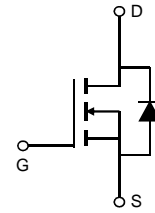


100V N-Channel MOSFET

The FNK10N01D have been fabricated using the advanced MOSTM high voltage process that is designed to deliver high levels of performance and robustness in switching application. By providing low $R_{DS(on)}$, Q_g and E_{OSS} along with guaranteed avalanche capability these parts can be adopted quickly into new and existing offline power designs.



General Features

- $V_{DS} = 100V, I_D = 100A$
- $R_{DS(on)} < 213m\Omega @ V_{GS}=10V$ (Typ:200m Ω)



TO-251S top view

Absolute Maximum Ratings $T_A=25^\circ\text{C}$ unless otherwise noted			
Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	I_D	$T_C=25^\circ\text{C}$	100
		$T_C=100^\circ\text{C}$	65
Pulsed Drain Current ^C	I_{DM}	340	
Continuous Drain Current	I_{DSM}	$T_A=25^\circ\text{C}$	16
		$T_A=70^\circ\text{C}$	12
Avalanche energy $L=0.1\text{mH}$ ^C	E_{AS}, E_{AR}	39	mJ
Power Dissipation ^B	P_D	$T_C=25^\circ\text{C}$	150
		$T_C=100^\circ\text{C}$	75
Power Dissipation ^A	P_{DSM}	$T_A=25^\circ\text{C}$	1.92
		$T_A=70^\circ\text{C}$	1.23
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 175	$^\circ\text{C}$

Thermal Characteristics					
Parameter	Symbol	Typ	Max	Units	
Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	11.6	13.9	$^\circ\text{C}/\text{W}$	
Maximum Junction-to-Ambient ^{A, D}		54	65		
Maximum Junction-to-Case	$R_{\theta JC}$	0.7	1	$^\circ\text{C}/\text{W}$	

* Drain current limited by maximum junction temperature.

Electrical Characteristics (T_J=25°C unless otherwise noted)

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 T _J =55°C			10 50	μA
I _{GSS}	Gate-Body leakage current	V _{DS} =0V, V _{GS} =±25V			±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	2.8	3.4	4	V
I _{D(ON)}	On state drain current	V _{GS} =10V, V _{DS} =5V	110			A
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =20A T _J =125°C		31	37	mΩ
		V _{GS} =7V, I _D =15A		200	213	
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =20A		28		S
V _{SD}	Diode Forward Voltage	I _S =1A, V _{GS} =0V		0.68	1	V
I _S	Maximum Body-Diode Continuous Current				95	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =50V, f=1MHz	950	1180	1450	pF
C _{oss}	Output Capacitance		77	110	145	pF
C _{riss}	Reverse Transfer Capacitance		21	36	50	pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz	0.4	0.8	1.2	Ω
SWITCHING PARAMETERS						
Q _g	Total Gate Charge	V _{GS} =10V, V _{DS} =50V, I _D =20A	15	19	23	nC
Q _{gs}	Gate Source Charge		5.5	7	8.5	nC
Q _{gd}	Gate Drain Charge		3.5	6.3	9	nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =10V, V _{DS} =50V, R _L =2.5Ω, R _{GEN} =3Ω		10		ns
t _r	Turn-On Rise Time			7.2		ns
t _{D(off)}	Turn-Off DelayTime			15		ns
t _f	Turn-Off Fall Time			7		ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =20A, dI/dt=500A/μs	13	19	25	ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =20A, dI/dt=500A/μs	50	70	90	nC

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

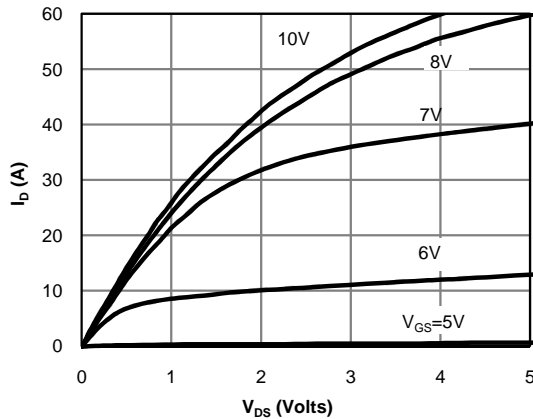


Fig 1: On-Region Characteristics (Note E)

