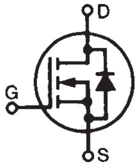
IXYS Preliminary Technical Information

TrenchT4™ Power MOSFET

IXTA340N04T4
IXTA340N04T4-7

V_{DSS} = 40V
I_{D25} = 340A
$R_{DS(on)}$ ≤ 1.7mΩ

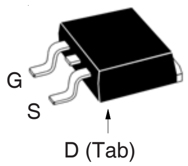
N-Channel Enhancement Mode
Avalanche Rated
Fast Intrinsic Rectifier



Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 175°C	40	V
V_{DGR}	T_J = 25°C to 175°C, R_{GS} = 1MΩ	40	V
V_{GSM}	Transient	± 15	V
I_{D25}	T_C = 25°C	340	A
I_{LRMS}	Lead Current Limit, RMS	160	A
I_{DM}	T_C = 25°C, Pulse Width Limited by T_{JM}	750	A
I_A	T_C = 25°C	170	A
E_{AS}	T_C = 25°C	1.2	J
I_A	T_C = 25°C	340	A
E_{AS}	T_C = 25°C	500	mJ
P_D	T_C = 25°C	480	W
T_J		-55 ... +175	°C
T_{JM}		175	°C
T_{stg}		-55 ... +175	°C
T_L	Maximum Lead Temperature for Soldering	300	°C
T_{SOLD}	Plastic Body for 10s	260	°C
F_C	Mounting Force	10..65 / 2.2..14.6	N/lb
Weight	TO-263	2.5	g
	TO-263 (7Leads)	3.0	g

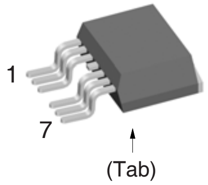
Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0V, I_D = 250µA	40			V
$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250µA	2.0		4.0	V
I_{GSS}	V_{GS} = ±15V, V_{DS} = 0V			±200	nA
I_{DSS}	V_{DS} = V_{DSS}, V_{GS} = 0V			5	µA
	T_J = 150°C			750	µA
$R_{DS(on)}$	V_{GS} = 10V, I_D = 100A, Notes 1, 2			1.7	mΩ

TO-263 AA



G = Gate D = Drain
S = Source Tab = Drain

TO-263 (7-Leads)



Pins: 1 - Gate
2, 3, 5 , 6 , 7 - Source
4 (Tab) - Drain

Features

- International Standard Packages
- 175°C Operating Temperature
- High Current Handling Capability
- Avalanche Rated
- Fast Intrinsic Rectifier
- Low $R_{DS(on)}$

Advantages

- Easy to Mount
- Space Savings
- High Power Density

Applications

- DC-DC Converters & Off-Line UPS
- Primary-Side Switch
- High Current Switching Applications

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Symbol	Test Conditions ($T_J = 25°C$, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	$V_{DS} = 10V$, $I_D = 60A$, Note 1	115	195		S
C_{iss}	$V_{GS} = 0V$, $V_{DS} = 25V$, $f = 1MHz$		13		nF
C_{oss}			1850		pF
C_{rss}			1226		pF
R_{Gi}	Gate Input Resistance		1.1		Ω
$t_{d(on)}$	**Resistive Switching Times** $V_{GS} = 10V$, $V_{DS} = 0.5 \bullet V_{DSS}$, $I_D = 0.5 \bullet I_{D25}$ $R_G = 3\Omega$ (External)		23		ns
t_r			55		ns
$t_{d(off)}$			113		ns
t_f			40		ns
$Q_{g(on)}$	$V_{GS} = 10V$, $V_{DS} = 0.5 \bullet V_{DSS}$, $I_D = 0.5 \bullet I_{D25}$		256		nC
Q_{gs}			64		nC
Q_{gd}			86		nC
R_{thJC}				0.31	°C/W

Source-Drain Diode

Symbol	Test Conditions ($T_J = 25°C$, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
I_S	$V_{GS} = 0V$			340	A
I_{SM}	Repetitive, Pulse Width Limited by T_{JM}			1360	A
V_{SD}	$I_F = 100A$, $V_{GS} = 0V$, Note 1			1.4	V
t_{rr}	$I_F = 150A$, $V_{GS} = 0V$, -di/dt = 100A/μs, $V_R = 30V$		43		ns
I_{RM}			10		A
Q_{RM}			210		nC

Notes: 1. Pulse test, $t \leq 300\mu s$, duty cycle, $d \leq 2\%$.
2. On through-hole packages, $R_{DS(on)}$ Kelvin test contact location must be 5mm or less from the package body.

