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TPM10040NK3

N-Channel Enhancement Mode MOSFET

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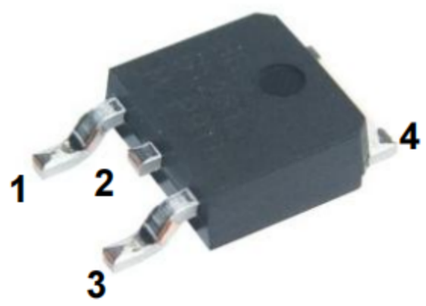
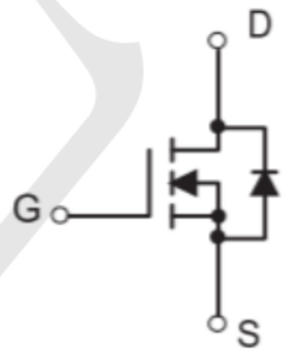
Product Summary

V_{DS}	100V
I_D (at V_{GS}=10V)	31A
$R_{DS(ON)}$ (at V_{GS}=10V)	< 24mΩ
$R_{DS(ON)}$ (at V_{GS}=4.5V)	< 33mΩ

TO-252



Circuit Diagram



N-MOS

Marking::40N10

Absolute Maximum Ratings (Tamb=25°C unless otherwise specified)

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_C=25°C	I_D	31	A
	T_C=100°C		21.5	
Pulsed Drain Current [C]		I_{DM}	80	
Continuous Drain Current	T_A=25°C	I_{DSM}	6.5	A
	T_A=70°C		5	
Avalanche Current [C]		I_{AS}	15	A
Avalanche energy L=0.1mH [C]		E_{AS}	11	mJ
Power Dissipation [B]	T_C=25°C	P_D	53.5	W
	T_C=100°C		26.5	
Power Dissipation [A]	T_A=25°C	P_{DSM}	2.5	W
	T_A=70°C		1.6	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 175	°C

Thermal Characteristics

Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient [A]	t ≤ 10s	$R_{\theta JA}$	16	20	°C/W
Maximum Junction-to-Ambient [A D]	Steady-State		41	50	°C/W
Maximum Junction-to-Case	Steady-State	$R_{\theta JC}$	2.2	2.8	°C/W

Electrical Characteristics (TA=25°C unless otherwise specified)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	I_D=250μA, V_{GS}=0V	100			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=100V, V_{GS}=0V			1	μA
		T_J=55°C			5	
I_{GSS}	Gate-Body leakage current	V_{DS}=0V, V_{GS}=±20V			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250μA	1.6	2.15	2.7	V
$I_{D(ON)}$	On state drain current	V_{GS}=10V, V_{DS}=5V	80			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=20A		18.5	24	mΩ
		T_J=125°C		33	42	
		V_{GS}=4.5V, I_D=18A		24.5	33	mΩ
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=20A		40		S
V_{SD}	Diode Forward Voltage	I_S=1A,V_{GS}=0V		0.72	1	V
I_S	Maximum Body-Diode Continuous Current				31	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=50V, f=1MHz		1190		pF
C_{oss}	Output Capacitance			95		pF
C_{rss}	Reverse Transfer Capacitance			7		pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz	0.5	1.1	1.7	Ω
SWITCHING PARAMETERS						
Q_g(10V)	Total Gate Charge	V_{GS}=10V, V_{DS}=50V, I_D=20A		16.5	25	nC
Q_g(4.5V)	Total Gate Charge			7	12	nC
Q_{gs}	Gate Source Charge			4.5		nC
Q_{gd}	Gate Drain Charge			2.5		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=10V, V_{DS}=50V, R_L=2.5Ω, R_{GEN}=3Ω		7		ns
t_r	Turn-On Rise Time			8		ns
$t_{D(off)}$	Turn-Off DelayTime			20		ns
t_f	Turn-Off Fall Time			3		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=20A, dI/dt=500A/μs		30		ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=20A, dI/dt=500A/μs		145		nC

Typical Performance Characteristics (T_A=25°C unless otherwise Specified)

