

TMN40100T

N-Channel Enhancement Mosfet

General Description

- Low $R_{DS(ON)}$
- RoHS and Halogen-Free Compliant

Applications

- Load switch
- PWM

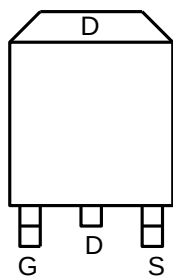
General Features

$V_{DS} = 40V$ $I_D = 100A$

$R_{DS(ON)} = 4.5 m\Omega (typ.) @ V_{GS} = 10V$

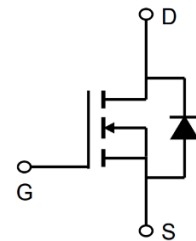
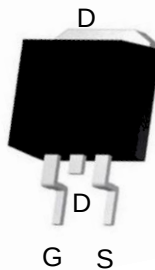
100% UIS Tested

100% R_g Tested



Marking: 100N04

T:TO-263-3L



Absolute Maximum Ratings ($T_C = 25^\circ C$ unless otherwise noted)

Symbol	Parameter		Rating	Unit
Common Ratings				
V _{DSS}	Drain-Source Voltage		40	V
V _{GSS}	Gate-Source Voltage		±20	
T _J	Maximum Junction Temperature		150	°C
T _{STG}	Storage Temperature Range		-55 to 150	
I _S	Diode Continuous Forward Current	T _C =25°C	100	A
I _D ^a	Continuous Drain Current	T _C =25°C	100	
		T _C =100°C	40	
I _{DM} ^b	Pulsed Drain Current	T _C =25°C	300	
P _D	Maximum Power Dissipation	T _C =25°C	54	W
		T _C =100°C	22	
R _{θJC}	Thermal Resistance-Junction to Case	Steady State	2.3	°C/W
R _{θJA} ^c	Thermal Resistance-Junction to Ambient	t ≤ 10s	17	°C/W
		Steady State	50	
I _{AS} ^d	Avalanche Current, Single pulse	L=0.1mH	40	A
E _{AS} ^d	Avalanche Energy, Single pulse	L=0.1mH	80	mJ

Note a : Max. continue current is limited by bonding wire.

Note b : Pulse width is limited by max. junction temperature.

Note c : Surface mounted on 1in2 pad area, steady state $t = 999s$.

Note d : UIS tested and pulse width limited by maximum junction temperature $150^\circ C$ (initial temperature $T_J = 25^\circ C$).

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA	40	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =32V, V _{GS} =0V T _J =85°C	-	-	1 30	μA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	1.0	1.5	2.2	V
I _{GSS}	Gate Leakage Current	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
R _{DS(ON)} ^e	Drain-Source On-state Resistance	V _{GS} =10V, I _{DS} =20A V _{GS} =4.5V, I _{DS} =15A	-	4.5 5.5	5.6 7.5	mΩ
Gfs	Forward Transconductance	V _{DS} =5V, I _{DS} =20A	-	31	-	S
Diode Characteristics						
V _{SD} ^e	Diode Forward Voltage	I _{SD} =20A, V _{GS} =0V	-	0.75	1.1	V
t _{rr}	Reverse Recovery Time	I _{SD} =20A, dI _{SD} /dt=100A/μs	-	28	-	ns
t _a	Charge Time		-	17	-	
t _b	Discharge Time		-	12	-	
Q _{rr}	Reverse Recovery Charge		-	20	-	nC
Dynamic Characteristics ^f						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz	-	1	2	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =20V, Frequency=1.0MHz	-	1645	2139	pF
C _{oss}	Output Capacitance		-	385	-	
C _{rss}	Reverse Transfer Capacitance		-	55	-	
t _{d(ON)}	Turn-on Delay Time	V _{DD} =20V, R _L =20Ω, I _{DS} =1A, V _{GEN} =10V, R _G =6Ω	-	14.3	26	ns
t _r	Turn-on Rise Time		-	7.7	14	
t _{d(OFF)}	Turn-off Delay Time		-	32.6	59	
t _f	Turn-off Fall Time		-	26.6	48	
Gate Charge Characteristics ^f						
Q _g	Total Gate Charge	V _{DS} =20V, V _{GS} =10V, I _{DS} =20A	-	24.8	34.7	nC
Q _g	Total Gate Charge	V _{DS} =20V, V _{GS} =4.5V, I _{DS} =20A	-	11.5	-	
Q _{gth}	Threshold Gate Charge		-	3	-	
Q _{gs}	Gate-Source Charge		-	5.2	-	
Q _{gd}	Gate-Drain Charge		-	2.6	-	

