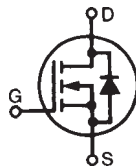


Trench™ Power MOSFET

IXTA48N20T
IXTP48N20T
IXTQ48N20T

$V_{DSS} = 200V$
 $I_{D25} = 48A$
 $R_{DS(on)} \leq 50m\Omega$

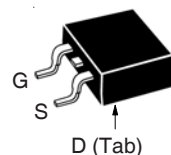
N-Channel Enhancement Mode
Avalanche Rated
Fast Intrinsic Rectifier



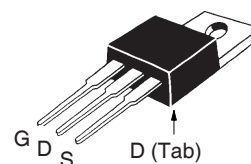
Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	$T_J = 25^\circ C$ to $175^\circ C$	200	V
V_{DGR}	$T_J = 25^\circ C$ to $175^\circ C$, $R_{GS} = 1M\Omega$	200	V
V_{GSM}	Transient	± 30	V
I_{D25}	$T_C = 25^\circ C$	48	A
I_{DM}	$T_C = 25^\circ C$, Pulse Width Limited by T_{JM}	130	A
I_A	$T_C = 25^\circ C$	5	A
E_{AS}	$T_C = 25^\circ C$	500	mJ
dv/dt	$I_S \leq I_{DM}$, $V_{DD} \leq V_{DSS}$, $T_J \leq 175^\circ C$	3	V/ns
P_D	$T_C = 25^\circ C$	250	W
T_J		-55 ... +175	$^\circ C$
T_{JM}		175	$^\circ C$
T_{stg}		-55 ... +175	$^\circ C$
T_L	1.6mm (0.062in.) from Case for 10s	300	$^\circ C$
T_{SOLD}	Plastic Body for 10 seconds	260	$^\circ C$
F_C	Mounting Force (TO-263)	10..65/2.2..14.6	Nm/lb.in
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 ($T_J = 25^\circ C$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
BV_{DSS}	$V_{GS} = 0V$, $I_D = 250\mu A$	200		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\mu A$	2.5		4.5 V
I_{GSS}	$V_{GS} = \pm 20V$, $V_{DS} = 0V$			± 100 nA
I_{DSS}	$V_{DS} = V_{DSS}$, $V_{GS} = 0V$ $T_J = 150^\circ C$			5 μA 250 μA
$R_{DS(on)}$	$V_{GS} = 10V$, $I_D = 0.5 \cdot I_{D25}$, Note 1	40	50	m Ω

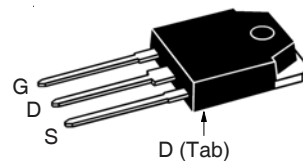
TO-263 AA (IXTA)



TO-220AB (IXTP)



TO-3P (IXTQ)



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

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

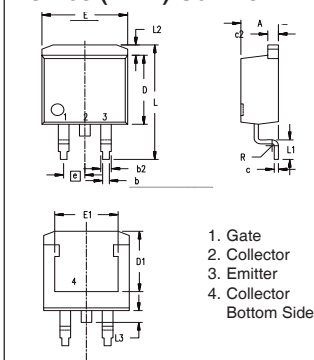
Symbol	Test Conditions	Characteristic Values		
(T _J = 25°C, Unless Otherwise Specified)		Min.	Typ.	Max.
g_{fs}	V _{DS} = 10V, I _D = 0.5 • I _{D25} , Note 1	26	44	S
C_{iss}	V _{GS} = 0V, V _{DS} = 25V, f = 1MHz		3090	pF
C_{oss}			350	pF
C_{rss}			40	pF
t_{d(on)}	Resistive Switching Times V _{GS} = 10V, V _{DS} = 0.5 • V _{DSS} , I _D = 0.5 • I _{D25} R _G = 10Ω(External)		20	ns
t_r			26	ns
t_{d(off)}			46	ns
t_f			28	ns
Q_{g(on)}	V _{GS} = 10V, V _{DS} = 0.5 • V _{DSS} , I _D = 0.5 • I _{D25}		60	nC
Q_{gs}			18	nC
Q_{gd}			13	nC
R_{thJC}				0.50 °C/W
R_{thCS}	TO-220		0.50	°C/W
R_{thCS}	TO-3P		0.25	°C/W

