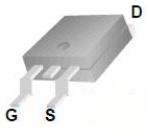
Features

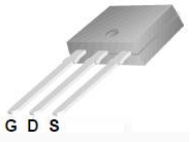
- Low gate charge
- 100% avalanche tested
- Improved dv/dt capability
- Halogen free package
- JEDEC Qualification
- Improved ESD performance

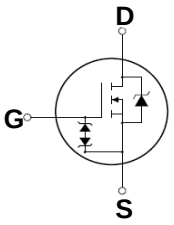
V_{DSS} = 440 V @T_{jmax}
I_D = 3.4A
$R_{DS(on)}$ = 1.6 Ω(max) @ V_{GS}= 10 V

D-PAK



I-PAK





Device	Package	Marking	Remark
TMD5N40ZG/TMU5N40ZG	D-PAK/I-PAK	TMD5N40ZG/TMU5N40ZG	Halogen Free

Absolute Maximum Ratings

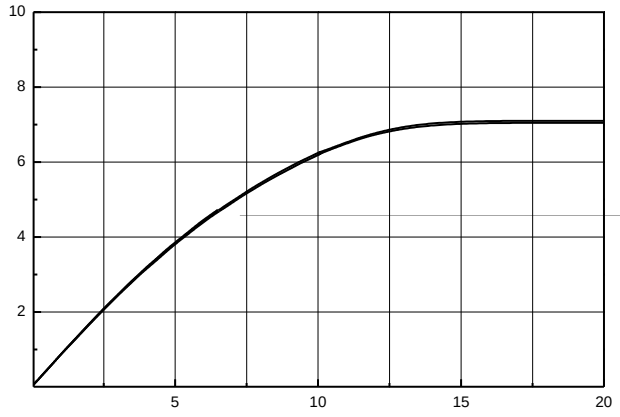
Parameter		Symbol	TMD5N40ZG/TMU5N40ZG	Unit
Drain-Source Voltage		V_{DS}	400	V
Gate-Source Voltage		V_{GS}	±30	V
Continuous Drain Current	T_C = 25 ℃	I_D	3.4*	A
	T_C = 100 ℃		2.15*	A
Pulsed Drain Current (Note 1)		I_{DM}	13.6*	A
Single Pulse Avalanche Energy (Note 2)		E_{AS}	165	mJ
Repetitive Avalanche Current (Note 1)		I_{AR}	3.4	A
Repetitive Avalanche Energy (Note 1)		E_{AR}	5.0	mJ
Power Dissipation	T_C = 25 ℃	P_D	50	W
	Derate above 25 ℃		0.4	W/℃
Peak Diode Recovery dv/dt (Note 3)		dv/dt	4.5	V/ns
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55~150	℃
Maximum lead temperature for soldering purposes,		T_L	300	℃

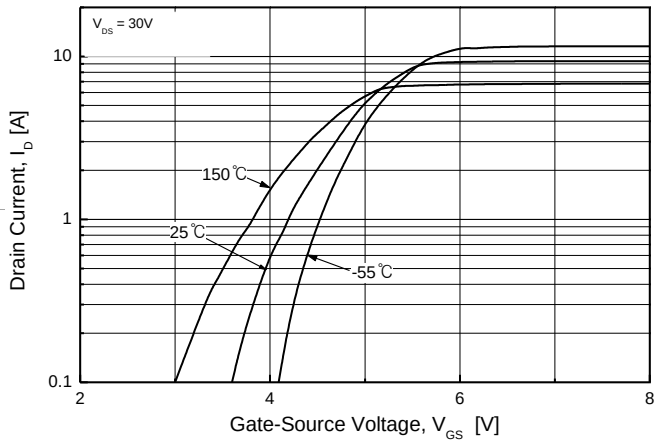
* Limited only by maximum junction temperature