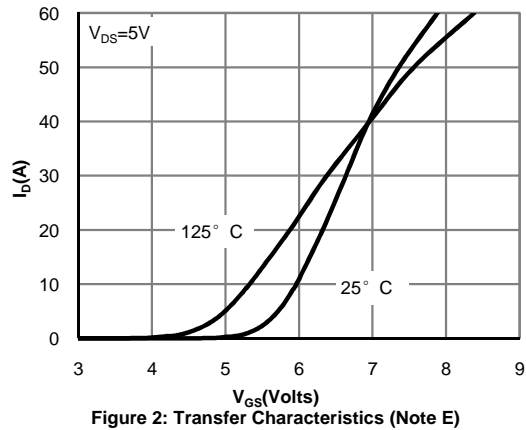


Figure 2: Transfer Characteristics (Note E)

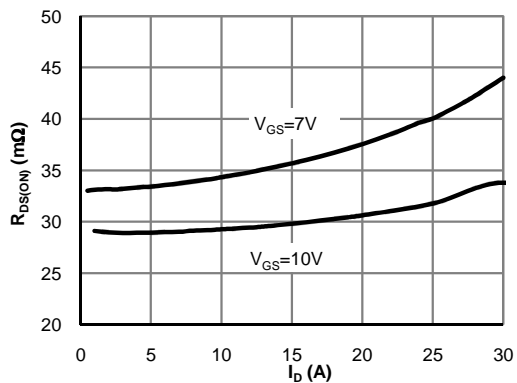


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

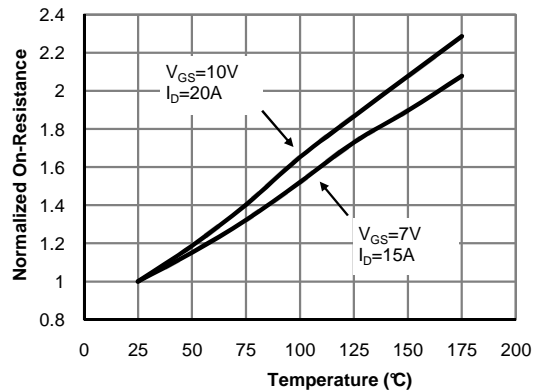


Figure 4: On-Resistance vs. Junction Temperature (Note E)