Note e : Pulse test ; pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

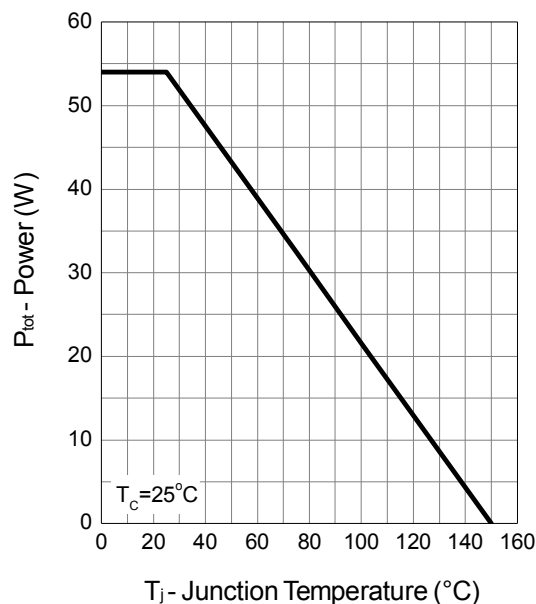
Note f : Guaranteed by design, not subject to production testing.

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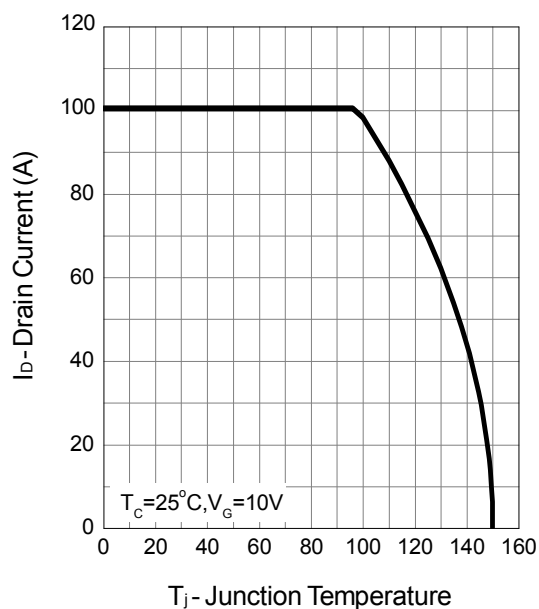
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Typical Characteristics