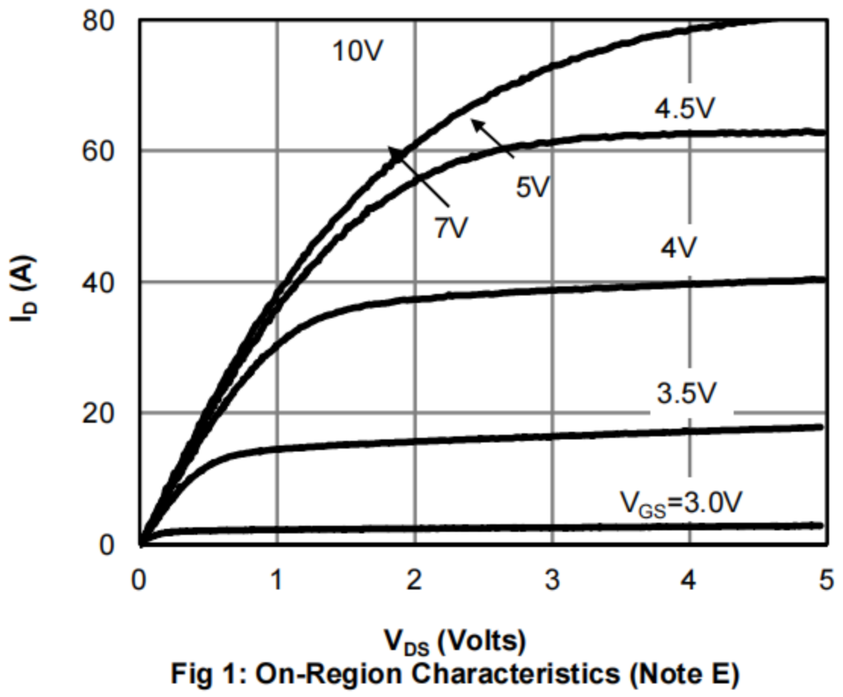


Fig 1: On-Region Characteristics (Note E)

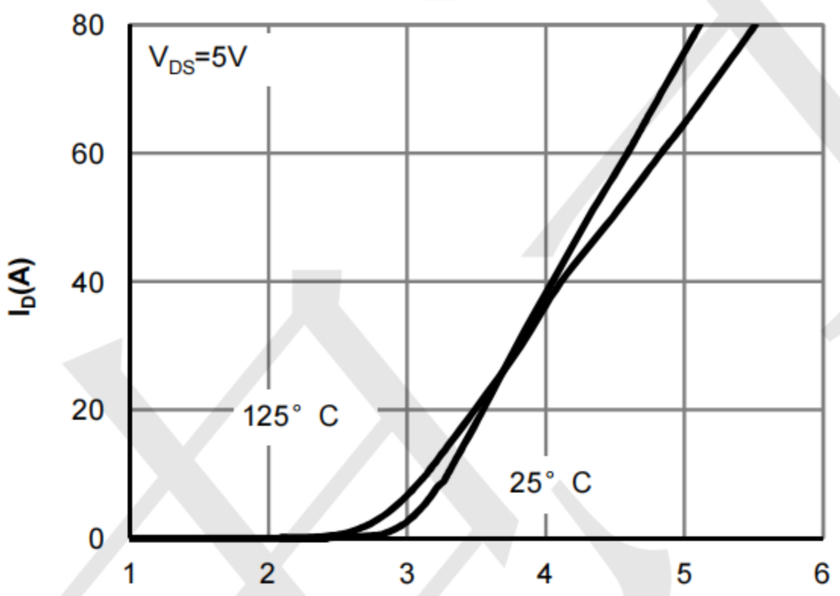


Figure 2: Transfer Characteristics (Note E)