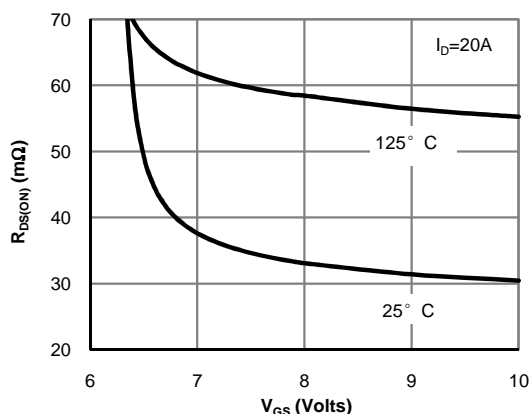


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

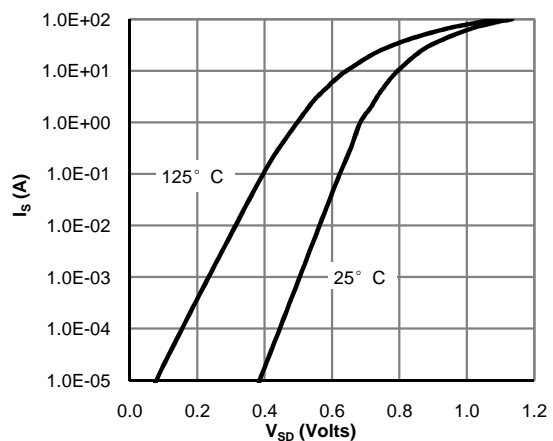


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

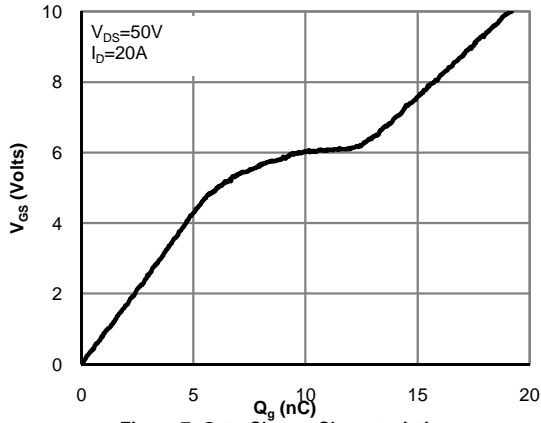


Figure 7: Gate-Charge Characteristics

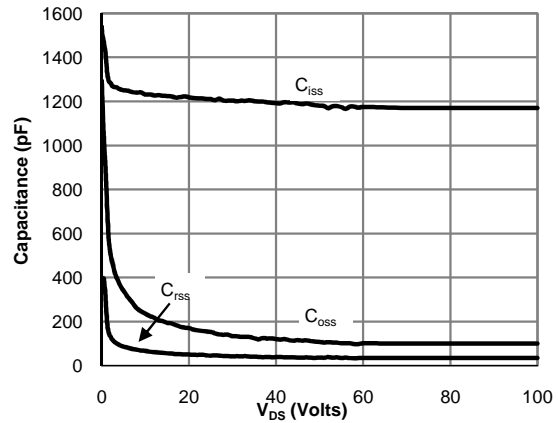


Figure 8: Capacitance Characteristics

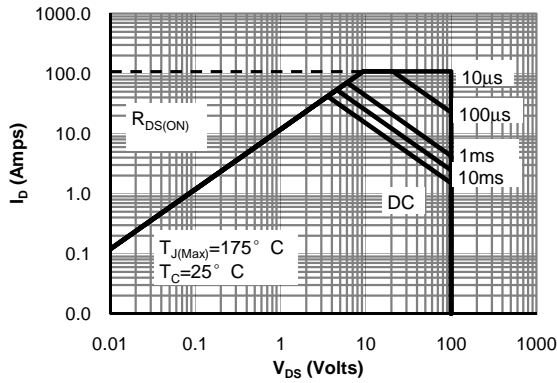


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

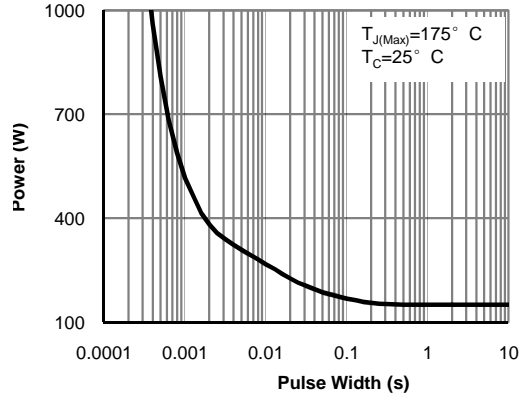