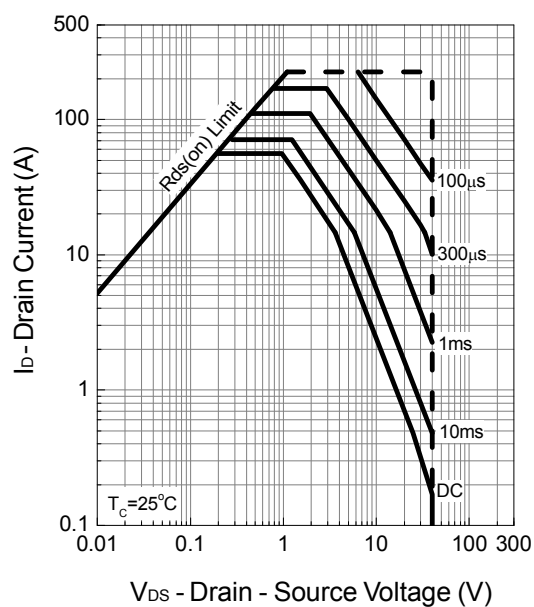
Power Dissipation



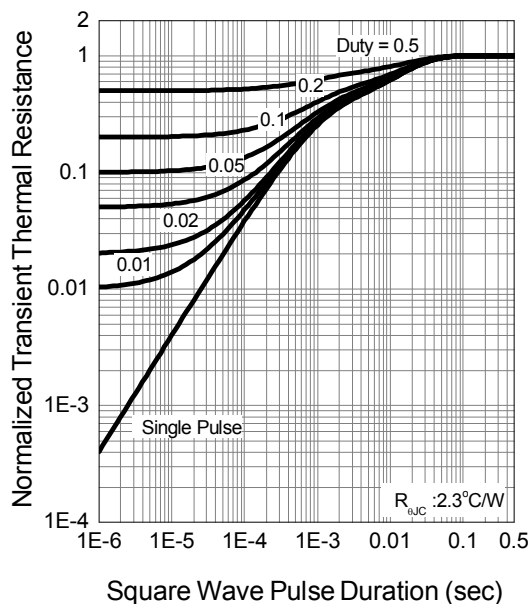
Drain Current



Safe Operation Area



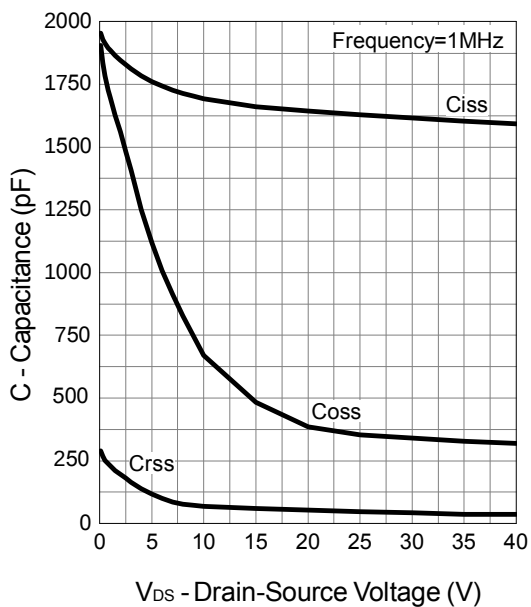
Thermal Transient Impedance



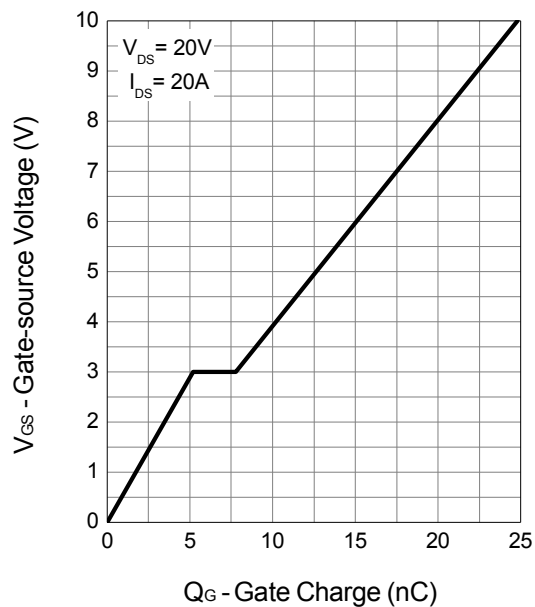
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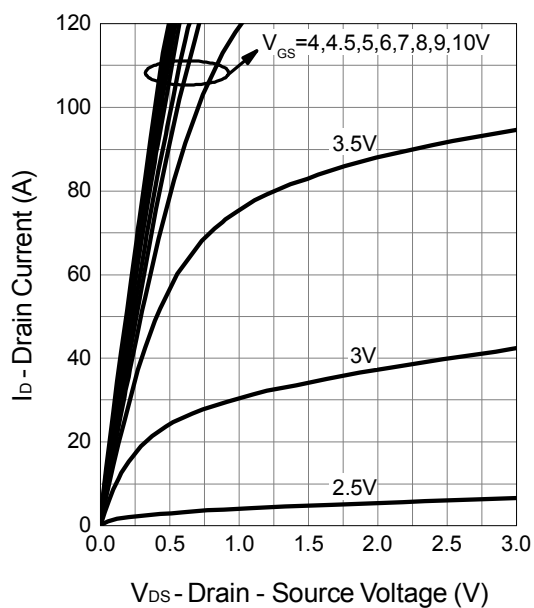
Capacitance