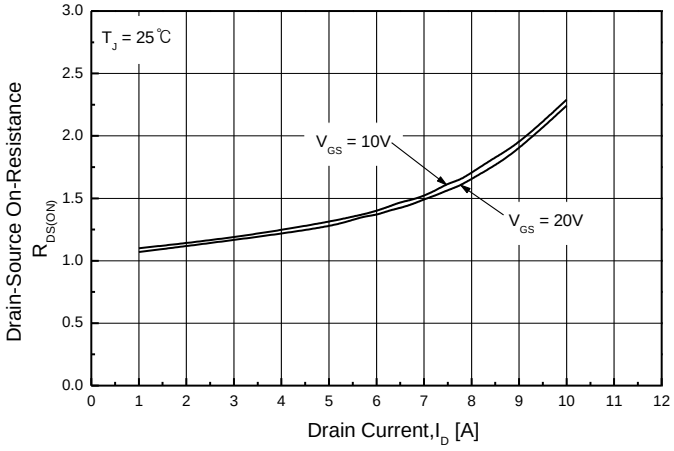
Thermal Characteristics

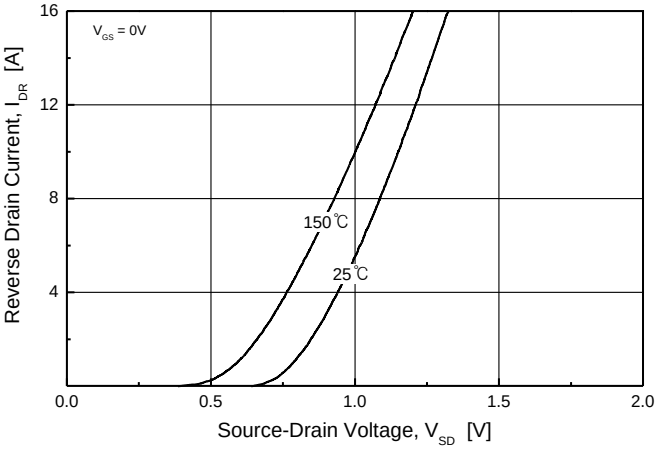
Parameter	Symbol	TMD5N40ZG/TMU5N40ZG	Unit
Maximum Thermal resistance, Junction-to-Case	$R_{\theta JC}$	2.5	℃/W
Maximum Thermal resistance, Junction-to-Ambient	$R_{\theta JA}$	110	℃/W

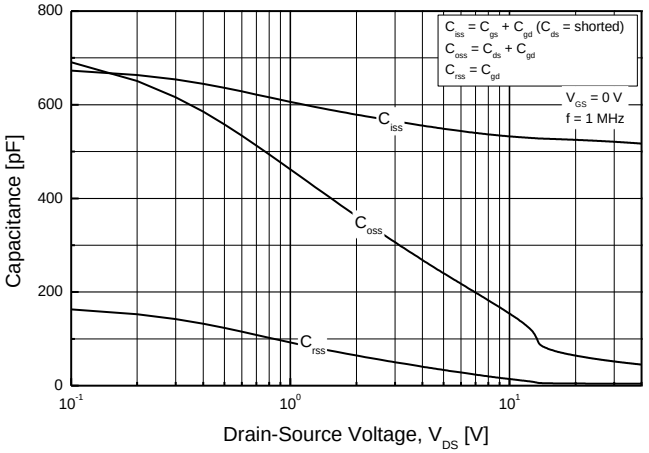
Parameter	Symbol	Test condition	Min	Typ	Max	Units
OFF						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0 V, I_D = 250 μA	400	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 400 V, V_{GS} = 0 V	--	--	1	μA
		V_{DS} = 320 V, T_C = 125°C	--	--	10	μA
Forward Gate-Source Leakage Current	I_{GSSF}	V_{GS} = 30 V, V_{DS} = 0 V	--	--	100	μA
Reverse Gate-Source Leakage Current	I_{GSSR}	V_{GS} = -30 V, V_{DS} = 0 V	--	--	-100	μA
ON						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 μA	2	--	4	V
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 1.7A	--	1.2	1.6	Ω
Forward Transconductance (Note 4)	g_{FS}	V_{DS} = 30 V, I_D = 1.7 A	--	7	--	S
DYNAMIC						
Input Capacitance	C_{iss}	V_{DS} = 25 V, V_{GS} = 0 V,	--	522	pF	pF
Output Capacitance						