Source-Drain Diode

Symbol	Test Conditions	Characteristic Values		
(T _J = 25°C, Unless Otherwise Specified)		Min.	Typ.	Max.
I_S	V _{GS} = 0V			48 A
I_{SM}	Repetitive, Pulse Width Limited by T _{JM}			192 A
V_{SD}	I _F = 48A, V _{GS} = 0V, Note 1			1.2 V
t_{rr}	I _F = 0.5 • I _{D25} , V _{GS} = 0V -di/dt = 100A/μs V _R = 0.5 • V _{DSS}		130	ns
I_{RM}			8.5	A
Q_{RM}			550	nC

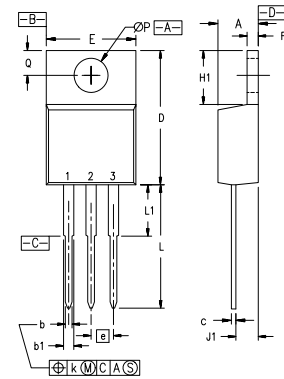
Note: 1. Pulse test, t ≤ 300μs, duty cycle, d ≤ 2%.

TO-263 (IXTA) Outline



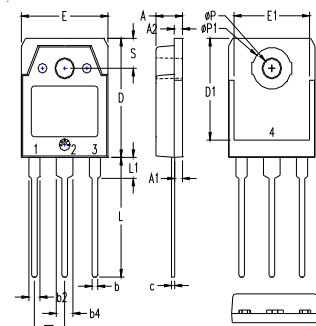
Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.06	4.83	.160	.190
b	0.51	0.99	.020	.039
b2	1.14	1.40	.045	.055
c	0.40	0.74	.016	.029
c2	1.14	1.40	.045	.055
D	8.64	9.65	.340	.380
D1	8.00	8.89	.280	.320
E	9.65	10.41	.380	.405
E1	6.22	8.13	.270	.320
e	2.54	BSC	.100	BSC
L	14.61	15.88	.575	.625
L1	2.29	2.79	.090	.110
L2	1.02	1.40	.040	.055
L3	1.27	1.78	.050	.070
L4	0	0.13	0	.005

TO-220 (IXTP) Outline



SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.170	.190	4.32	4.83
b	.025	.040	0.64	1.02
b1	.045	.065	1.15	1.65
c	.014	.022	0.35	0.56
D	.580	.630	14.73	16.00
E	.390	.420	9.91	10.66
e	.100 BSC		2.54 BSC	
F	.045	.055	1.14	1.40
H1	.230	.270	5.85	6.85
J1	.090	.110	2.29	2.79
k	0	.015	0	0.38
L	.500	.550	12.70	13.97
L1	.110	.230	2.79	5.84
ØP	.139	.161	3.53	4.08
Q	.100	.125	2.54	3.18

TO-3P (IXTQ) Outline



SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.185	.193	4.70	4.90
A1	.051	.059	1.30	1.50
A2	.057	.065	1.45	1.65
b	.035	.045	0.90	1.15
b2	.075	.087	1.90	2.20
b4	.114	.126	2.90	3.20
c	.022	.031	0.55	0.80
D	.780	.799	19.80	20.30
D1	.665	.677	16.90	17.20
E	.610	.622	15.50	15.80
E1	.531	.539	13.50	13.70
e	.215 BSC		5.45 BSC	
L	.779	.795	19.80	20.20
L1	.134	.142	3.40	3.60
ØP	.126	.134	3.20	3.40
ØP1	.272	.280	6.90	7.10
S	.193	.201	4.90	5.10

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
	4,850,072	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 @ $T_J = 25^\circ\text{C}$

