IXTA86N20T Datasheet

DiGi Electronics Part Number	IXTA86N20T-DG
Manufacturer	IXYS
Manufacturer Product Number	IXTA86N20T
Description	MOSFET N-CH 200V 86A TO263
Detailed Description	N-Channel 200 V 86A (Tc) 480W (Tc) Surface Mount TO-263AA

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Purchase and inquiry

Manufacturer Product Number:	Manufacturer:
IXTA86N20T	IXYS
Series:	Product Status:
Trench	Active
FET Type:	Technology:
N-Channel	MOSFET (Metal Oxide)
Drain to Source Voltage (Vdss):	Current - Continuous Drain (Id) @ 25°C:
200 V	86A (Tc)
Drive Voltage (Max Rds On, Min Rds On):	Rds On (Max) @ Id, Vgs:
10V	29mOhm @ 500mA, 10V
Vgs(th) (Max) @ Id:	Gate Charge (Qg) (Max) @ Vgs:
5V @ 1mA	90 nC @ 10 V
Vgs (Max):	Input Capacitance (Ciss) (Max) @ Vds:
±30V	4500 pF @ 25 V
FET Feature:	Power Dissipation (Max):
-	480W (Tc)
Operating Temperature:	Mounting Type:
-55°C ~ 175°C (TJ)	Surface Mount
Supplier Device Package:	Package / Case:
TO-263AA	TO-263-3, D2PAK (2 Leads + Tab), TO-263AB
Base Product Number:	
IXTA86	

Environmental & Export classification

RoHS Status:	Moisture Sensitivity Level (MSL):
ROHS3 Compliant	1 (Unlimited)
REACH Status:	ECCN:
REACH Unaffected	EAR99
HTSUS:	
8541.29.0095	

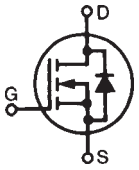
IXYS

Trench Gate Power MOSFET

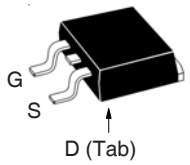
IXTA86N20T
IXTP86N20T
IXTQ86N20T

V_{DSS} = 200V
I_{D25} = 86A
$R_{DS(on)}$ ≤ 33mΩ

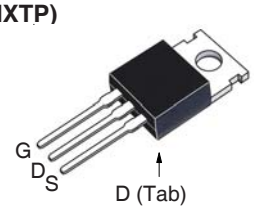
N-Channel Enhancement Mode
Avalance Rated



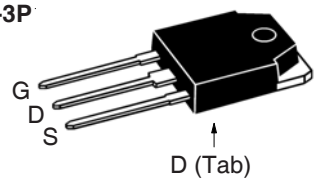
TO-263



TO-220 (IXTP)



TO-3P



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

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 175°C	200	V
V_{DGR}	T_J = 25°C to 175°C, R_{GS} = 1MΩ	200	V
V_{GSS}	Continuous	±20	V
V_{GSM}	Transient	±30	V
I_{D25}	T_C = 25°C	86	A
I_{DM}	T_C = 25°C, Pulse Width Limited by T_{JM}	260	A
I_A	T_C = 25°C	10	A
E_{AS}	T_C = 25°C	1	J
P_D	T_C = 25°C	550	W
dv/dt	$I_S \le I_{DM}$, $V_{DD} \le V_{DSS}$, $T_J \le 150°C$	3	V/ns
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}	1.6 mm (0.062in.) from Case for 10s	260	°C
F_C	Mounting Force (TO-263)	10..65 / 2.2..14.6	N/lb
M_d	Mounting Torque (TO-220 & TO-3P)	1.13 / 10	Nm/lb.in
Weight	TO-263	2.5	g
	TO-220	3.0	g
	TO-3P	5.5	g

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0V, I_D = 250μA	200			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 1mA	3.0		5.0	V
I_{GSS}	V_{GS} = ±20V, V_{DS} = 0V			±200	nA
I_{DSS}	$V_{DS} = V_{DSS}$, V_{GS} = 0V			1	μA
	T_J = 125°C			250	μA
$R_{DS(on)}$	V_{GS} = 10V, $I_D = 0.5 \bullet I_{D25}$, Note 1			33	mΩ