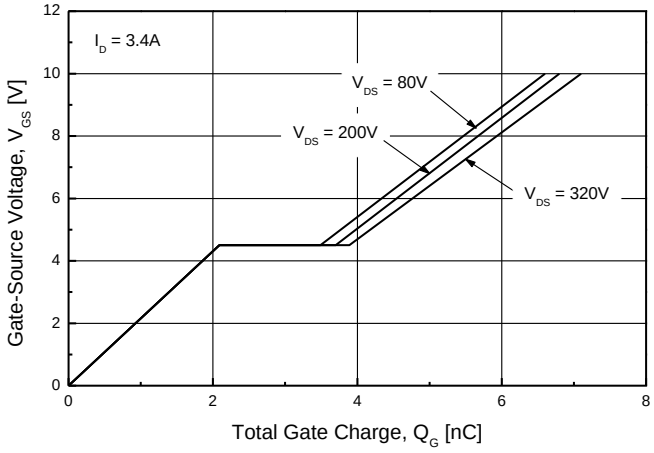

10
8
6
4
2
5
10
15
20

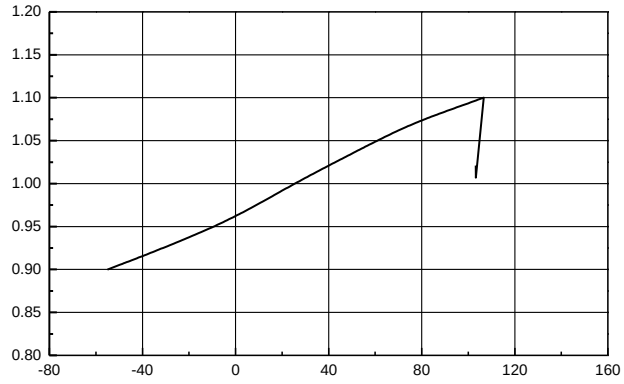

V_DS = 30V
10
1
0.1
150℃
25℃
-55℃
2
4
6
8
Drain Current, I_D [A]
Gate-Source Voltage, V_GS [V]

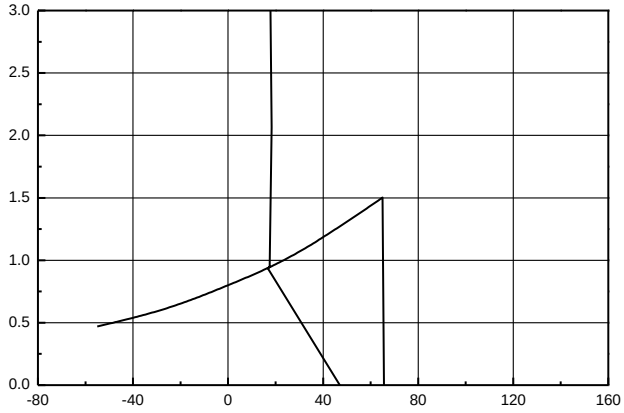

T_J = 25℃
V_GS = 10V
V_GS = 20V
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
1
2
3
4
5
6
7
8
9
10
11
12
Drain-Source On-Resistance
R_DS(ON)
Drain Current,I_D [A]

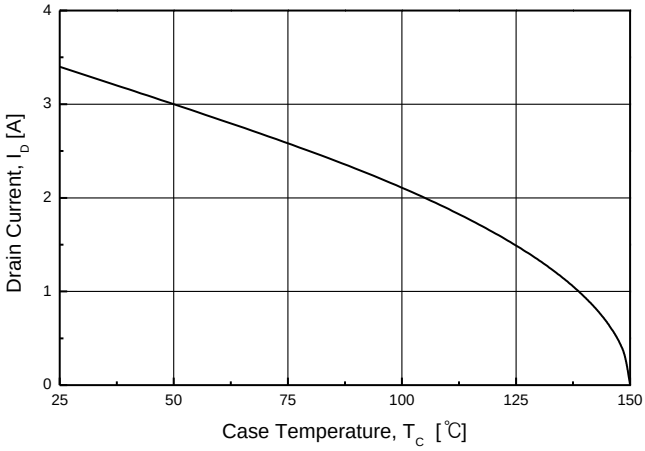

V_GS = 0V
16
12
8
4
150℃
25℃
0.0
0.5
1.0
1.5
2.0
Reverse Drain Current, I_DR [A]
Source-Drain Voltage, V_SD [V]

