

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
40V	3.0m Ω @10V	120A
	4.0m Ω @4.5V	

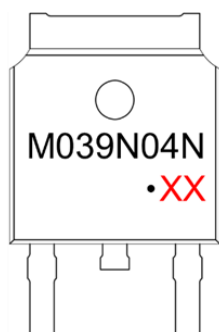
Feature

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

Application

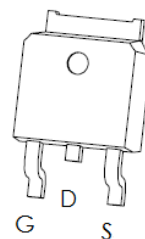
- Power Switching Application

MARKING:

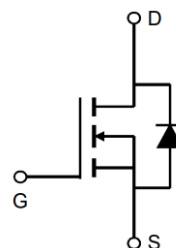


M039N04N = Device Code
 XX = Date Code
 Solid Dot = Green Indicator

TO-252-2L



Schematic diagram



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	I_D	120	A
Pulsed Drain Current ²	I_{DM}	340	A
Single Pulsed Avalanche Current ³	I_{AS}	43	A
Single Pulsed Avalanche Energy ³	E_{AS}	462	mJ
Power Dissipation ⁵	P_D	56	W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	2.2	$^\circ\text{C/W}$
Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55~ +150	$^\circ\text{C}$

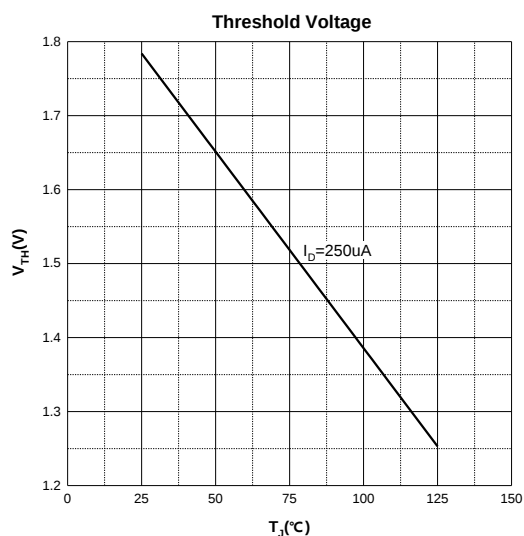
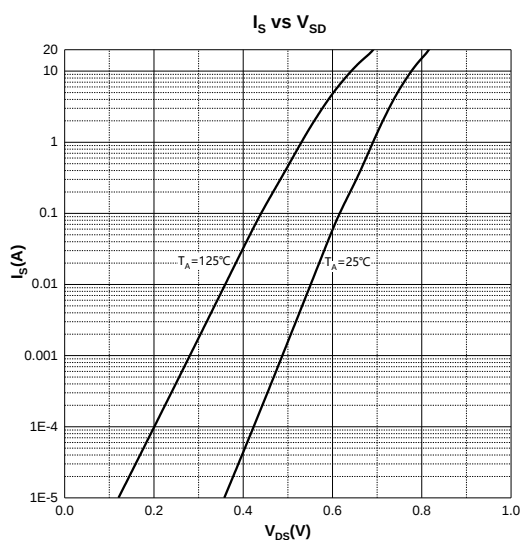
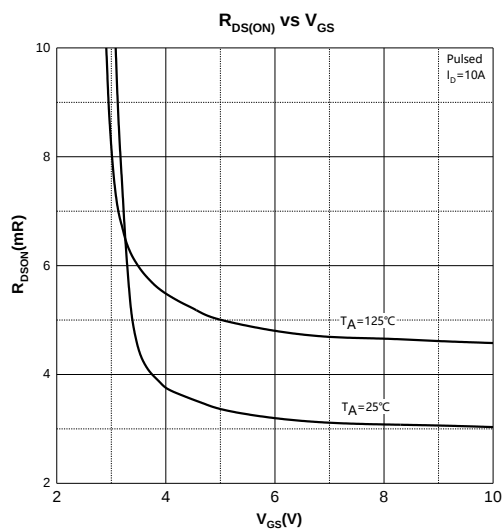
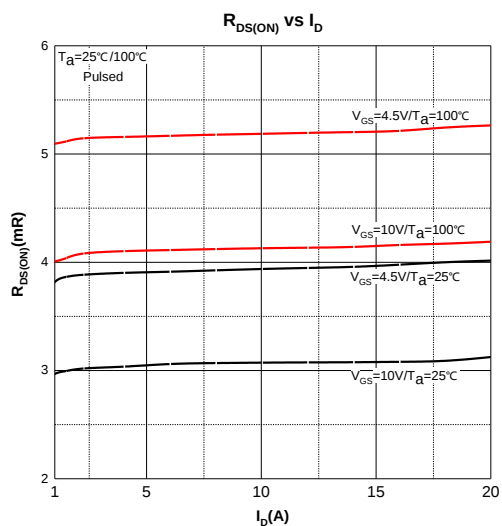
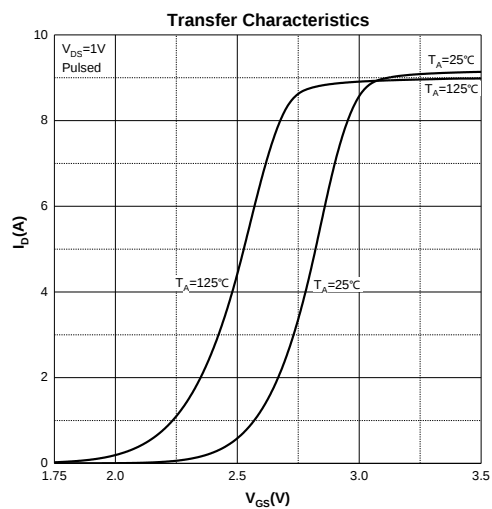
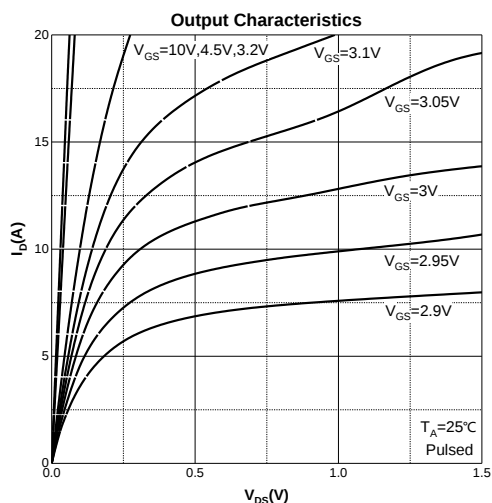
MOSFET ELECTRICAL CHARACTERISTICS ($T_J = 25^{\circ}\text{C}$ unless otherwise noted)