Features

- 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
- Battery Chargers
- Switch-Mode and Resonant-Mode Power Supplies
- DC Choppers
- AC Motor Drives
- Uninterruptible Power Supplies
- High Speed Power 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 = 0.5 • I_{D25}, Note 1	46	78		S
C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		4500		pF
C_{oss}			550		pF
C_{rss}			73		pF
$t_{d(on)}$	**Resistive Switching Times** V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25} R_G = 3.3Ω (External)		22		ns
t_r			24		ns
$t_{d(off)}$			52		ns
t_f			29		ns
$Q_{g(on)}$	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		90		nC
Q_{gs}			30		nC
Q_{gd}			23		nC
R_{thJC}				0.27	°C/W
R_{thCS}	TO-220		0.50		°C/W
	TO-3P		0.25		°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			86	A
I_{SM}	Repetitive, pulse Width Limited by T_{JM}			260	A
V_{SD}	I_F = I_S, V_{GS} = 0V, Note 1			1.5	V
t_{rr}	I_F = 25A, -di/dt = 100A/μs, V_R = 100V		140		ns

Note 1. Pulse test, t ≤ 300μs, duty cycle, d ≤ 2%.

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

Fig. 1. Output Characteristics @ T_J = 25°C

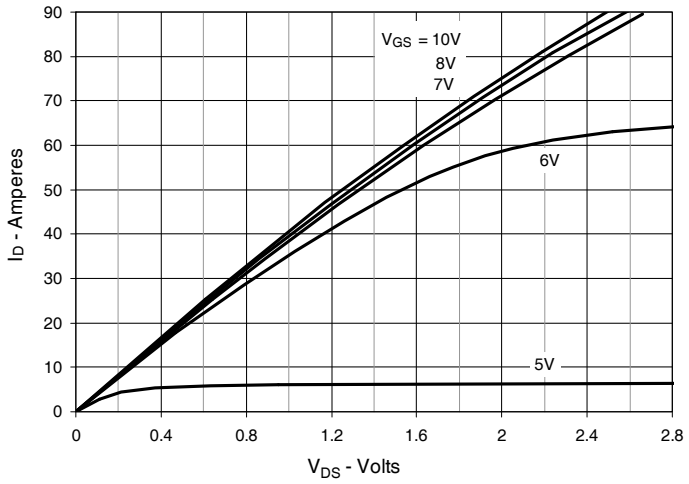

Fig. 2. Extended Output Characteristics@ T_J = 25°C

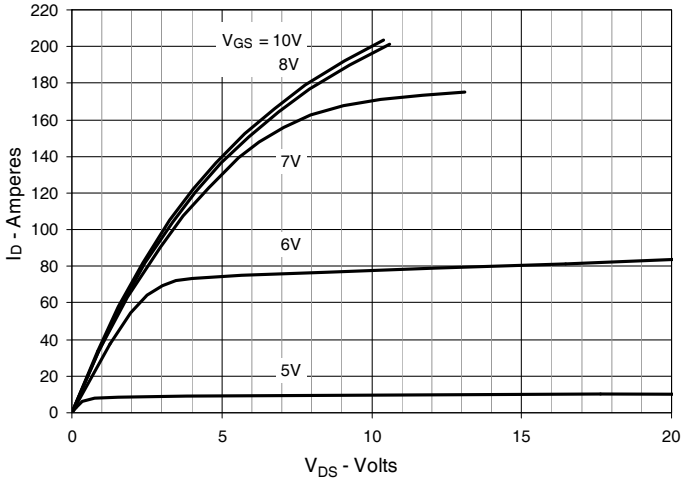

Fig. 3. Output Characteristics @ T_J = 125°C

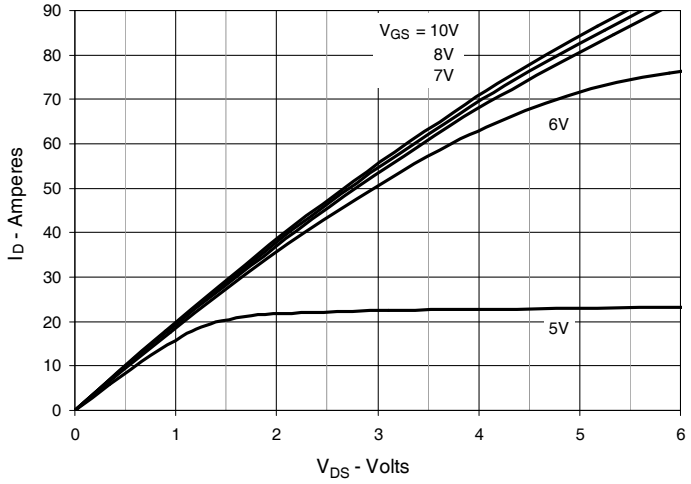

Fig. 4. $R_{DS(on)}$ Normalized to I_D = 43A Value vs. Junction Temperature

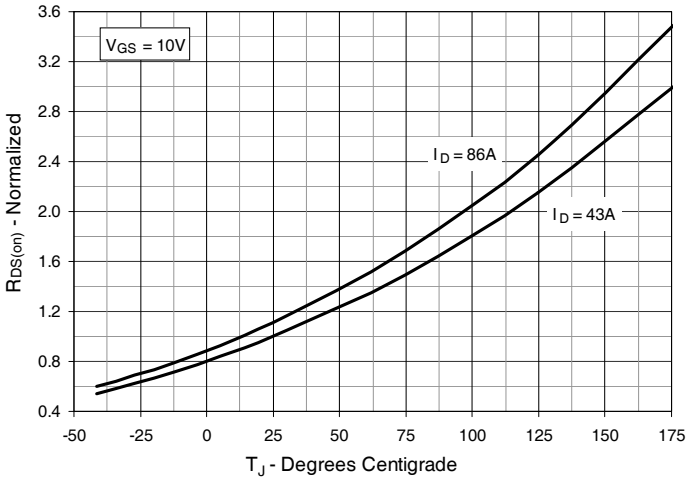

Fig. 5. $R_{DS(on)}$ Normalized to I_D = 43A Value vs. Drain Current

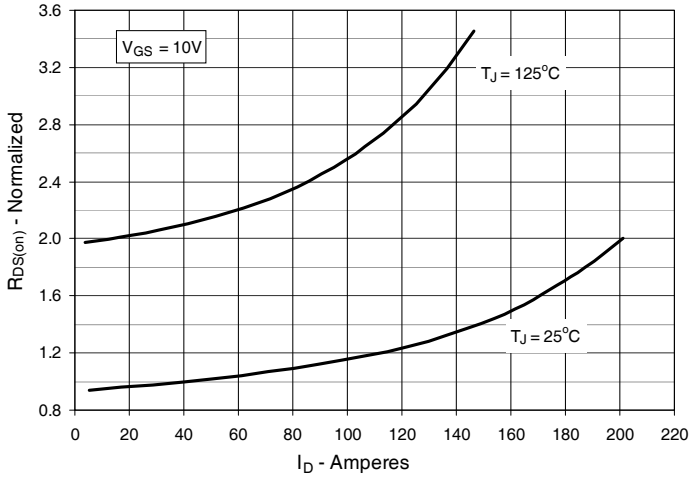

Fig. 6. Drain Current vs. Case Temperature

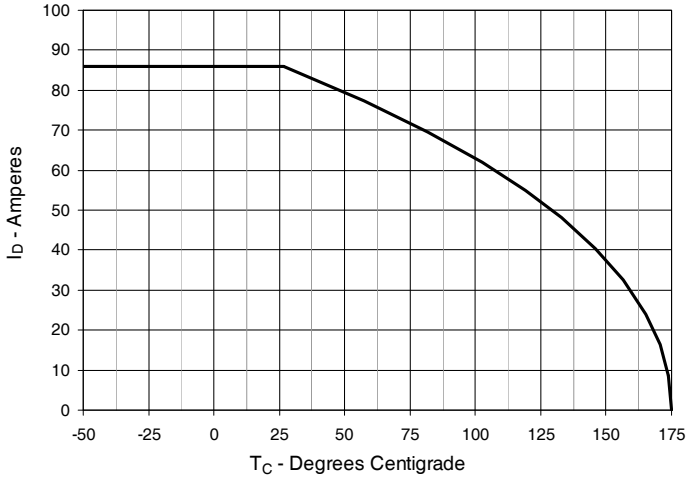

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Fig. 7. Input Admittance