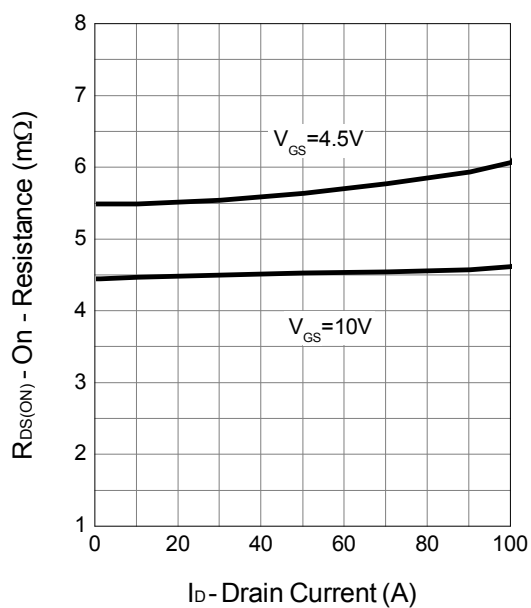
Gate Charge



Output Characteristics



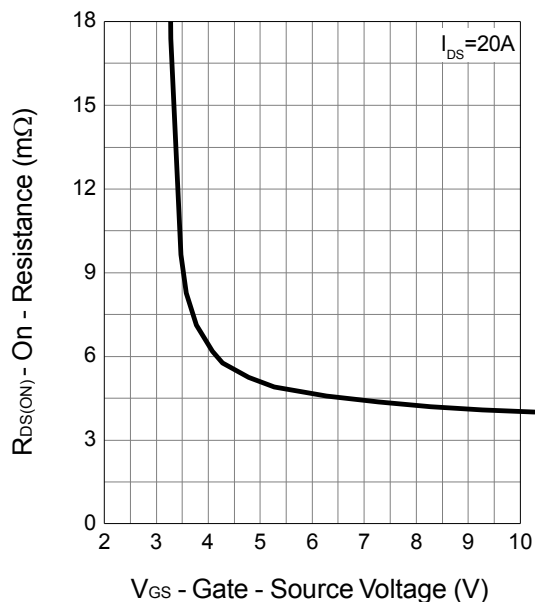
Drain-Source On Resistance



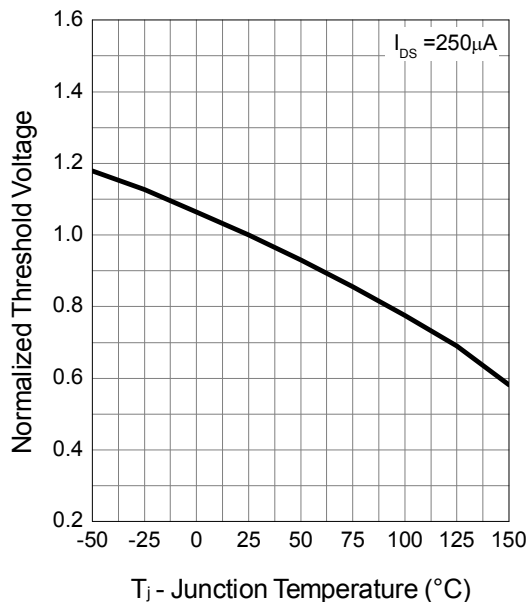
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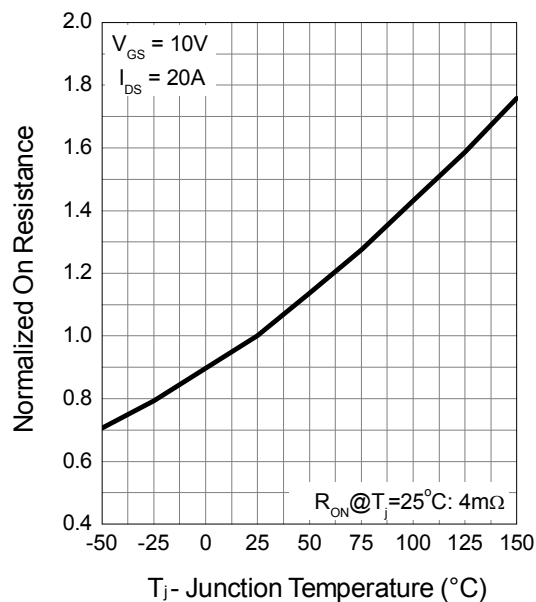
Gate-Source On Resistance