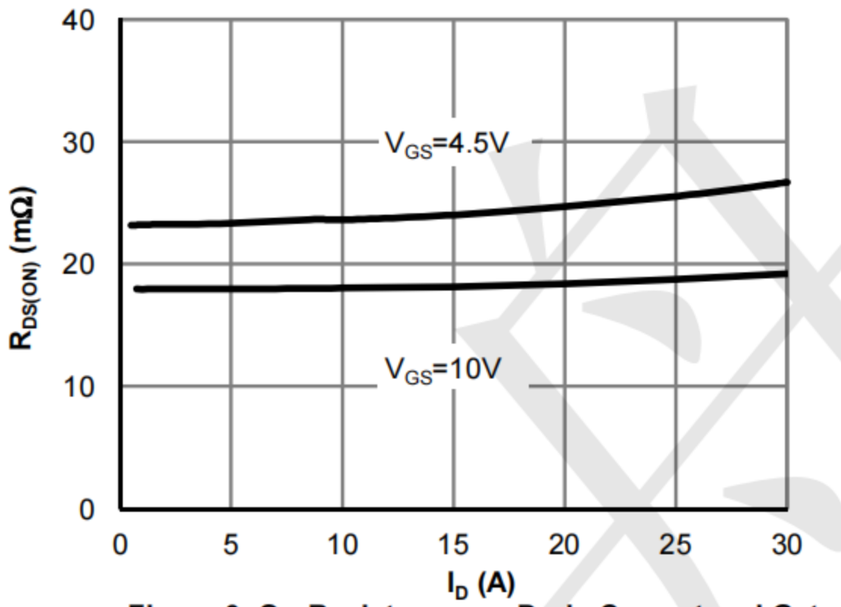


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

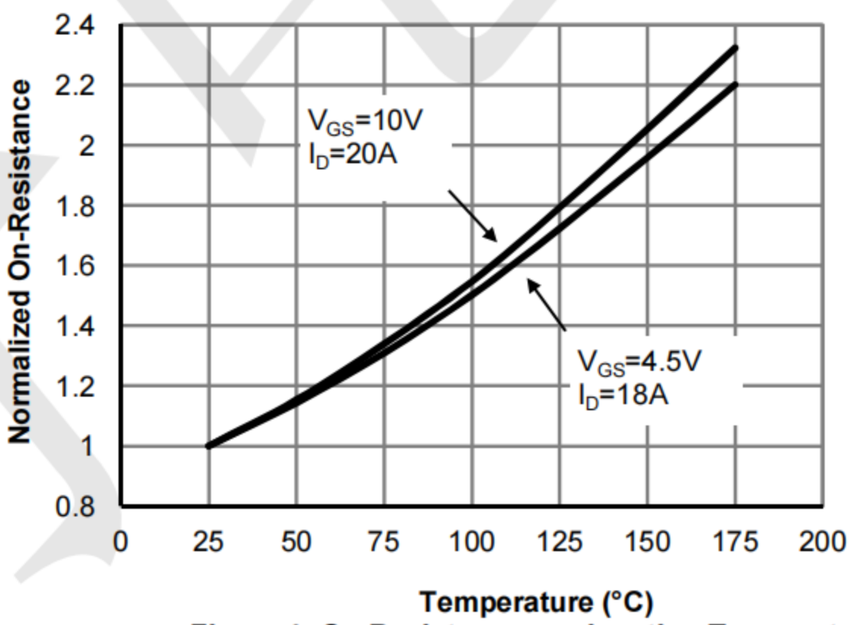


Figure 4: On-Resistance vs. Junction Temperature (Note E)

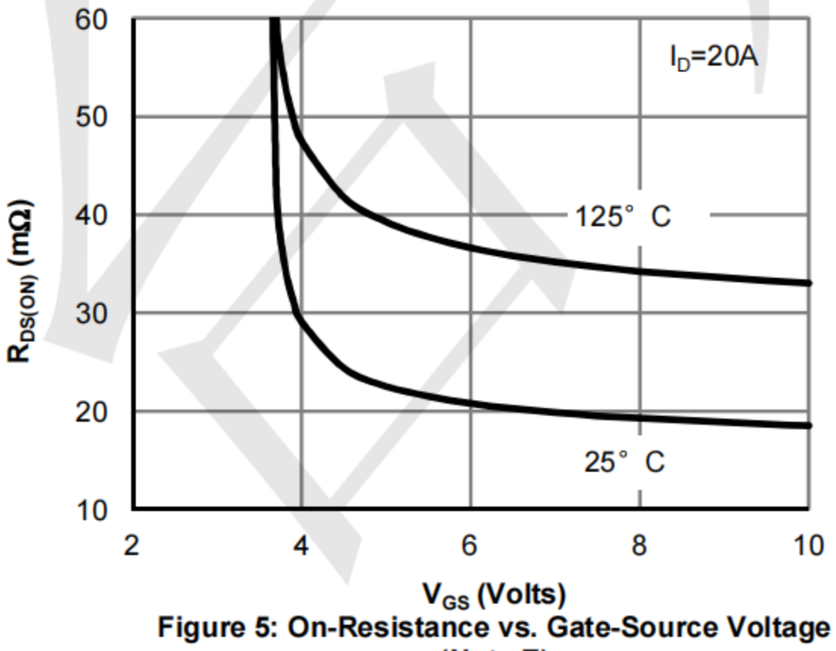


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

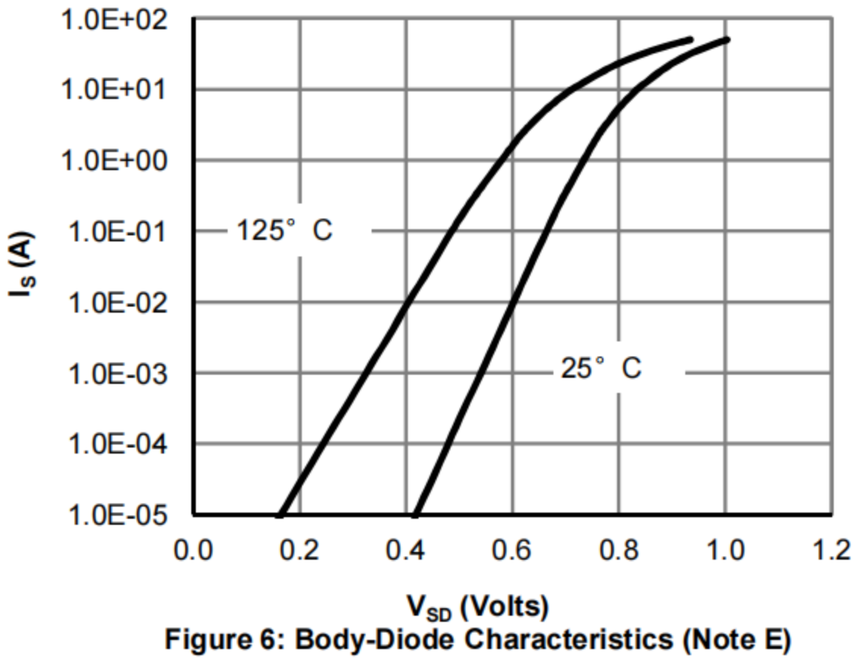


Figure 6: Body-Diode Characteristics (Note E)

Typical Performance Characteristics (T_A=25°C unless otherwise Specified)