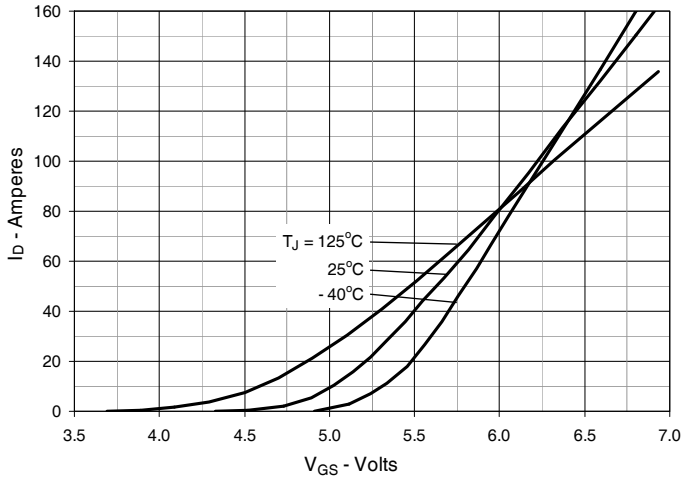

Fig. 8. Transconductance

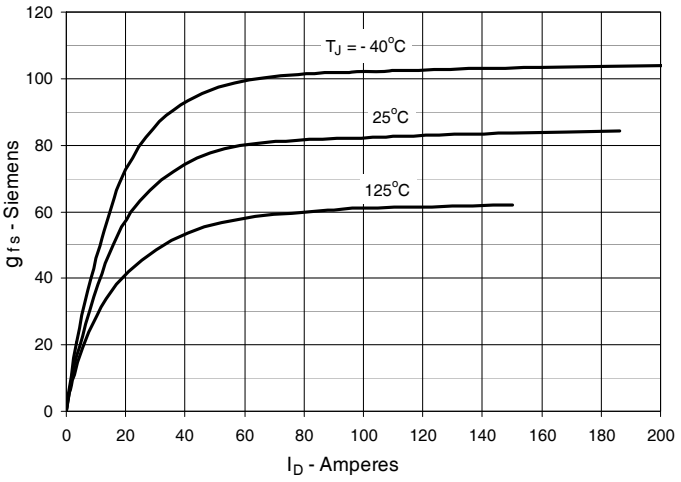

Fig. 9. Forward Voltage Drop of Intrinsic Diode

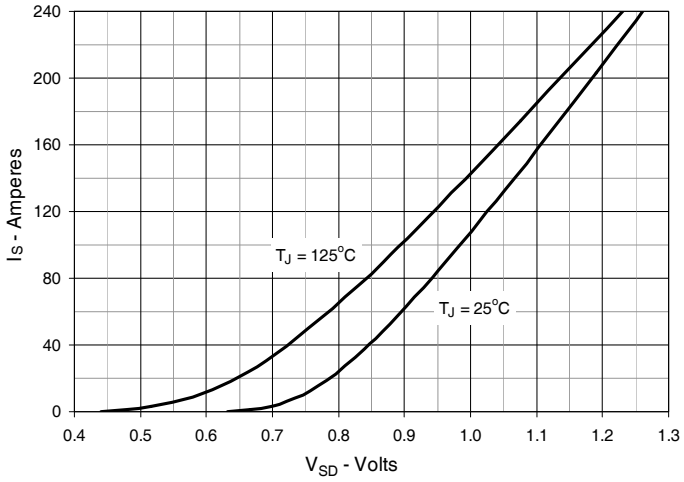

Fig. 10. Gate Charge

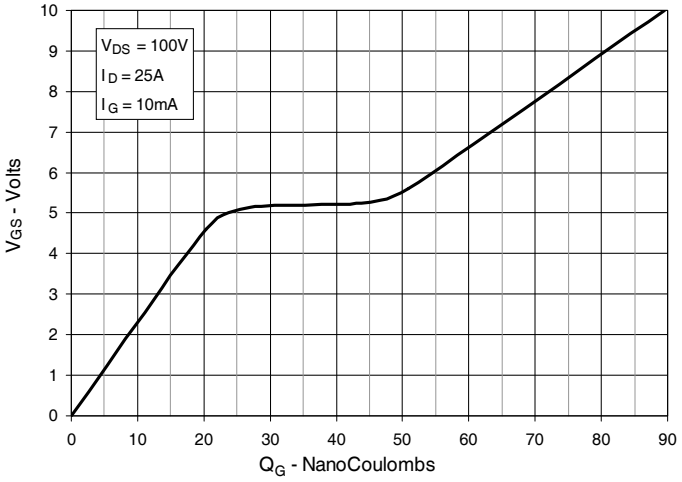

Fig. 11. Capacitance

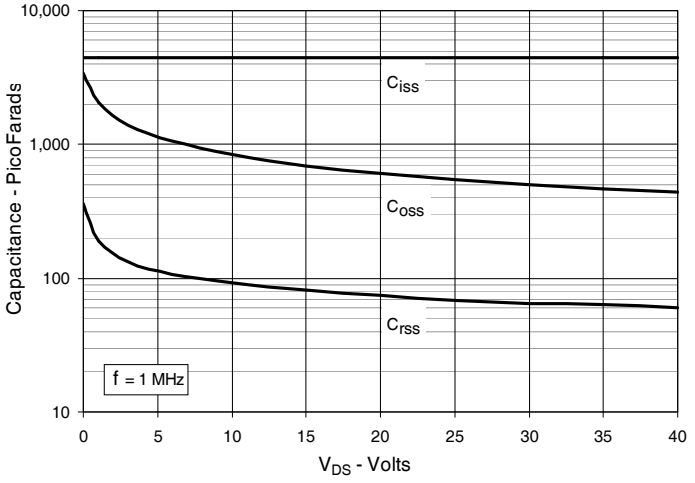

Fig. 12. Maximum Transient Thermal Impedance

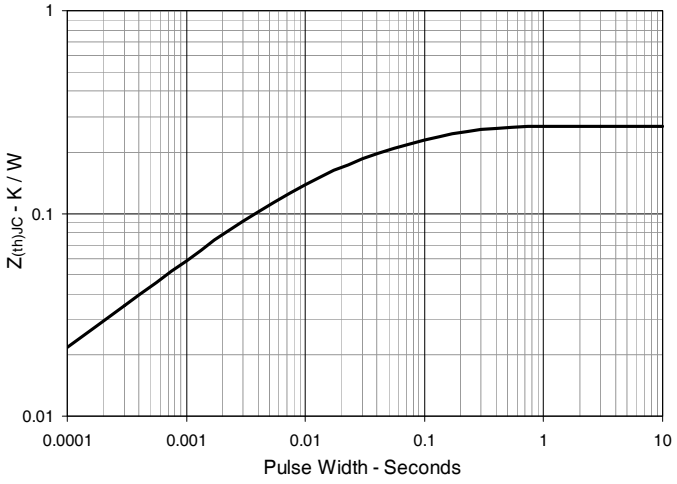

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Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature