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

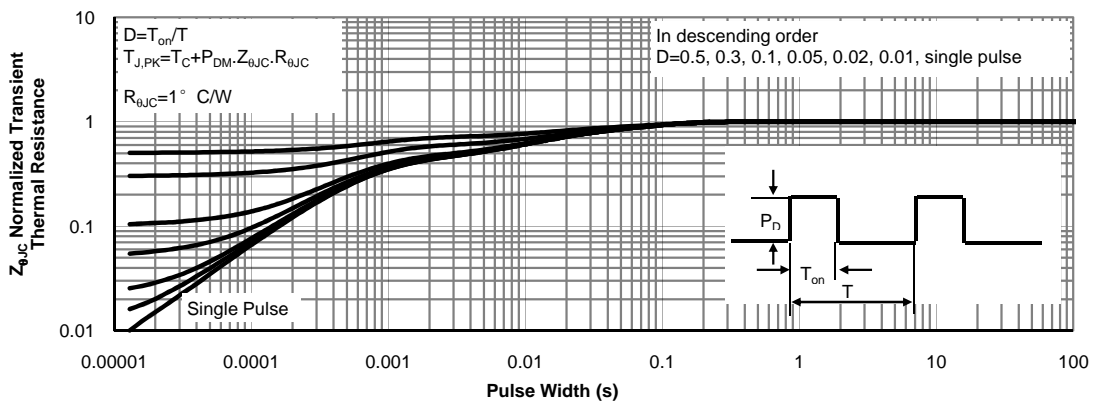


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

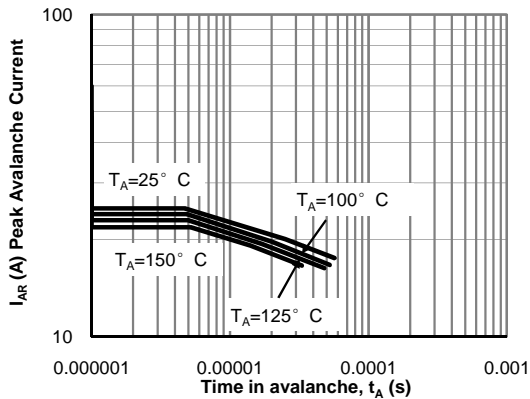


Figure 12: Single Pulse Avalanche capability (Note C)

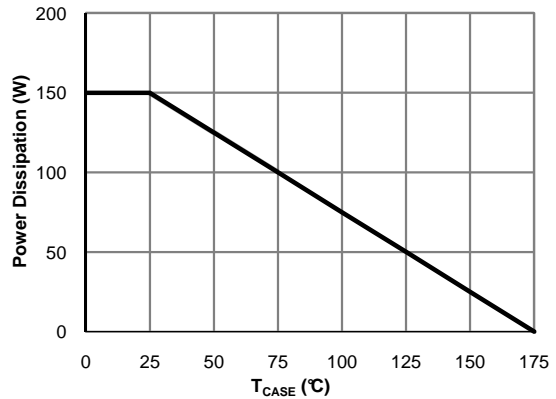


Figure 13: Power De-rating (Note F)

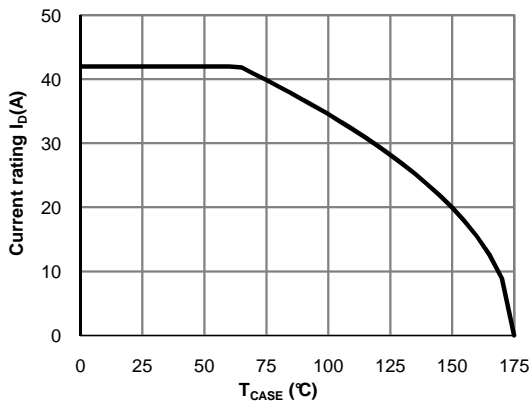


Figure 14: Current De-rating (Note F)

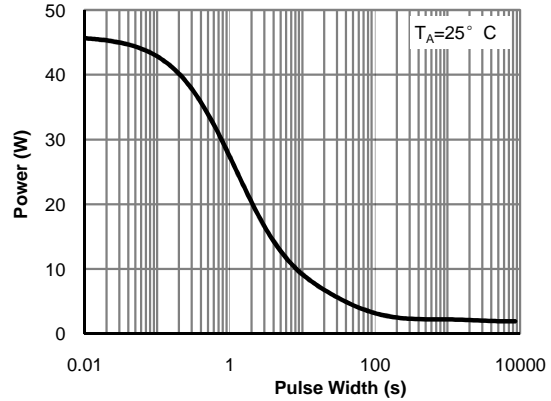


Figure 15: Single Pulse Power Rating Junction-to-Ambient (Note G)