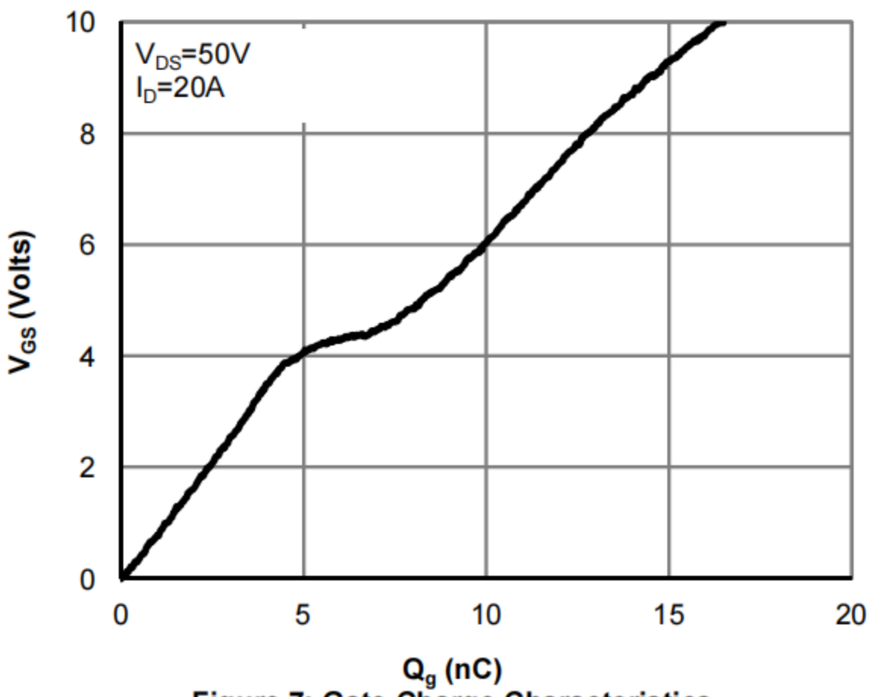


Figure 7: Gate-Charge Characteristics

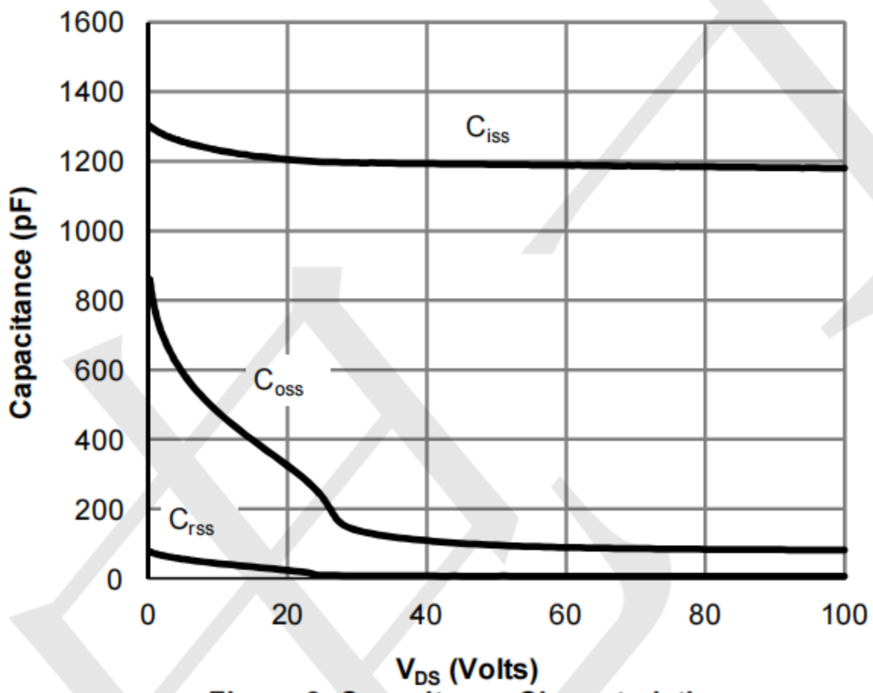


Figure 8: Capacitance Characteristics

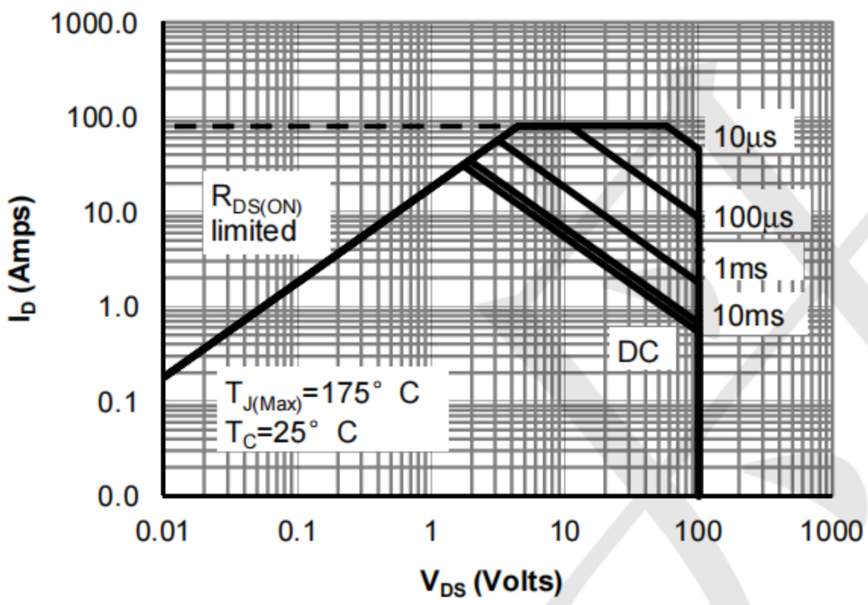


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