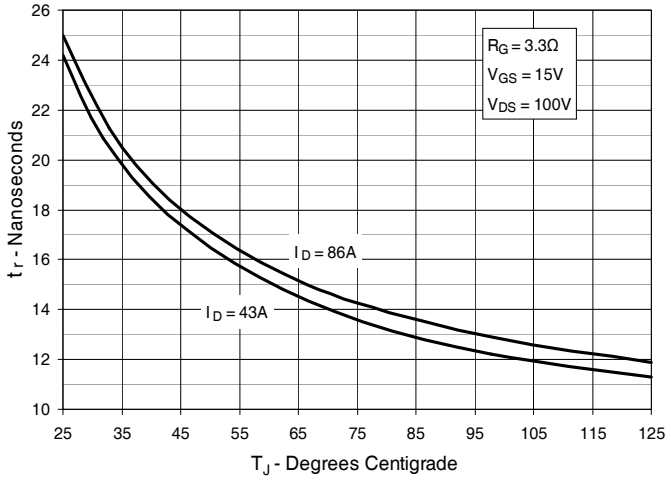


Fig. 14. Resistive Turn-on Rise Time vs. Drain Current

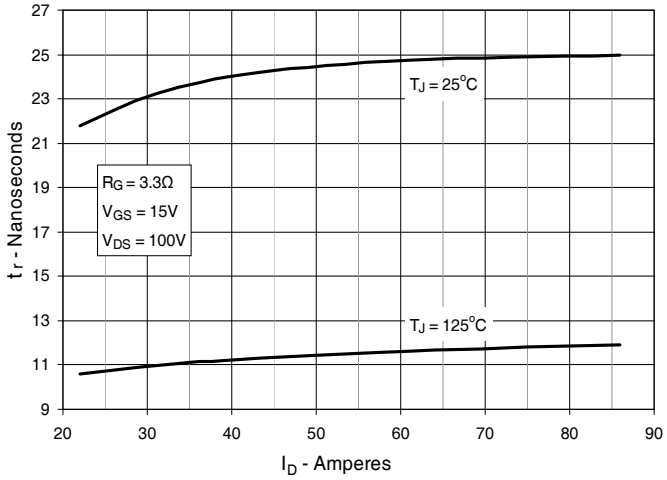


Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance

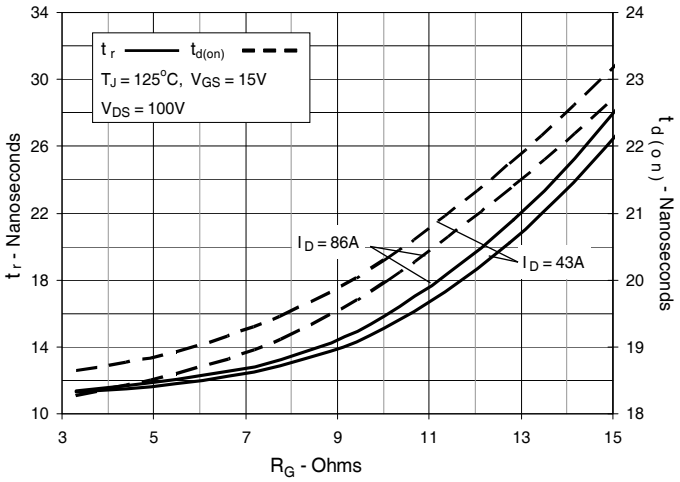


Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature

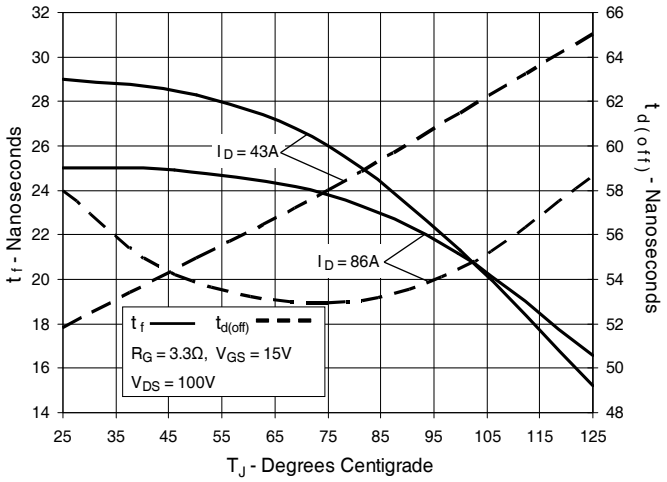


Fig. 17. Resistive Turn-off Switching Times vs. Drain Current

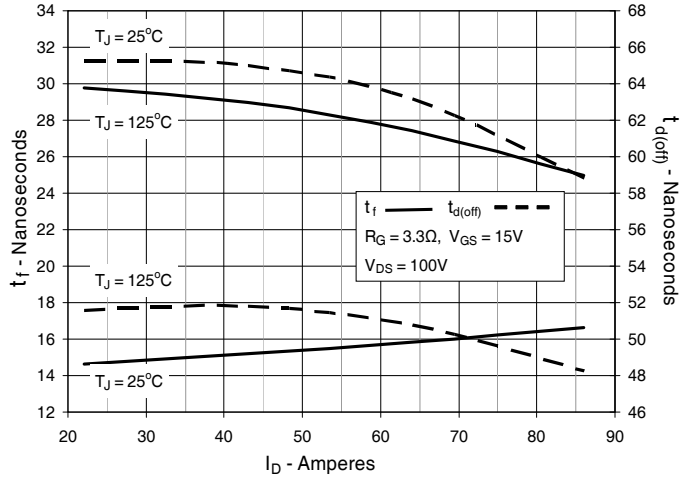
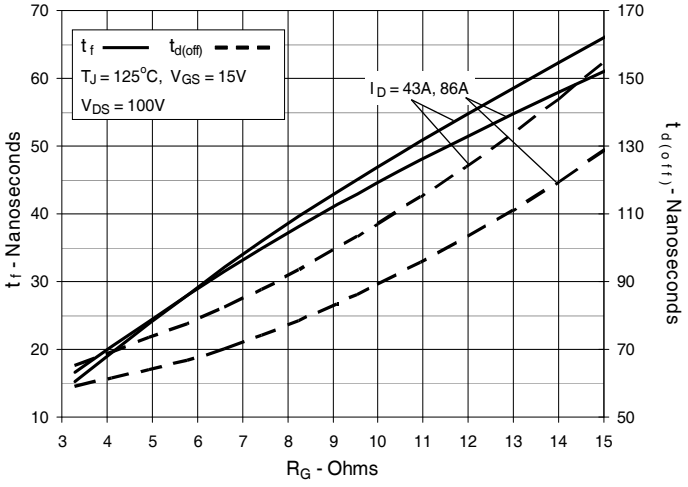


Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance