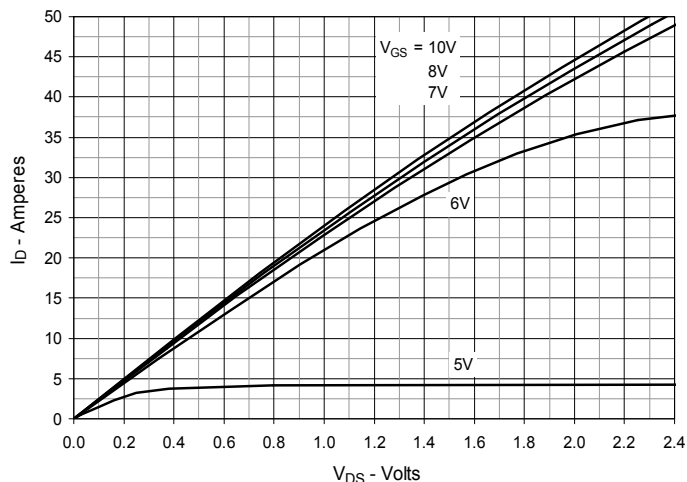


Fig. 2. Extended Output Characteristics @ $T_J = 25^\circ\text{C}$

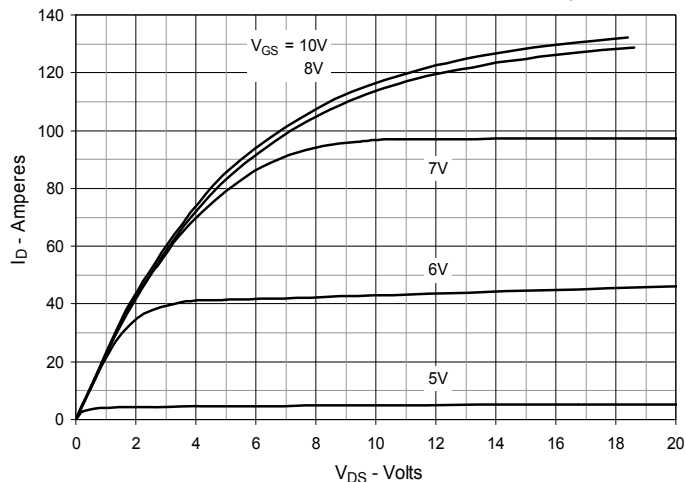


Fig. 3. Output Characteristics @ $T_J = 150^\circ\text{C}$

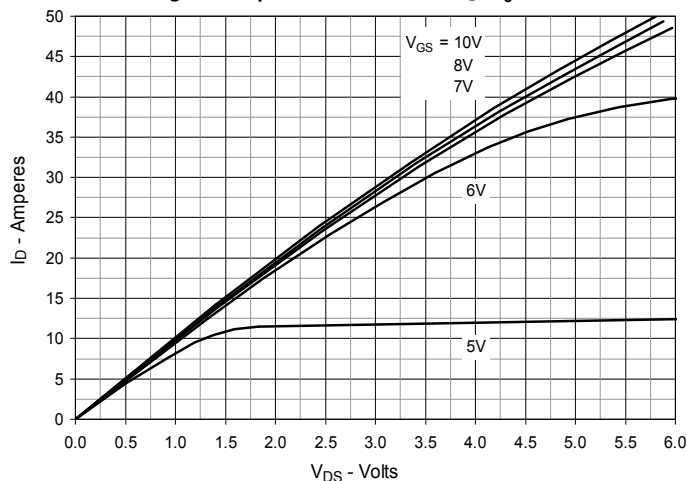


Fig. 4. $R_{DS(on)}$ Normalized to $I_D = 24\text{A}$ Value vs. Junction Temperature