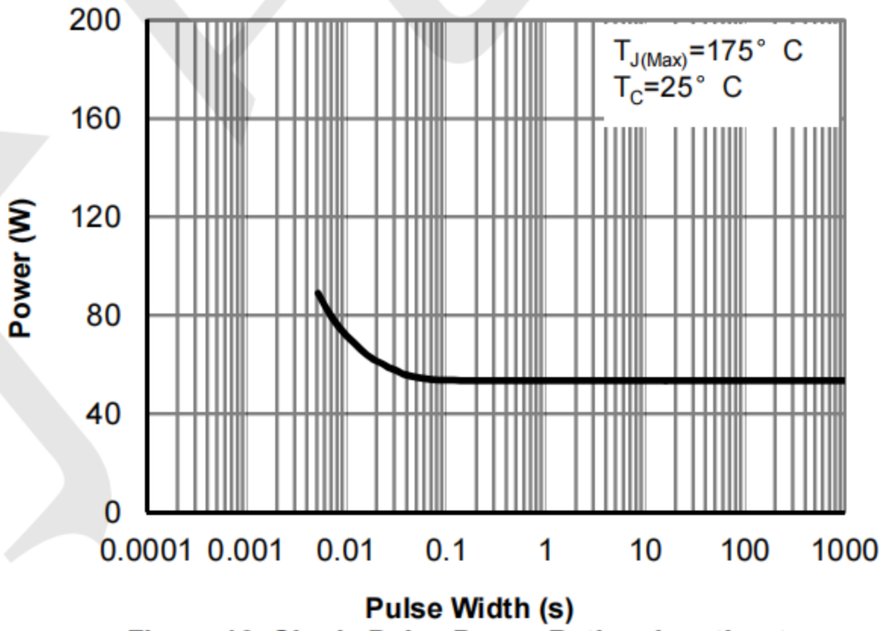


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

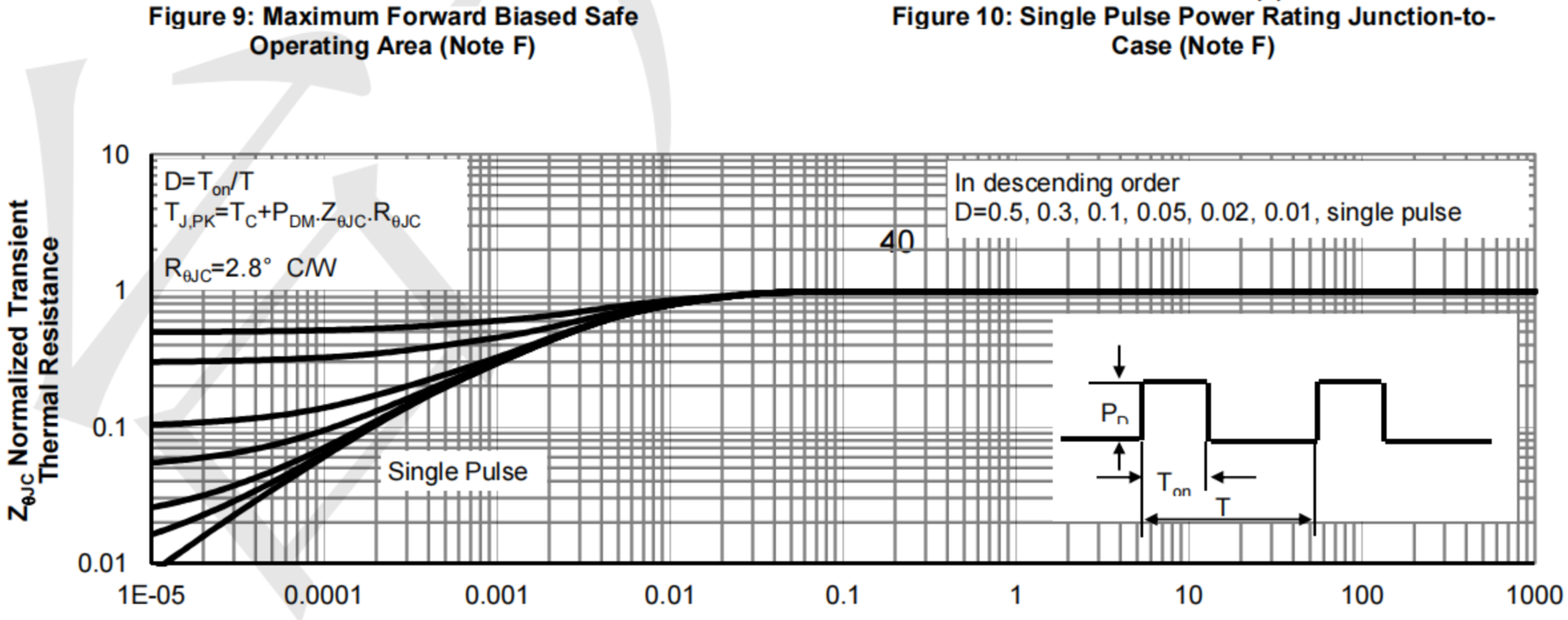


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