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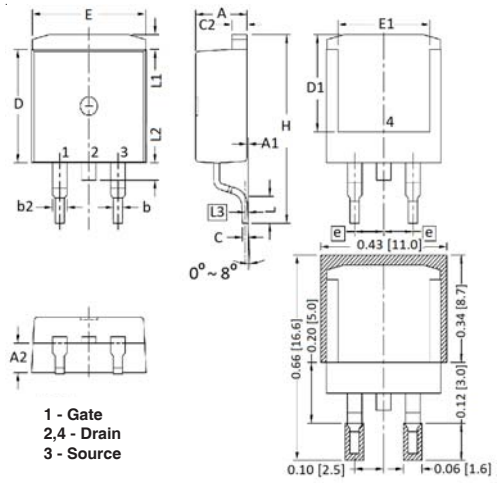
IXTA86N20T IXTP86N20T IXTQ86N20T

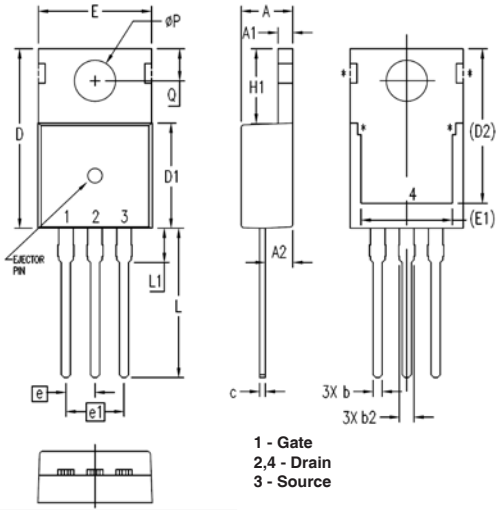
TO-263 Outline



1 - Gate
2,4 - Drain
3 - Source

SYM	INCHES		MILLIMETER	
	MIN	MAX	MIN	MAX
A	.170	.185	4.30	4.70
A1	.000	.008	0.00	0.20
A2	.091	.098	2.30	2.50
b	.028	.035	0.70	0.90
b2	.046	.060	1.18	1.52
C	.018	.024	0.45	0.60
C2	.049	.060	1.25	1.52
D	.340	.370	8.63	9.40
D1	.300	.327	7.62	8.30
E	.380	.410	9.65	10.41
E1	.270	.330	6.86	8.38
e	.100 BSC		2.54 BSC	
H	.580	.620	14.73	15.75
L	.075	.105	1.91	2.67
L1	.039	.060	1.00	1.52
L2	—	.070	—	1.77
L3	.010 BSC		0.254 BSC	