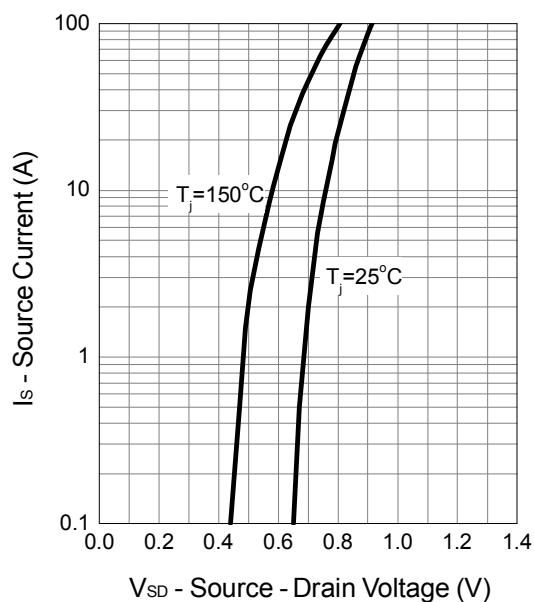
Gate Threshold Voltage



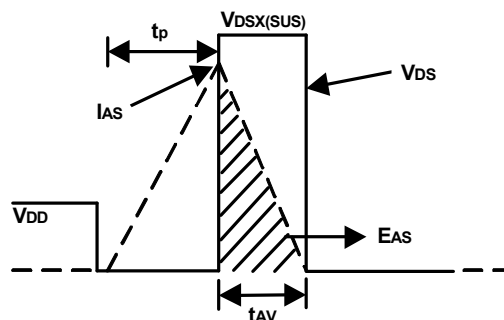
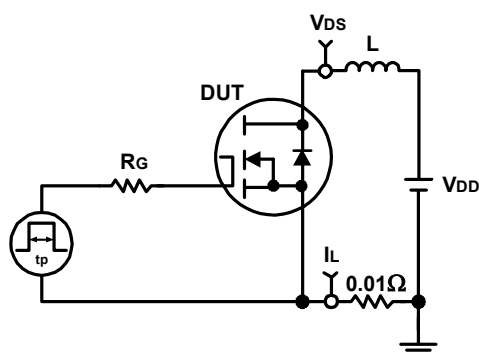
Drain-Source On Resistance



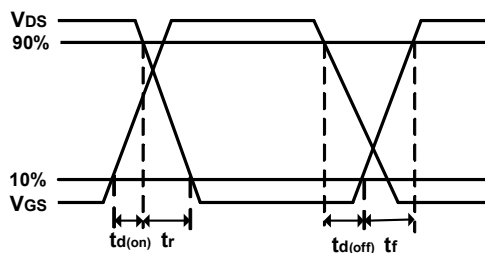
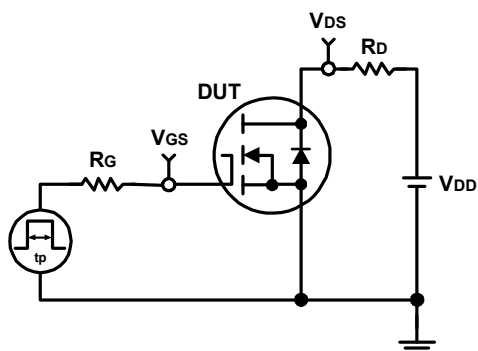
Source-Drain Diode Forward