Typical Performance Characteristics (T_A=25°C unless otherwise Specified)

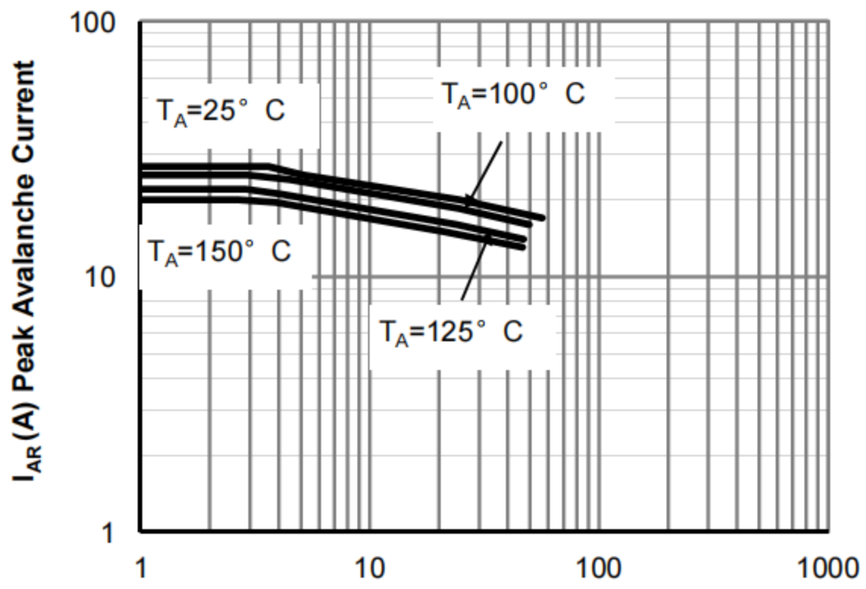


Figure 12: Single Pulse Avalanche capability (Note C)

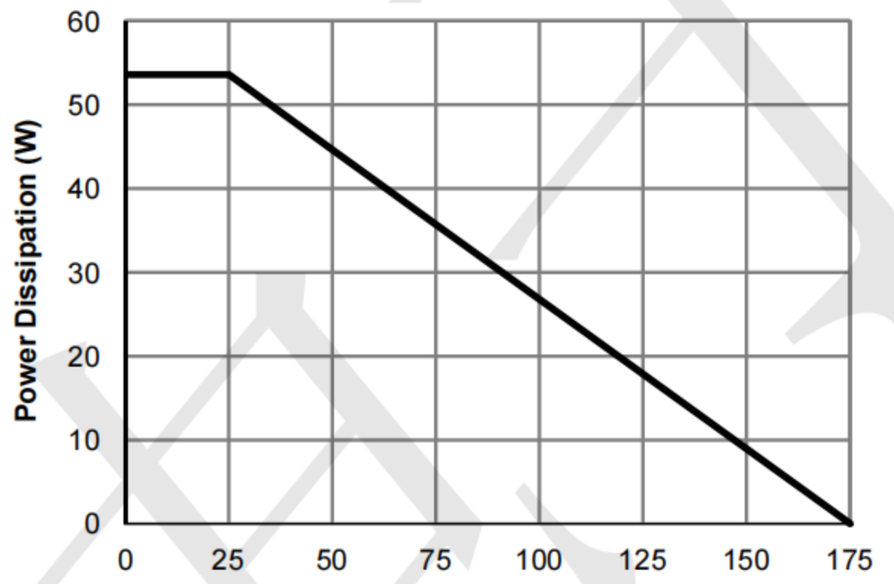


Figure 13: Power De-rating (Note F)