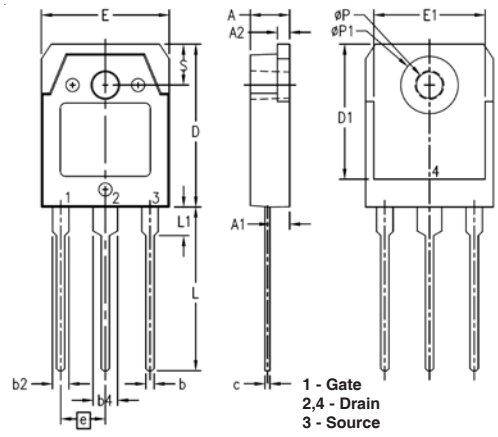
TO-220 Outline



1 - Gate
2,4 - Drain
3 - Source

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.169	.185	4.30	4.70
A1	.047	.055	1.20	1.40
A2	.079	.106	2.00	2.70
b	.024	.039	0.60	1.00
b2	.045	.057	1.15	1.45
c	.014	.026	0.35	0.65
D	.587	.626	14.90	15.90
D1	.335	.370	8.50	9.40
(D2)	.500	.531	12.70	13.50
E	.382	.406	9.70	10.30
(E1)	.283	.323	7.20	8.20
e	.100 BSC		2.54 BSC	
e1	.200 BSC		5.08 BSC	
H1	.244	.268	6.20	6.80
L	.492	.547	12.50	13.90
L1	.110	.154	2.80	3.90
øP	.134	.150	3.40	3.80
Q	.106	.126	2.70	3.20

TO-3P Outline



1 - Gate
2,4 - Drain
3 - Source

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.181	.197	4.60	5.00
A1	.087	1.02	2.20	2.60
A2	.057	.065	1.45	1.65
b	.031	.047	0.80	1.20
b2	.071	.087	1.80	2.20
b4	.110	.126	2.80	3.20
c	.022	.031	0.55	0.80
D	.776	.791	19.70	20.10
D1	.640	.680	16.26	17.27
E	.606	.622	15.40	15.80
E1	.531	.539	13.50	13.70
e	.215 BSC		5.45 BSC	
L	.779	.795	19.80	20.20
L1	.130	.146	3.30	3.70
øP	.122	.134	3.10	3.40
øP1	.272	.280	6.90	7.10
S	.189	.205	4.80	5.20

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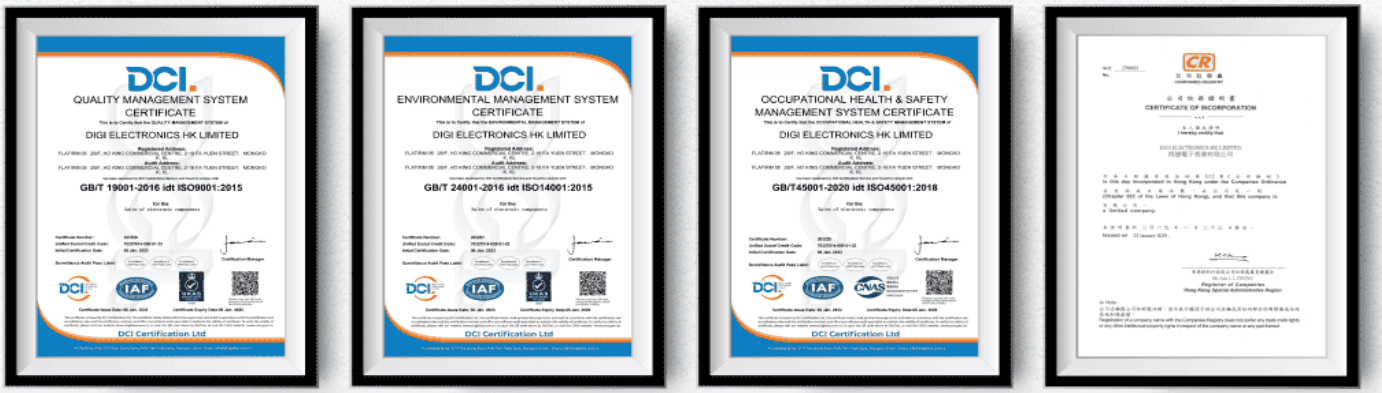

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