PRELIMINARY TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from a subjective evaluation of the design, based upon prior knowledge and experience, and constitute a "considered reflection" of the anticipated result. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.

IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:
4,835,592 4,931,844 5,049,961 5,237,481 6,162,665 6,404,065 B1 6,683,344 6,727,585 7,005,734 B2 7,157,338B2
4,860,072 5,017,508 5,063,307 5,381,025 6,259,123 B1 6,534,343 6,710,405 B2 6,759,692 7,063,975 B2
4,881,106 5,034,796 5,187,117 5,486,715 6,306,728 B1 6,583,505 6,710,463 6,771,478 B2 7,071,537

Fig. 1. Output Characteristics @ T_J = 25ºC

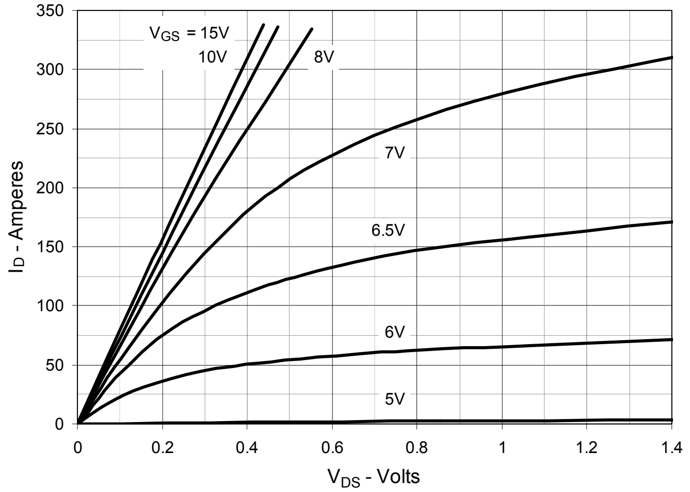


Fig. 2. Extended Output Characteristics @ T_J = 25ºC

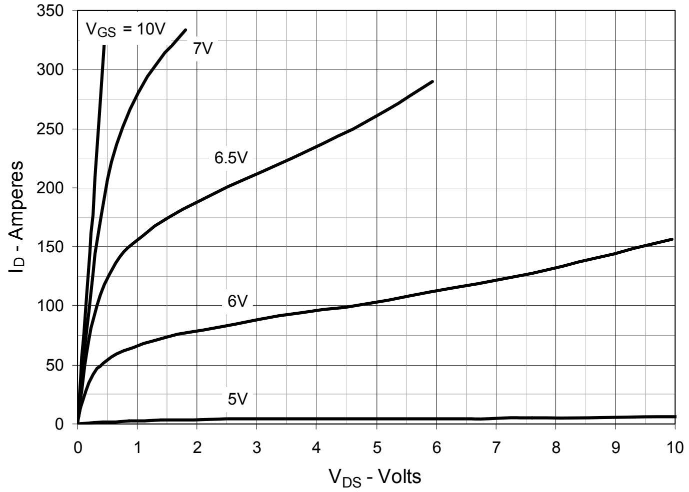


Fig. 3. Output Characteristics @ T_J = 150ºC

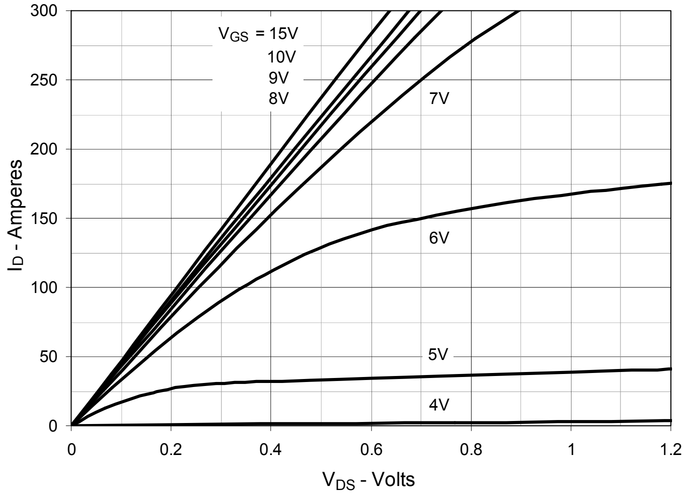


Fig. 4. Normalized $R_{DS(on)}$ to I_D = 170A Value vs. Junction Temperature

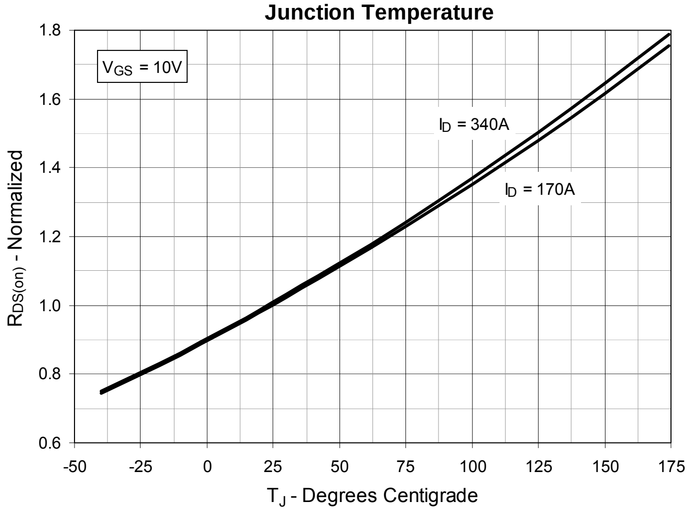


Fig. 5. Normalized $R_{DS(on)}$ to I_D = 170A vs. Drain Current

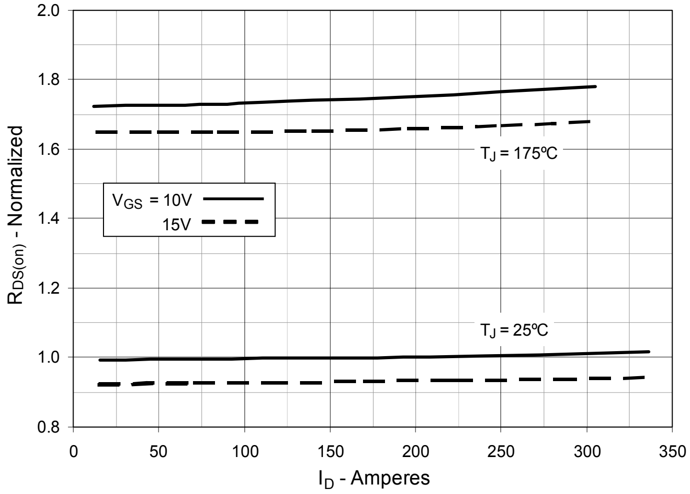
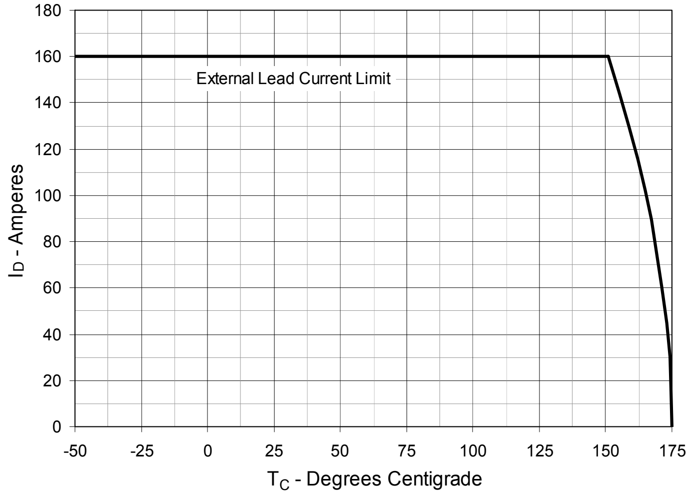