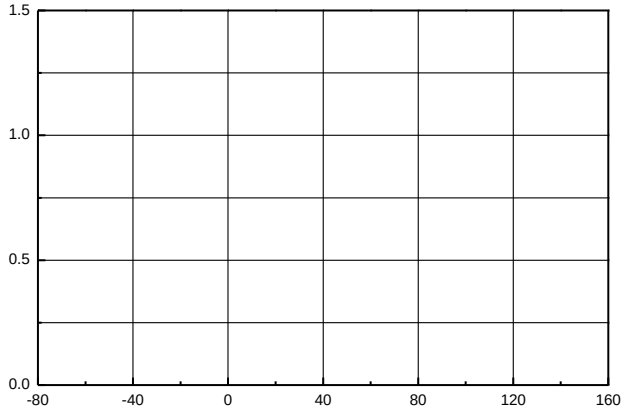

C_iss = C_gs + C_gd (C_ds = shorted)
C_oss = C_ds + C_gd
C_rss = C_gd
V_GS = 0 V
f = 1 MHz
C_iss
C_oss
C_rss
800
600
400
200
0
10^-1
10^0
10^1
Capacitance [pF]
Drain-Source Voltage, V_DS [V]

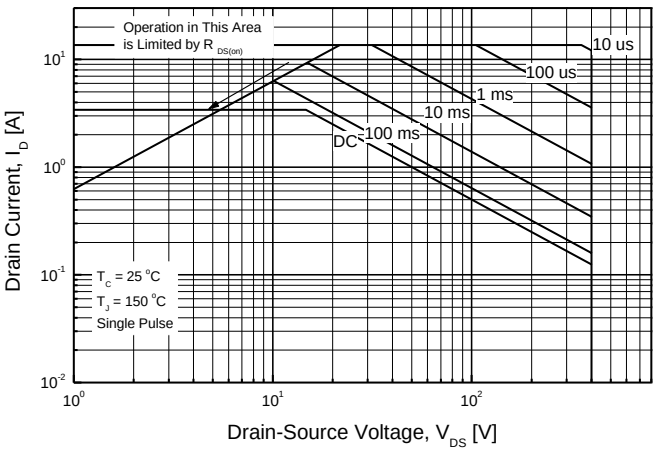

I_D = 3.4A
V_DS = 80V
V_DS = 200V
V_DS = 320V
12
10
8
6
4
2
0
0
2
4
6
8
Gate-Source Voltage, V_GS [V]
Total Gate Charge, Q_G [nC]