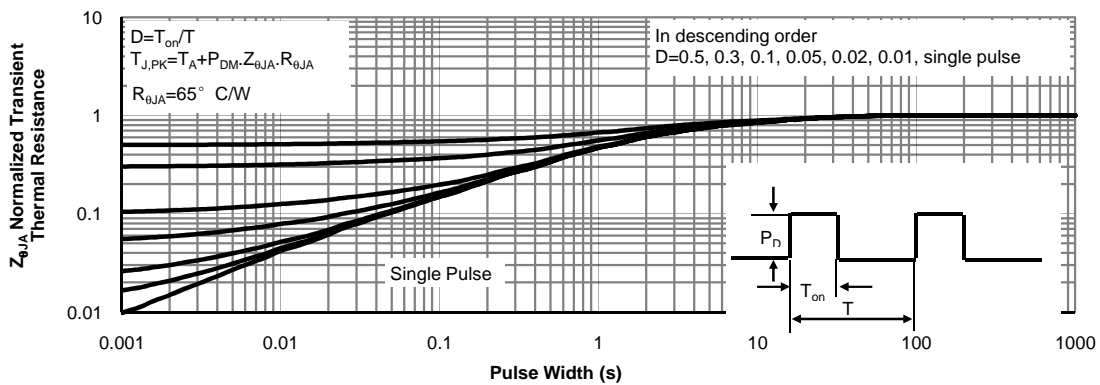


Figure 16: Normalized Maximum Transient Thermal Impedance (Note G)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

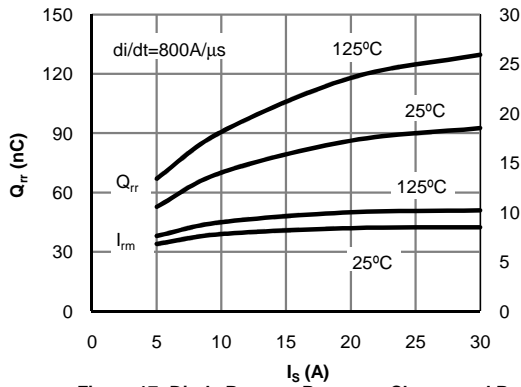


Figure 17: Diode Reverse Recovery Charge and Peak Current vs. Conduction Current

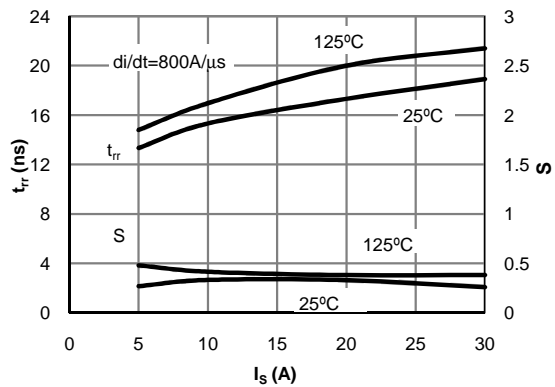


Figure 18: Diode Reverse Recovery Time and Softness Factor vs. Conduction Current