Fig. 6. Drain Current vs. Case Temperature



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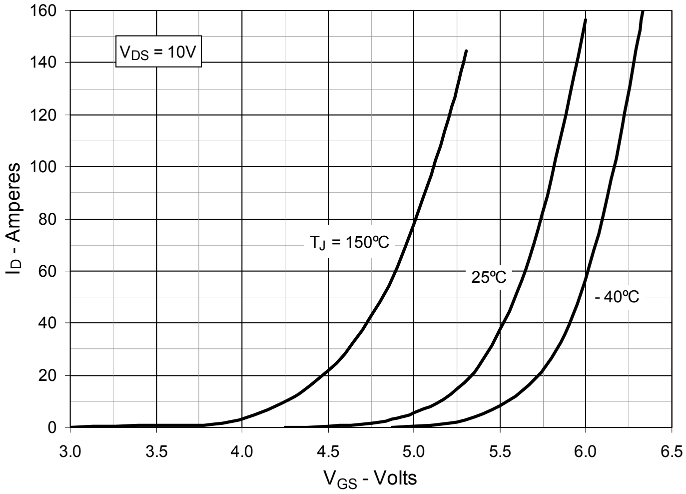

Fig. 7. Input Admittance

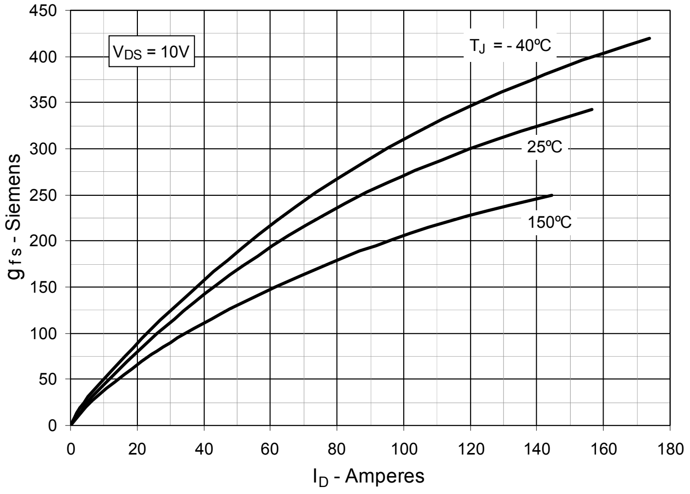

Fig. 8. Transconductance

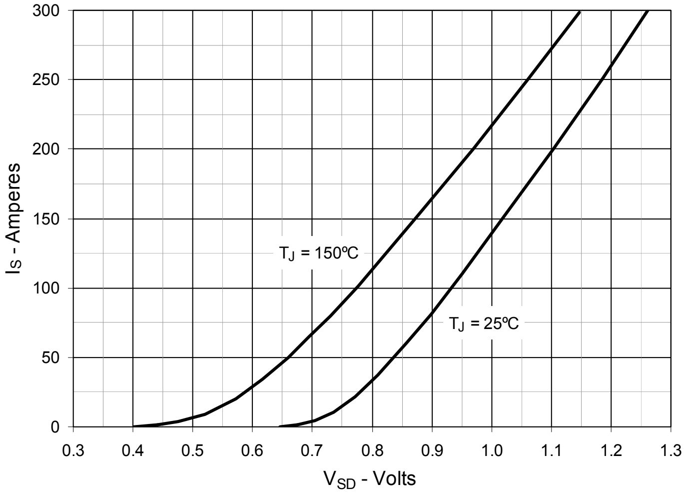

Fig. 9. Forward Voltage Drop of Intrinsic Diode

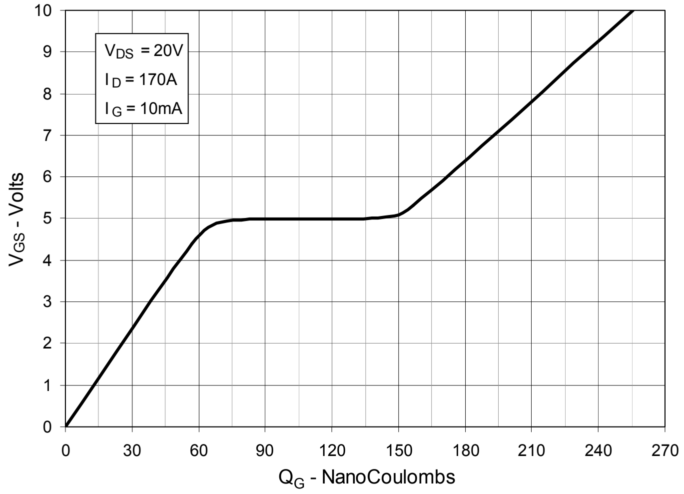

Fig. 10. Gate Charge

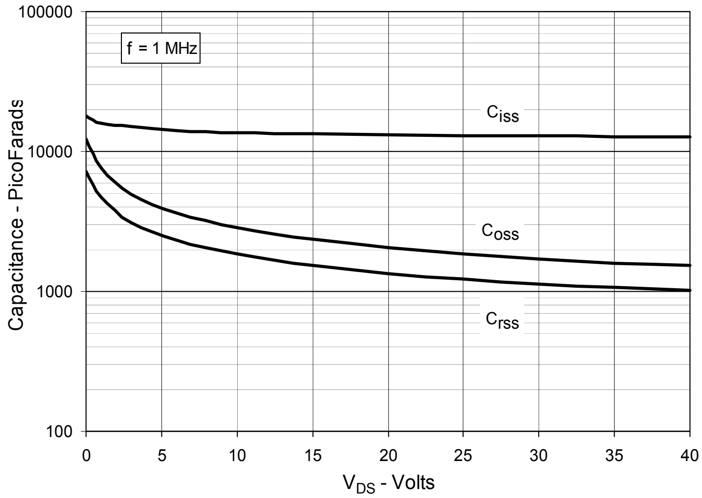

Fig. 11. Capacitance