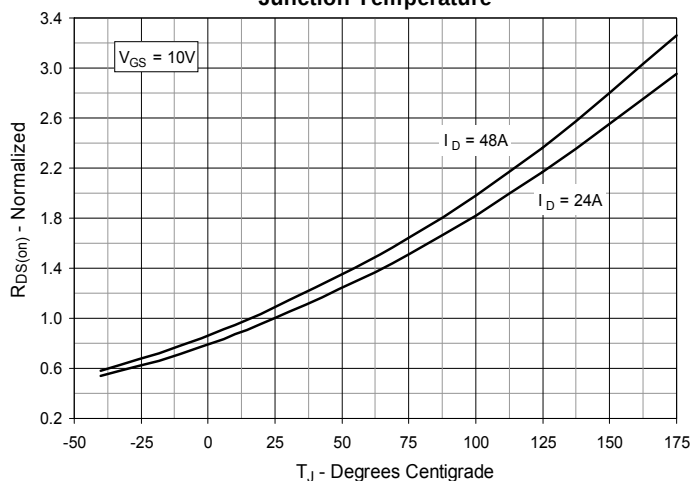


Fig. 5. $R_{DS(on)}$ Normalized to $I_D = 24\text{A}$ Value vs. Drain Current

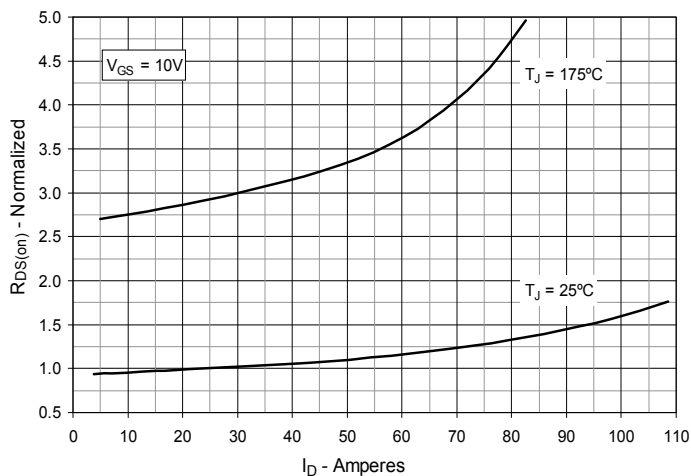


Fig. 6. Maximum Drain Current vs. Case Temperature

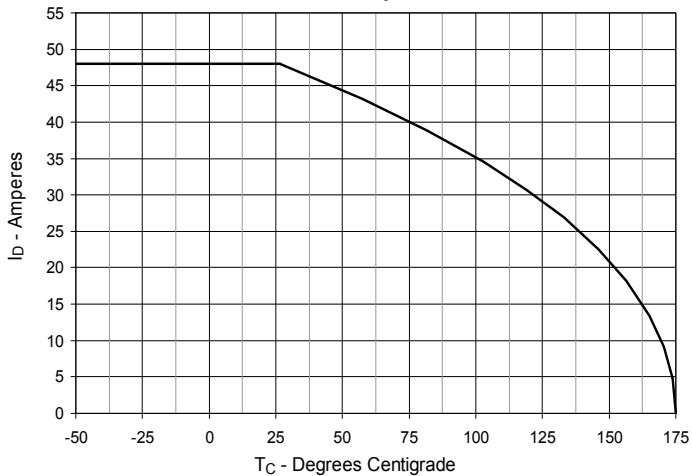