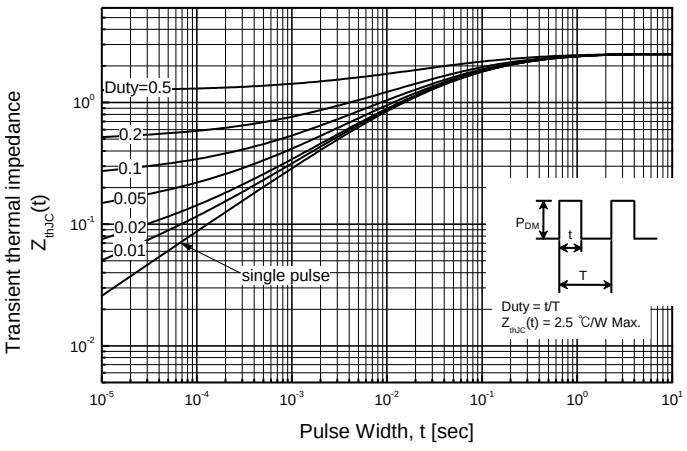

1.20
1.15
1.10
1.05
1.00
0.95
0.90
0.85
0.80
-80
-40
0
40
80
120
160


3.0
2.5
2.0
1.5
1.0
0.5
0.0
-80
-40
0
40
80
120
160

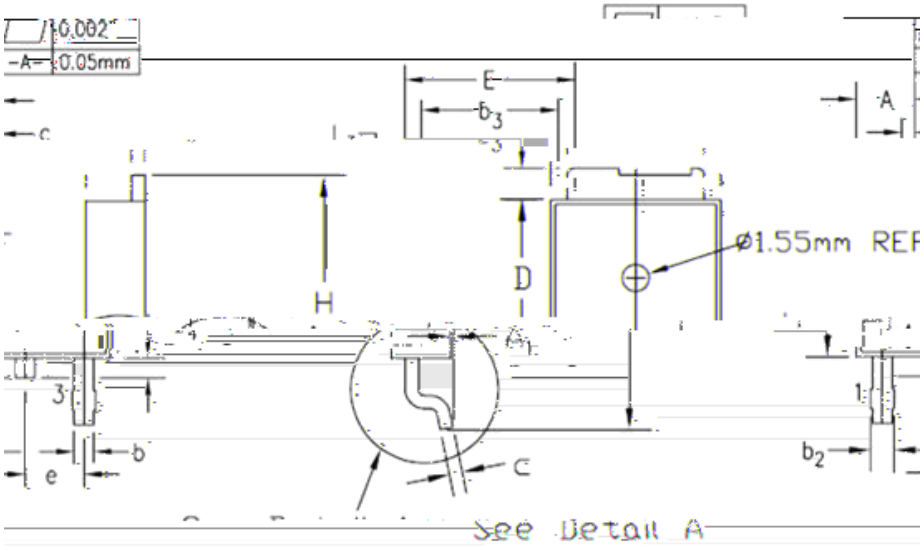

Drain Current, I_D [A]
4
3
2
1
0
25
50
75
100
125
150
Case Temperature, T_C [℃]

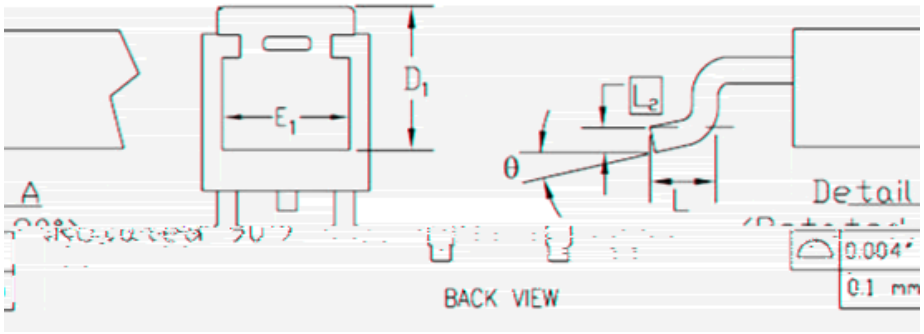

1.5
1.0
0.5
0.0
-80
-40
0
40
80
120
160


Operation in This Area
is Limited by $R_{DS(on)}$
10 us
100 us
1 ms
10 ms
DC
100 ms
T_C = 25 °C
T_J = 150 °C
Single Pulse
Drain Current, I_D [A]
10^1
10^0
10^{-1}
10^{-2}
10^0
10^1
10^2
Drain-Source Voltage, V_{DS} [V]


Transient thermal impedance
$Z_{thJC}(t)$
Duty=0.5
0.2
0.1
0.05
0.02
0.01
single pulse
P_{DM}
t
T
Duty = t/T
$Z_{thJC}(t)$ = 2.5 ℃/W Max.
10^0
10^{-1}
10^{-2}
10^{-5}
10^{-4}
10^{-3}
10^{-2}
10^{-1}
10^0
10^1
Pulse Width, t [sec]

