.0	3.0	m Ω
		$V_{GS} = 4.5V, I_D = 10A$		2.7	3.7	
Forward Transconductance	g_{FS}	$V_{DS} = 5V, I_D = 20A$		77		S
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{DS} = 20V, V_{GS} = 0V, f = 1MHz$		3149		pF
Output Capacitance	C_{oss}			1115		
Reverse Transfer Capacitance	C_{rss}			75		
Gate Resistance	R_g	$V_{DS} = 0V, V_{GS} = 0V, f = 1MHz$		3.4		Ω
Switching Characteristics						
Total Gate Charge	Q_g	$V_{DS} = 20V, V_{GS} = 10V, I_D = 20A$		48.5		nC
Gate-Source Charge	Q_{gs}			8.3		
Gate-Drain Charge	Q_{gd}			7.4		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 20V, V_{GS} = 10V, R_L = 1\Omega,$ $R_G = 3\Omega$		12		ns
Turn-On Rise Time	t_r			3		
Turn-Off Delay Time	$t_{d(off)}$			30		
Turn-Off Fall Time	t_f			4		
Source-Drain Diode Characteristics						
Diode Forward Voltage ⁴	V_{SD}	$V_{GS} = 0V, I_S = 10A$			1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F = 20A, di/dt = 500A/\mu s$		18		ns
Body Diode Reverse Recovery Charge	Q_{rr}				57	

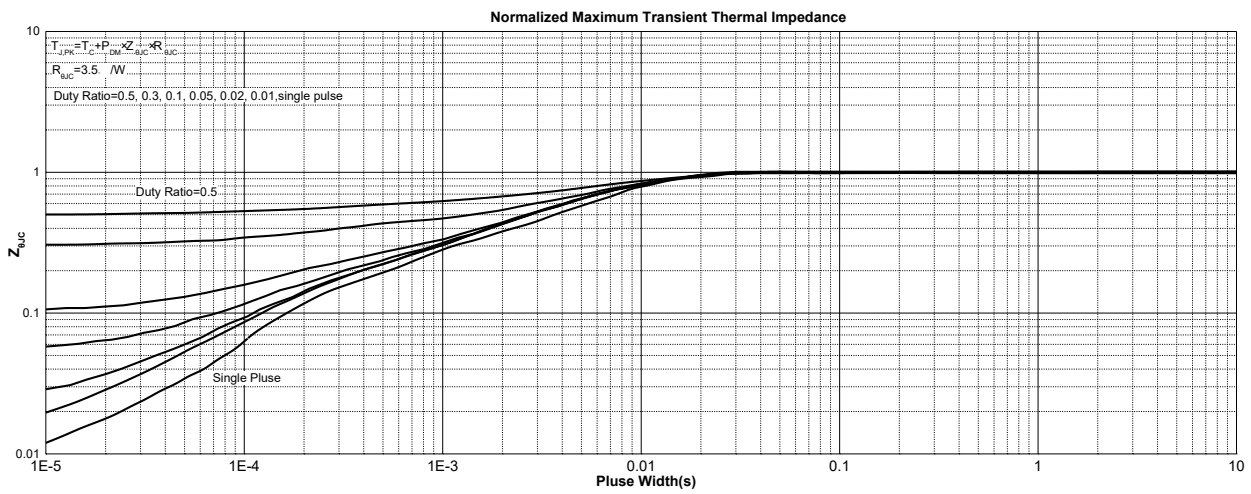
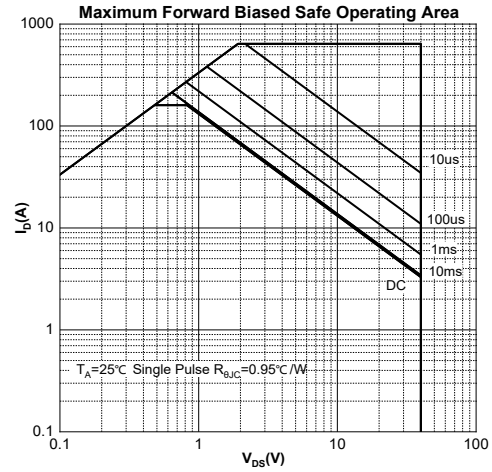
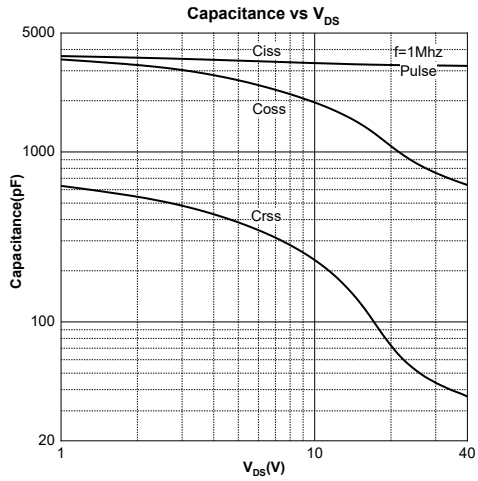
Notes :