Fig. 7. Input Admittance

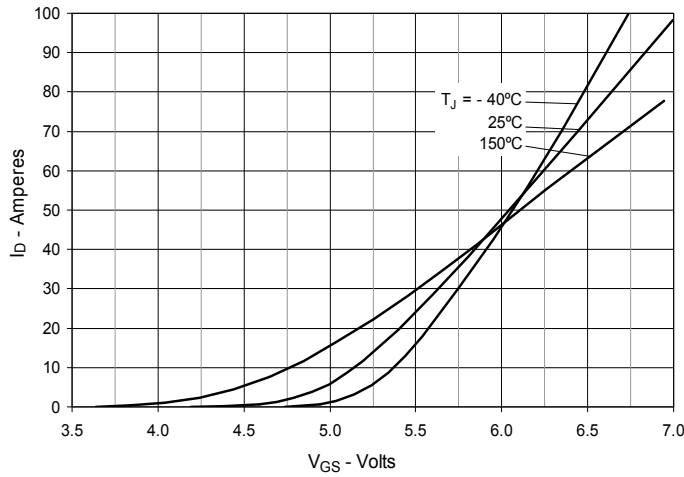


Fig. 8. Transconductance

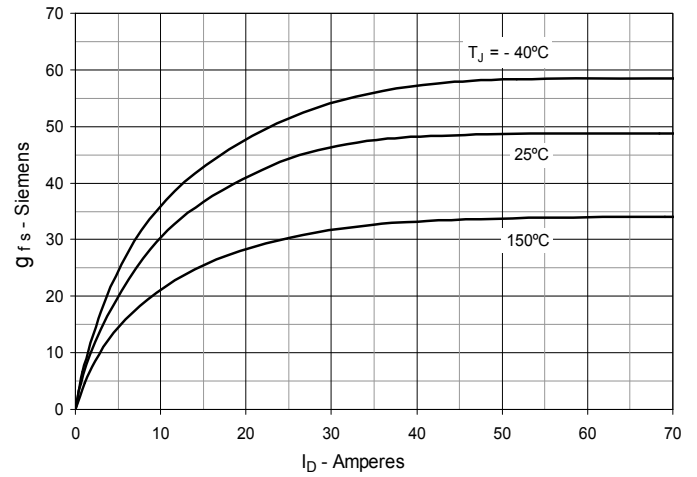


Fig. 9. Forward Voltage Drop of Intrinsic Diode

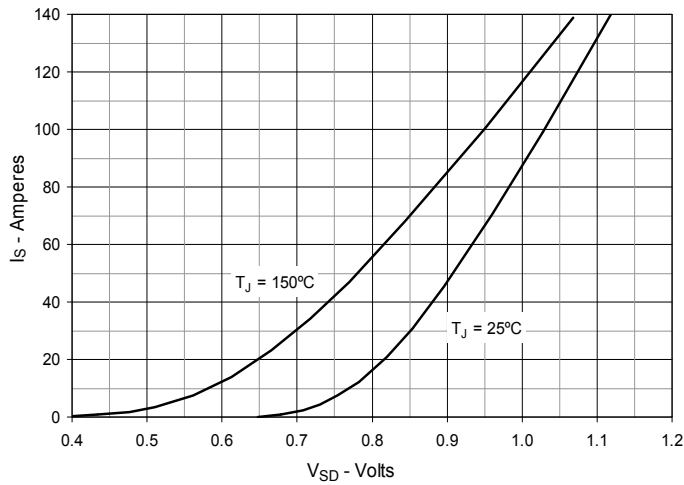


Fig. 10. Gate Charge