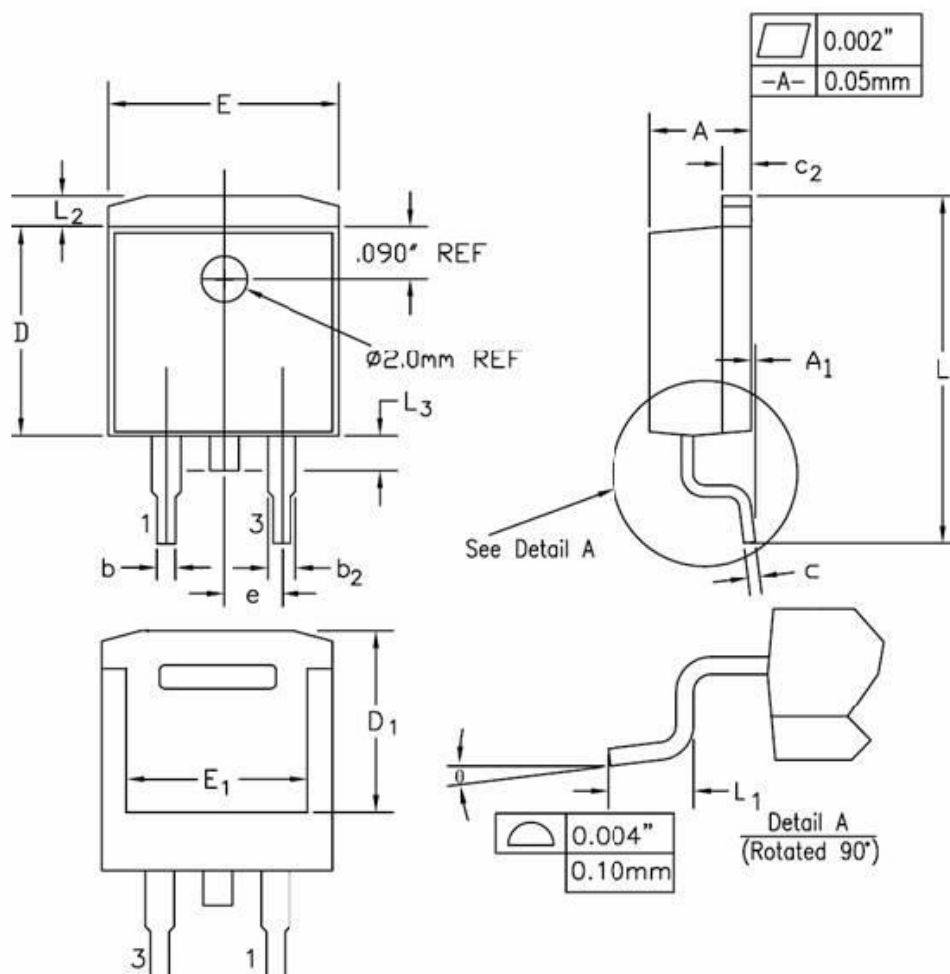
Avalanche Test Circuit and Waveforms



Switching Time Test Circuit and Waveforms



Package Information:TO-263-3L



SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN	MAX	MIN	MAX	
A	0.170	0.180	4.32	4.57	
A1	-	0.010	-	0.25	
b	0.028	0.037	0.71	0.94	
b2	0.045	0.055	1.15	1.40	
c	0.018	0.024	0.46	0.61	
c2	0.048	0.055	1.22	1.40	
D	0.350	0.370	8.89	9.40	
D1	0.315	0.324	8.01	8.23	
E	0.395	0.405	10.04	10.28	
E1	0.310	0.318	7.88	8.08	
e	0.100 BSC.		2.54 BSC.		
L	0.580	0.620	14.73	15.75	
L1	0.090	0.110	2.29	2.79	
L2	0.045	0.055	1.15	1.39	
L3	0.050	0.070	1.27	1.77	
θ	0°	8°	0°	8°	