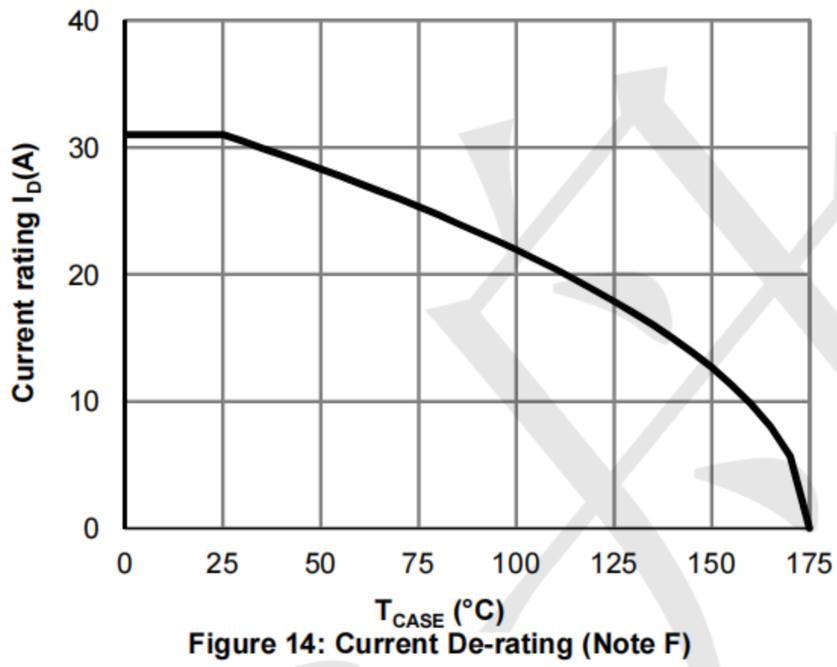


Figure 14: Current De-rating (Note F)

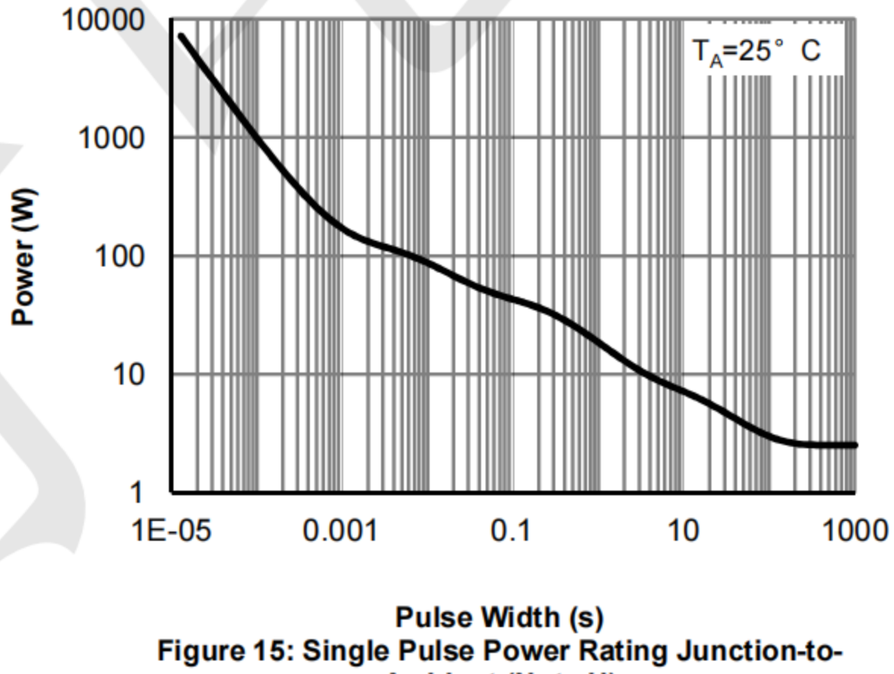


Figure 15: Single Pulse Power Rating Junction-to-Ambient (Note H)