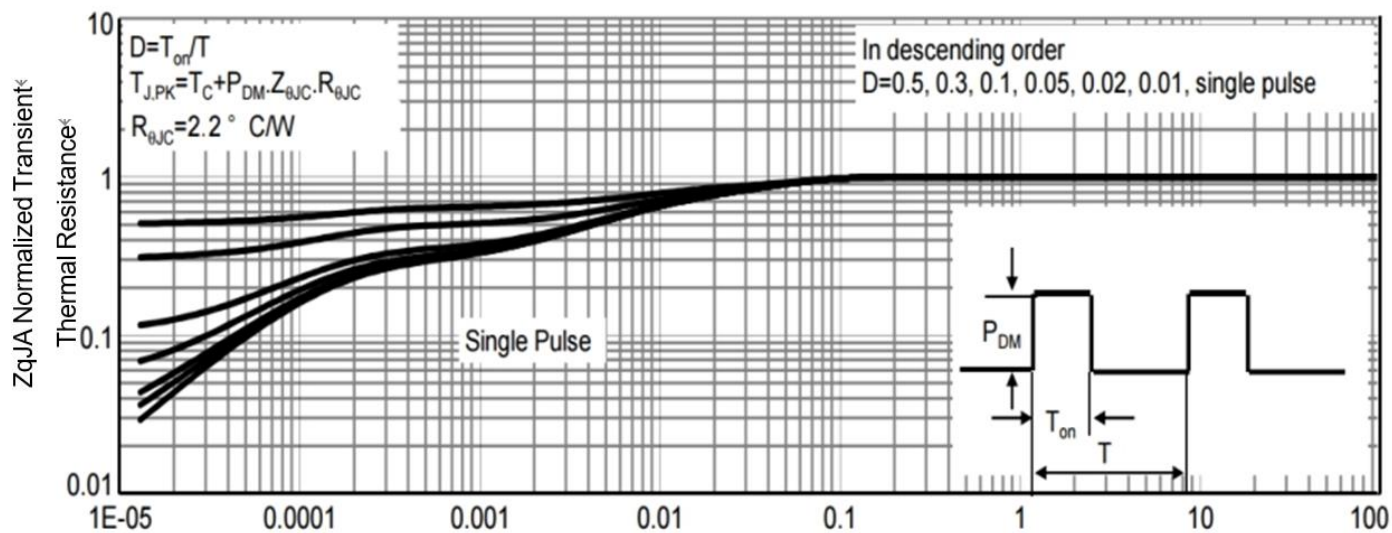
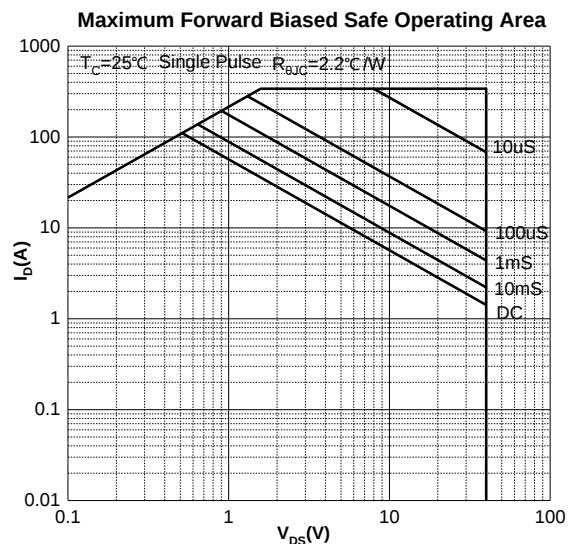
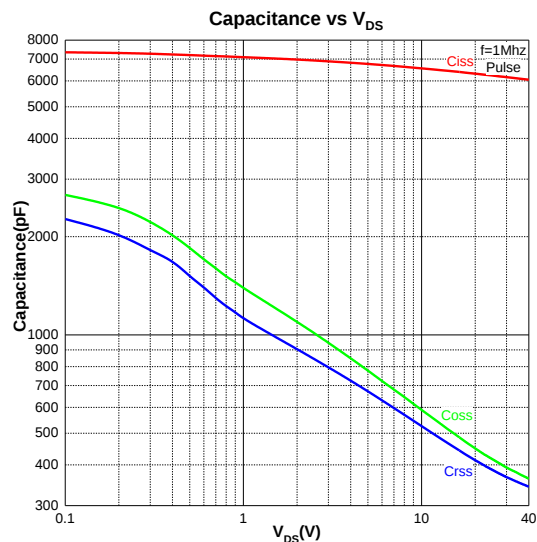
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Off Characteristics						
Drain - Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D = 250μA	40			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 32V, V _{GS} = 0V			1	μA
Gate - Body Leakage Current	I _{GSS}	V _{GS} = ±20V, V _{DS} = 0V			±100	nA
On Characteristics ⁴						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	1.0	1.7	3.0	V
Drain-source On-resistance	R _{DS(on)}	V _{GS} = 10V, I _D = 30A		3.0	3.9	mΩ
		V _{GS} = 4.5V, I _D = 10A		4.0	6.0	
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} = 20V, V _{GS} = 0V, f = 1MHz		6573		pF
Output Capacitance	C _{oss}			451		
Reverse Transfer Capacitance	C _{rss}			411		
Gate Resistance	R _g	V _{GS} = 0V, f = 1MHz		0.94		Ω
Switching Characteristics						
Total Gate Charge	Q _g	V _{DS} = 20V, V _{GS} = 10V, I _D = 30A		110		nC
Gate-source Charge	Q _{gs}			17		
Gate-drain Charge	Q _{gd}			21		
Turn-on Delay Time	t _{d(on)}	V _{DD} =15V, I _D =15A, R _G =3.3Ω, V _{GS} =10V		10.3		ns
Turn-on Rise Time	t _r			5.3		
Turn-off Delay Time	t _{d(off)}			44		
Turn-off Fall Time	t _f			9.2		
Source - Drain Diode Characteristics						
Diode Forward Voltage ⁴	V _{SD}	V _{GS} = 0V, I _S = 10A			1.2	V