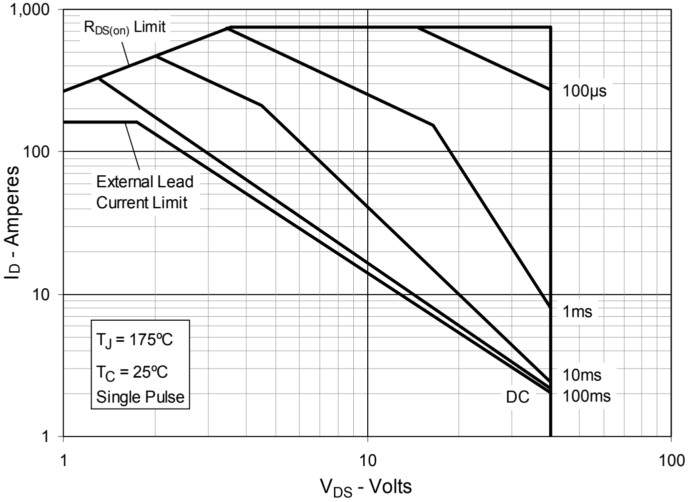

Fig. 12. Forward-Bias Safe Operating Area

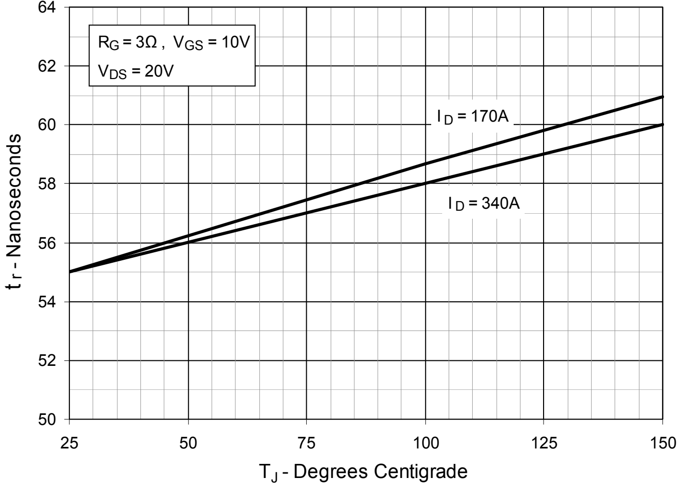

Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature

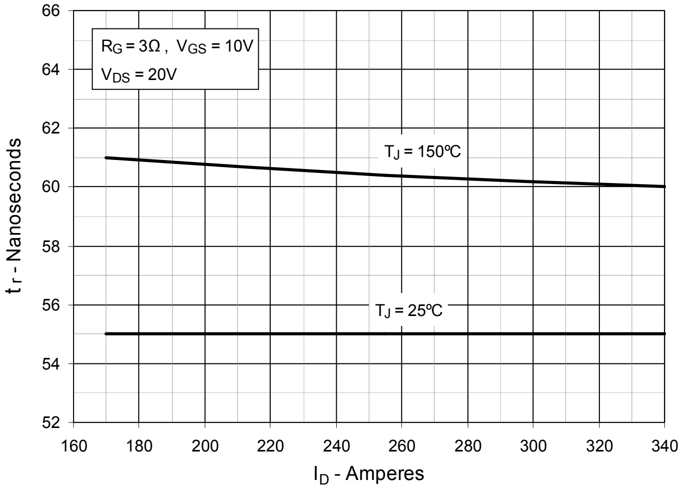

Fig. 14. Resistive Turn-on Rise Time vs. Drain Current

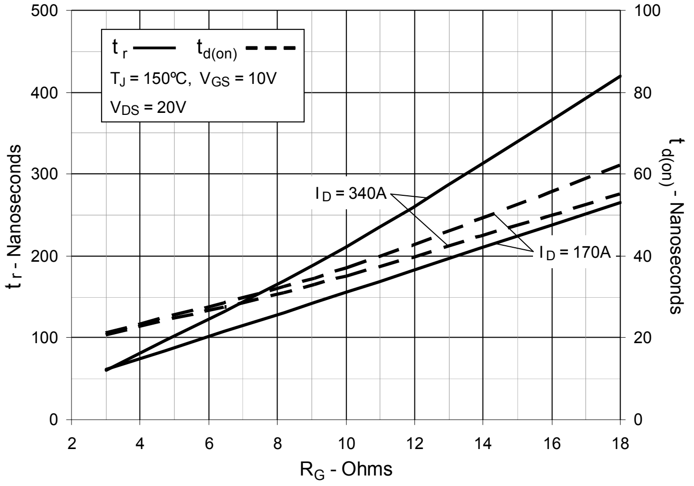

Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance

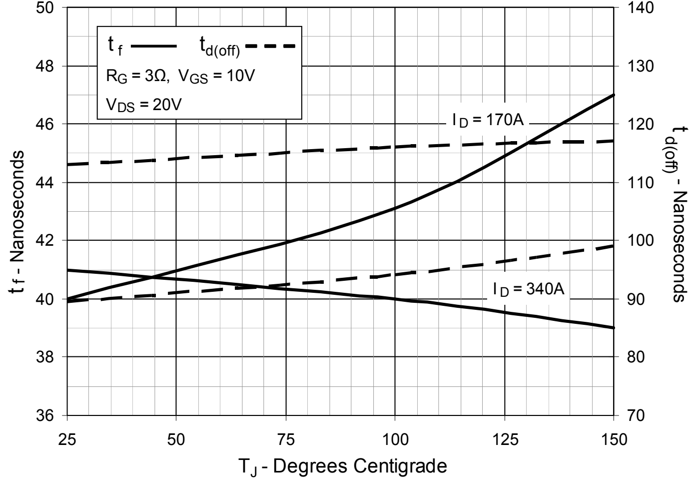

Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature