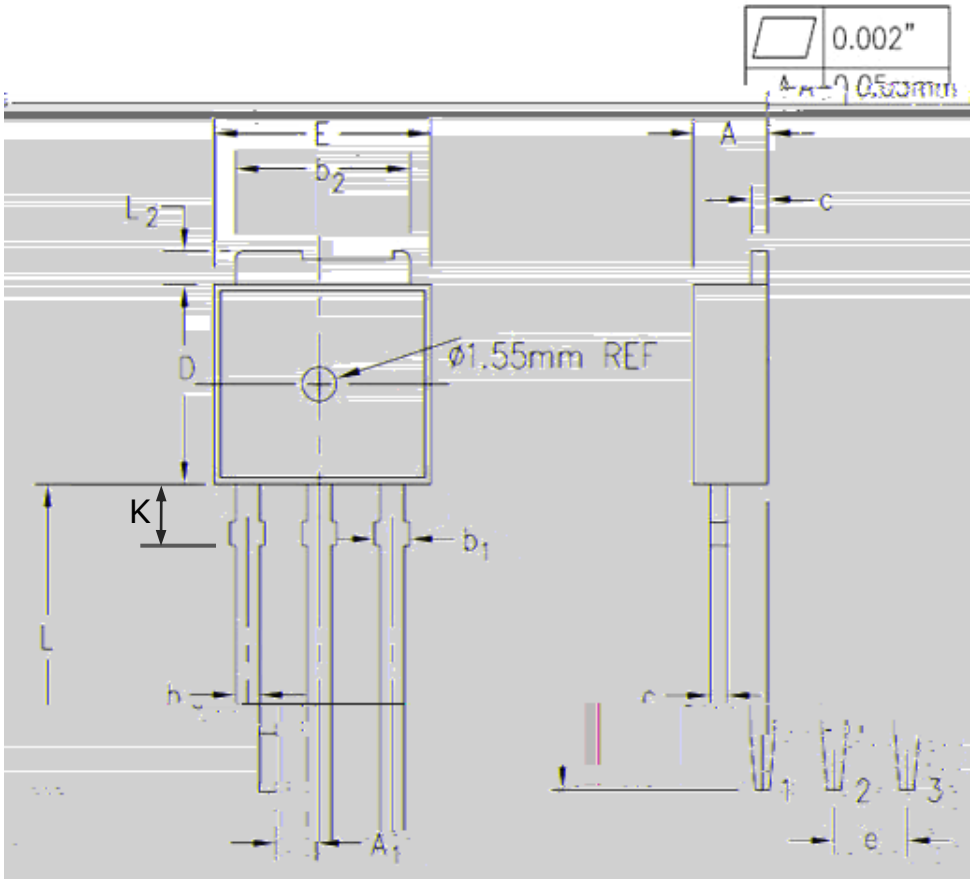
TO-252 (D-PAK) MECHANICAL DATA





SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	0.086	0.094	2.19	2.38	
A_1	–	0.005	–	0.13	
b	0.025	0.035	0.64	0.89	
b_2	0.033	0.045	0.84	1.14	
b_3	0.205	0.215	5.21	5.46	
c	0.018	0.024	0.46	0.61	
D	0.235	0.245	5.97	6.22	
D_1	0.205	–	5.21	–	2
E	0.250	0.265	6.35	6.73	
E_1	0.190	–	4.83	–	2
e	0.090 BSC		2.29 BSC		
H	0.380	0.410	9.65	10.41	
L	0.055	0.070	1.40	1.78	4
L_2	0.020 BSC		0.51 BSC		
L_3	0.035	0.050	0.89	1.27	
L_4	0.025	0.040	0.64	1.01	3
θ	0°	8°	0°	8°	

TO-251 (I-PAK) MECHANICAL DATA



	INCHES		MILIMETERS		NOTES
SYMBOL	MIN.	MAX.	MIN.	MAX.	
A	0.086	0.094	2.19	2.39	
A1	0.040	0.045	1.02	1.14	
b	0.025	0.035	0.64	0.89	
b1	0.037	0.045	0.95	1.14	
b2	0.205	0.215	5.21	5.46	
c	0.018	0.023	0.46	0.58	
D	0.235	0.245	5.97	6.22	
E	0.250	0.265	6.35	6.73	
e	0.090 TYP.		2.28 TYP.		
L	0.350	0.380	8.89	9.65	
L2	0.035	0.050	0.89	1.27	
K	0.079	0.096	2.00	2.44	