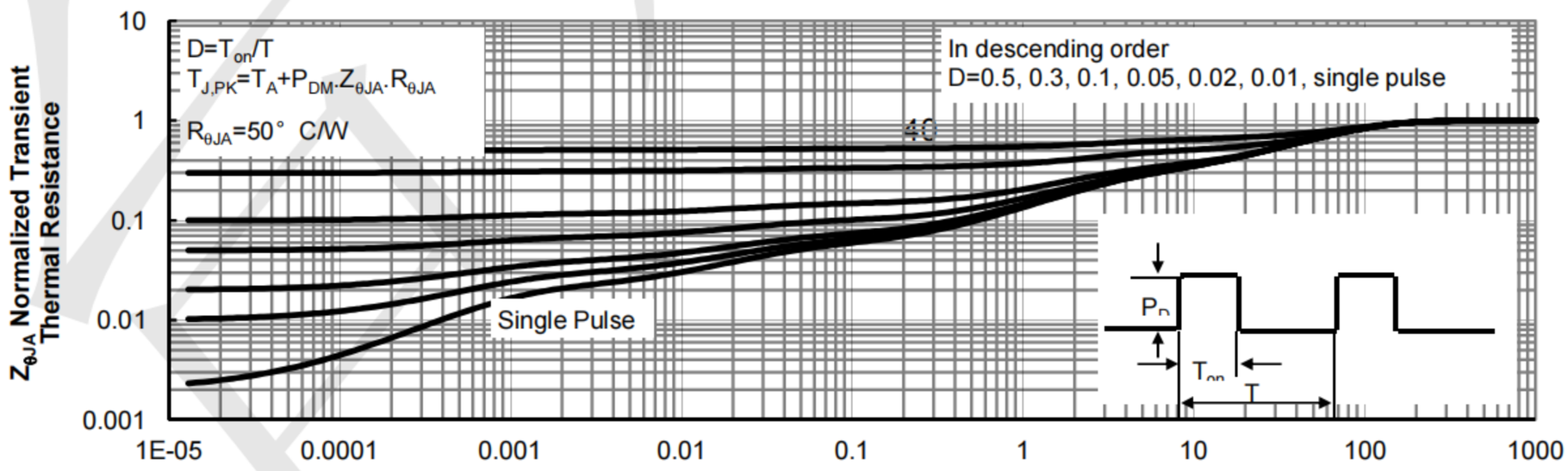
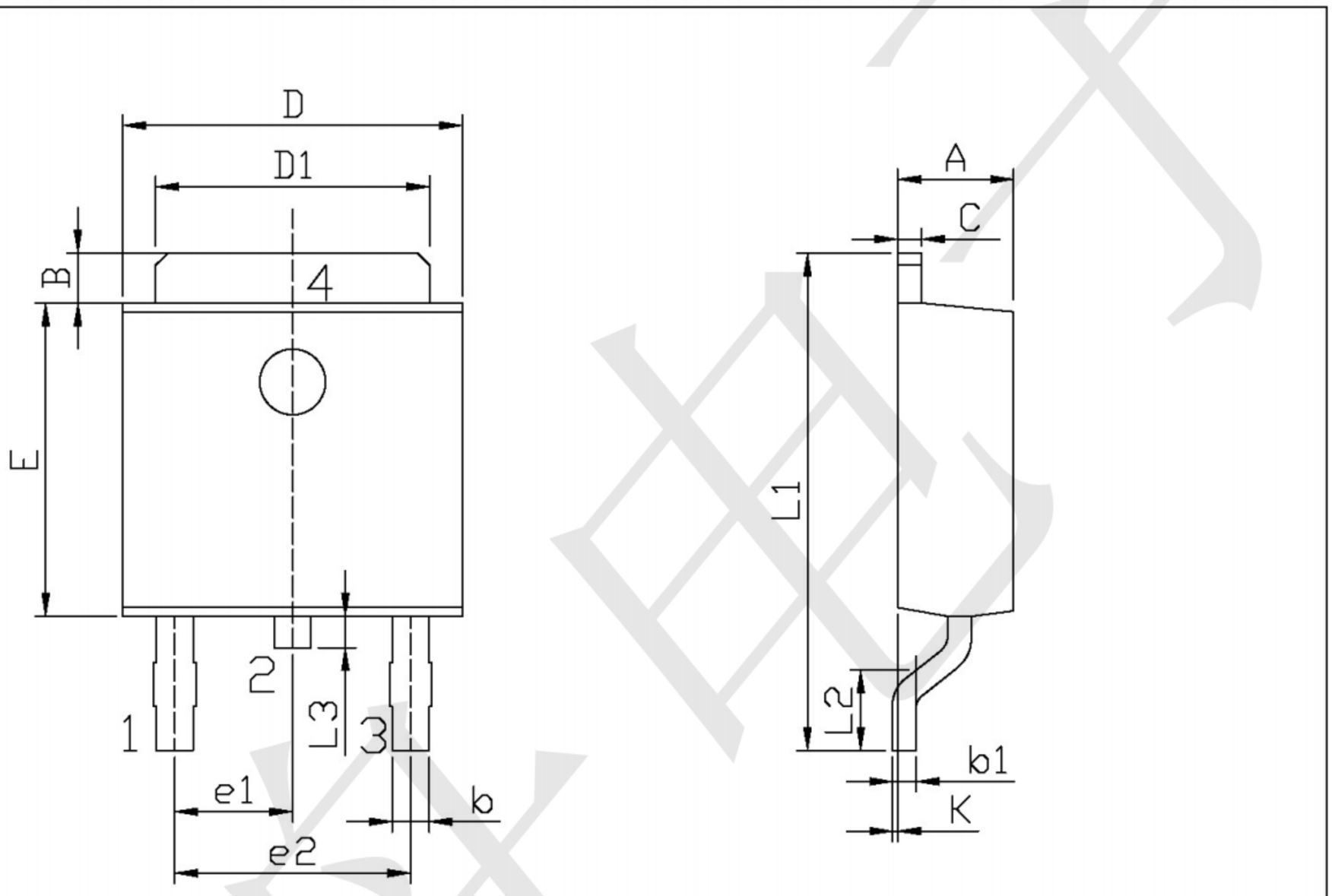


Figure 16: Normalized Maximum Transient Thermal Impedance (Note H)

Outline Drawing - TO-252 (unit:mm)



单位：mm

Symbol	Dimensions In Millimeters		Symbol	Dimensions In Millimeters	
	Min	Max		Min	Max
A	2.20	2.40	E	5.95	6.25
B	0.95	1.25	e1	2.24	2.34
b	0.50	0.70	e2	4.43	4.73
b1	0.45	0.55	L1	9.45	9.95
C	0.45	0.55	L2	1.25	1.75
D	6.45	6.75	L3	0.60	0.90
D1	5.10	5.50	K	0.00	0.10