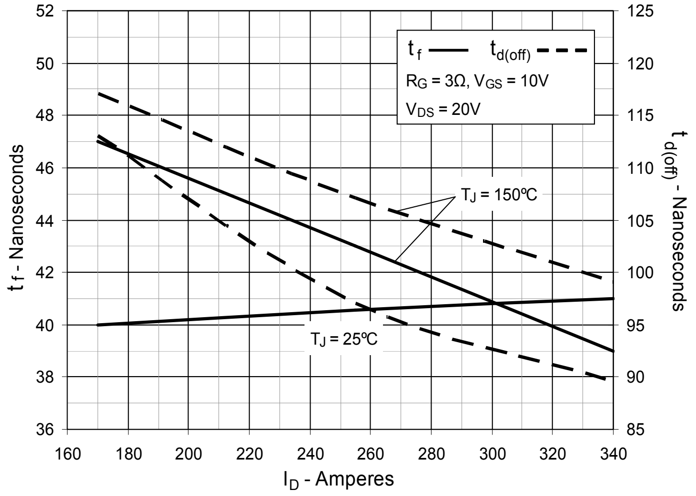

Fig. 17. Resistive Turn-off Switching Times vs. Drain Current

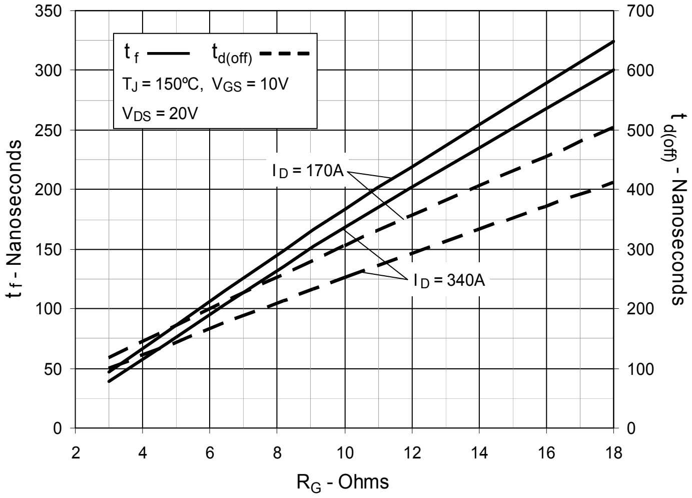

Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance

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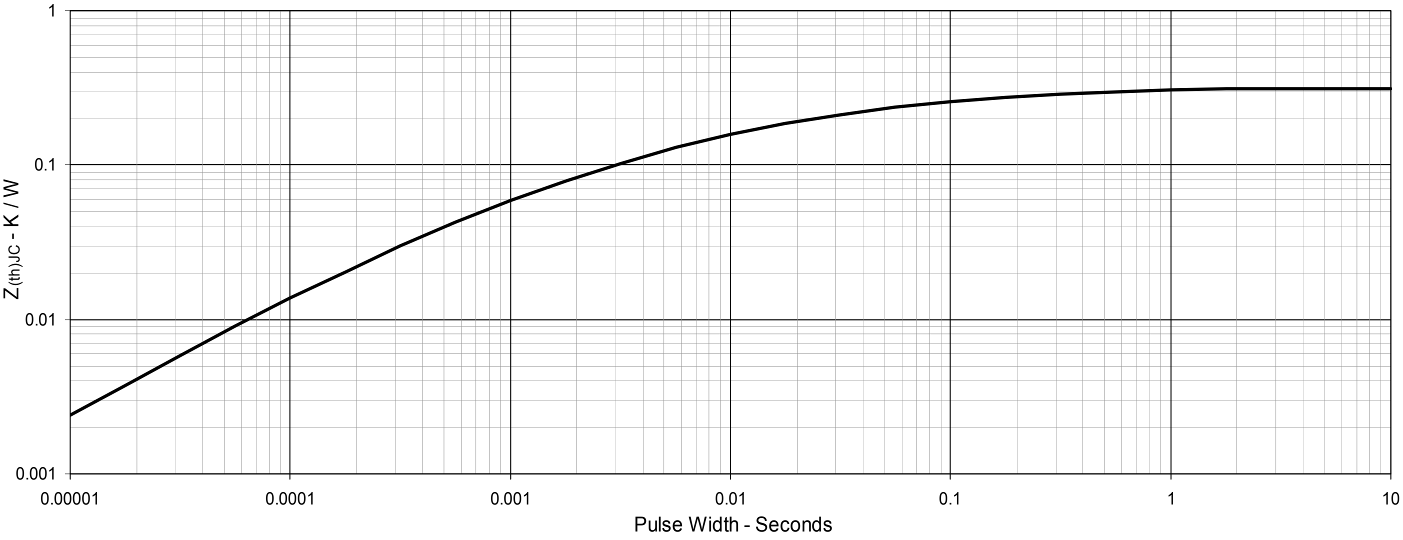
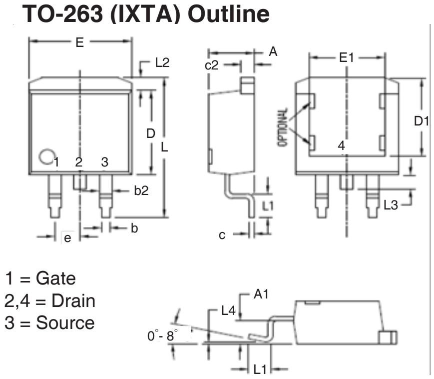
Fig. 19. Maximum Transient Thermal Impedance

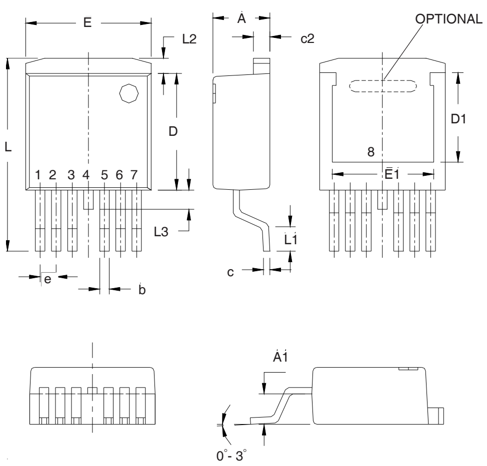


TO-263 (IXTA) Outline



SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.160	.190	4.06	4.83
A1	.080	.110	2.03	2.79
b	.020	.039	0.51	0.99
b2	.045	.055	1.14	1.40
c	.016	.029	0.40	0.74
c2	.045	.055	1.14	1.40
D	.340	.380	8.64	9.65
D1	.315	.350	8.00	8.89
E	.380	.410	9.65	10.41
E1	.245	.320	6.22	8.13
e	.100 BSC		2.54 BSC	
L	.575	.625	14.61	15.88
L1	.090	.110	2.29	2.79
L2	.040	.055	1.02	1.40
L3	.050	.070	1.27	1.78
L4	0	.005	0	0.13

TO-263 (7-lead) (IXTA..7) Outline



SYM	INCHES		MILLIMETER	
	MIN	MAX	MIN	MAX
A	.170	.185	4.30	4.70
A1	.085	.104	2.15	2.65
b	.026	.035	0.65	0.90
c	.016	.024	0.40	0.60
c2	.049	.055	1.25	1.40
D	.355	.370	9.00	9.40
D1	.272	.280	6.90	7.10
E	.386	.402	9.80	10.20
E1	.311	.319	7.90	8.10
e	.050 BSC		1.27BSC	
L	.591	.614	15.00	15.60
L1	.091	.110	2.30	2.80
L2	.039	.059	1.00	1.50
L3	.000	.059	0.00	1.50

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IXYS REF: T_340N04T4(T6-M04) 1-27-16

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