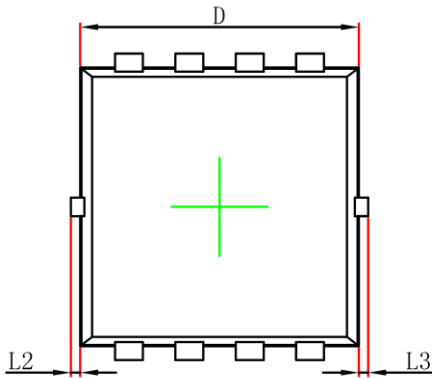
- 1.The maximum current rating is limited by package. And device mounted on a large heatsink.
- 2.Pulse Test: Pulse Width $\leq 10\mu s$, duty cycle $\leq 1\%$.
- 3.EAS condition: $V_{DD} = 25V, V_{GS} = 10V, L = 0.5mH, R_G = 25\Omega$ Starting $T_J = 25^\circ C$.
- 4.Pulse Test: Pulse Width $\leq 300\mu s$, duty cycle $\leq 2\%$.
- 5.The power dissipation P_D is limited by $T_{J(MAX)} = 150^\circ C$. 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 $T_A = 25^\circ C$.

Typical Characteristics

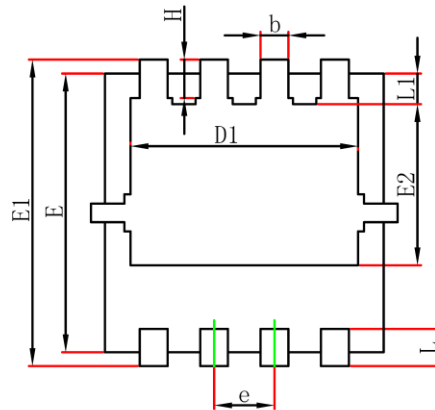


Typical Characteristics

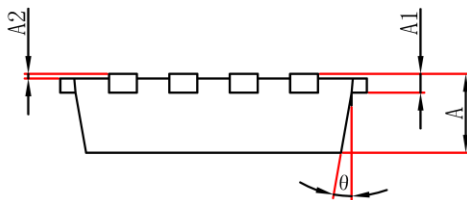




Top View
[顶视图]



Bottom View
[背视图]



Side View
[侧视图]

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.700	0.900	0.028	0.035
A1	0.152REF		0.006REF	
A2	0.000	0.050	0.000	0.002
D	2.900	3.200	0.114	0.126
D1	2.300	2.600	0.091	0.102
E	2.900	3.200	0.114	0.126
E1	3.150	3.450	0.124	0.136
E2	1.535	1.935	0.060	0.076
b	0.200	0.400	0.008	0.016
e	0.550	0.750	0.022	0.030
L	0.300	0.500	0.012	0.020
L1	0.180	0.480	0.007	0.019
L2	0.000	0.100	0.000	0.004
L3	0.000	0.100	0.000	0.004
H	0.315	0.515	0.012	0.020
θ	0°	12°	0°	12°