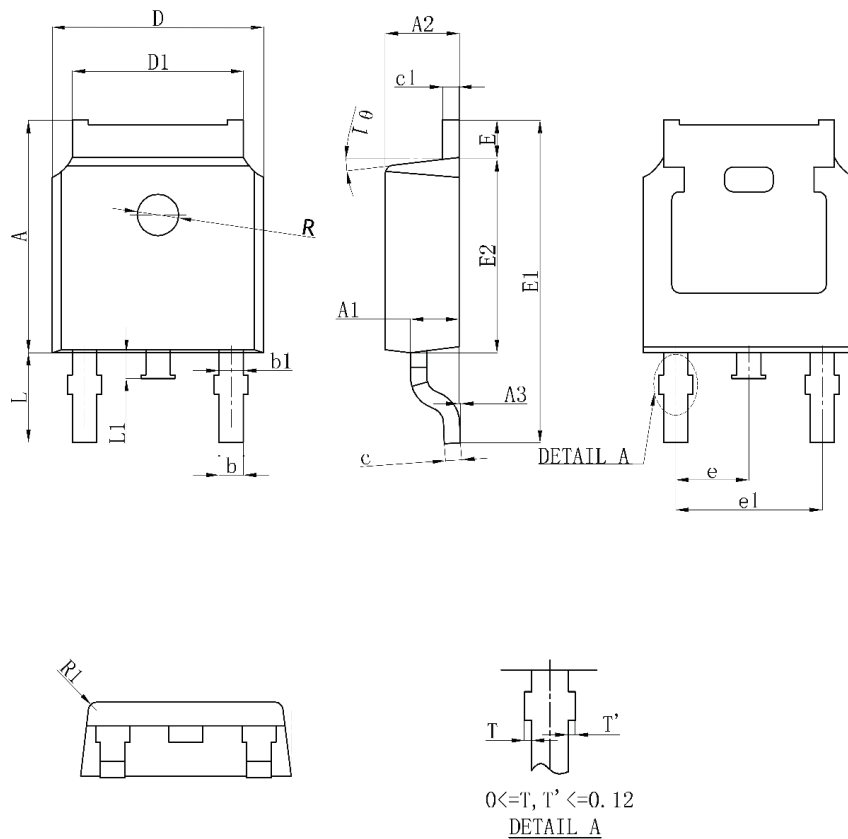
Notes :

- 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: $V_{DD} = 25V, V_{GS} = 10V, L = 0.5mH, R_G = 25\Omega$ 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

Typical Characteristics





TO-252-2L Package Information


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	7.050	7.150	0.278	0.281
A1	0.960	1.060	0.038	0.042
A2	2.200	2.400	0.087	0.094
A3	0.000	0.100	0.000	0.004
b	0.760REF		0.030REF	
b1	1.000REF		0.039REF	
c	0.508REF		0.020REF	
c1	0.508REF		0.020REF	
D	6.550	6.650	0.258	0.262
D1	5.100	5.460	0.201	0.215
E	0.950	1.050	0.037	0.041
E1	9.700	10.400	0.382	0.409
E2	6.000	6.200	0.236	0.244
e	2.286BSC		0.090BSC	
e1	4.572REF		0.180REF	
L	2.650	2.950	0.104	0.116
L1	0.700	0.900	0.028	0.035
θ	7°REF		7°REF	
R	1.300REF		0.051REF	
R1	0.250REF		0.010REF	