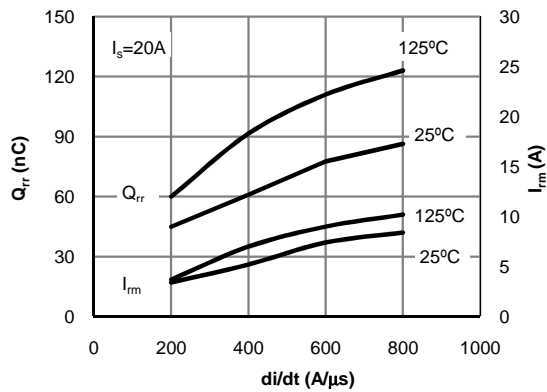


Figure 19: Diode Reverse Recovery Charge and Peak Current vs. di/dt

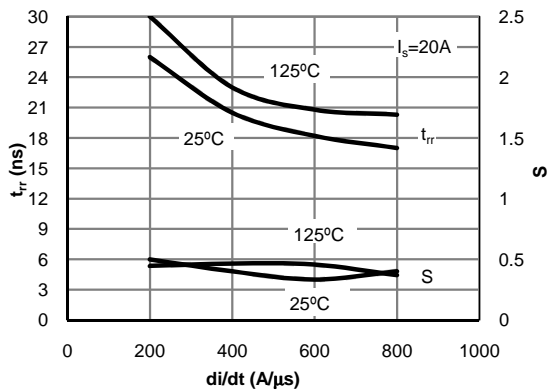
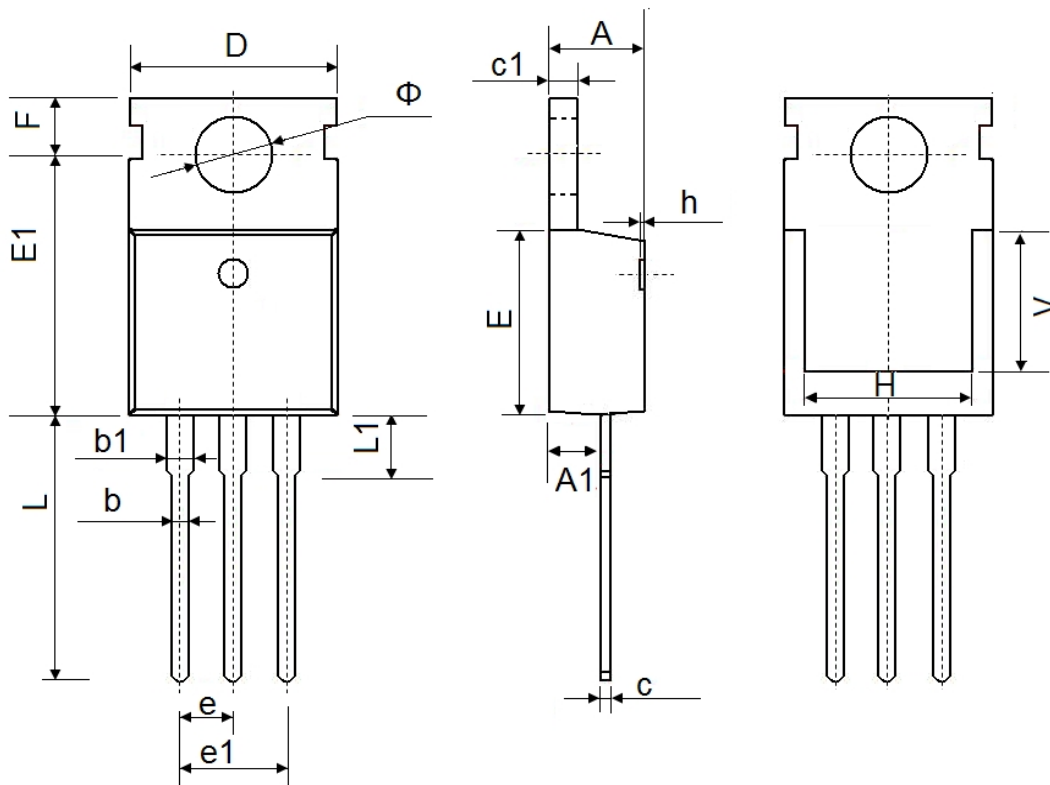


Figure 20: Diode Reverse Recovery Time and Softness Factor vs. di/dt

TO-220 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.400	4.600	0.173	0.181
A1	2.250	2.550	0.089	0.100
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.330	0.650	0.013	0.026
c1	1.200	1.400	0.047	0.055
D	9.910	10.250	0.390	0.404
E	8.9500	9.750	0.352	0.384
E1	12.650	12.950	0.498	0.510
e	2.540 TYP.		0.100TYP.	
e1	4.980	5.180	0.196	0.204
F	2.650	2.950	0.104	0.116
H	7.900	8.100	0.311	0.319
h	0.000	0.300	0.000	0.012
L	12.900	13.400	0.508	0.528
L1	2.850	3.250	0.112	0.128
V	7.500 REF.		0.295 REF.	
Φ	3.400	3.800	0.134	0.150