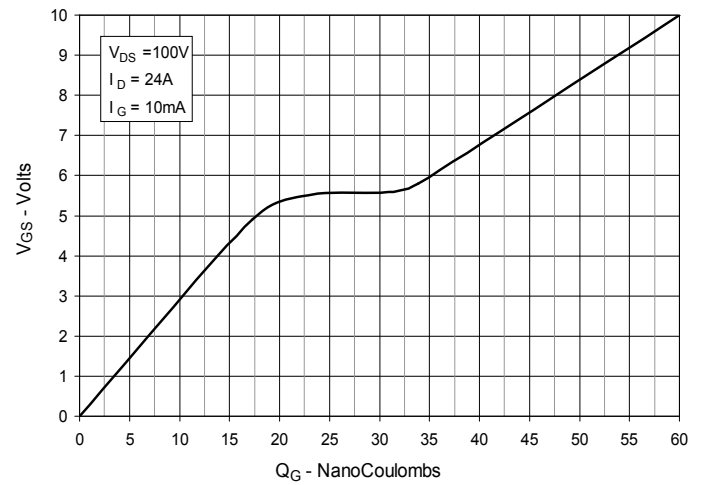


Fig. 11. Capacitance

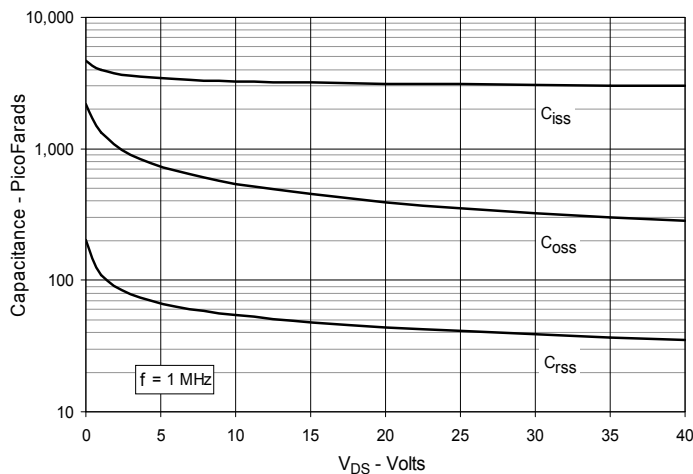
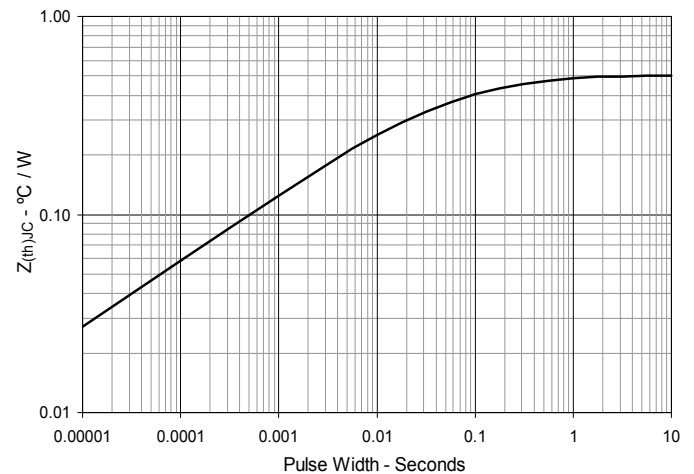
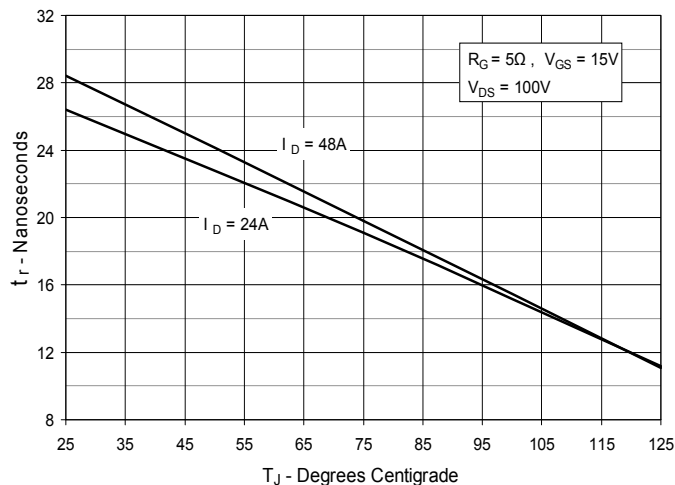
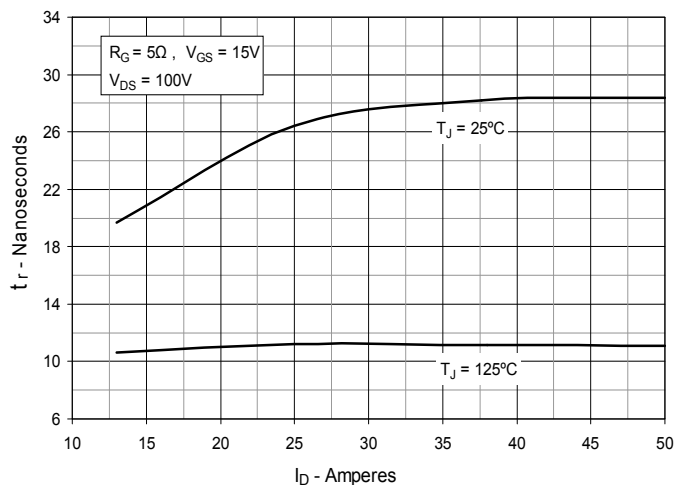
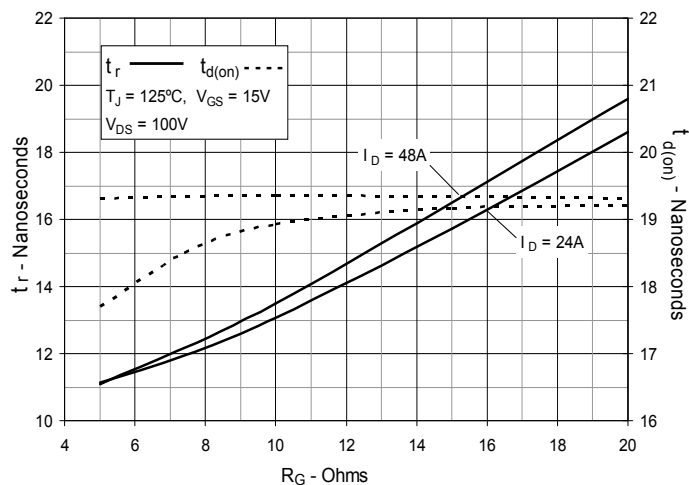
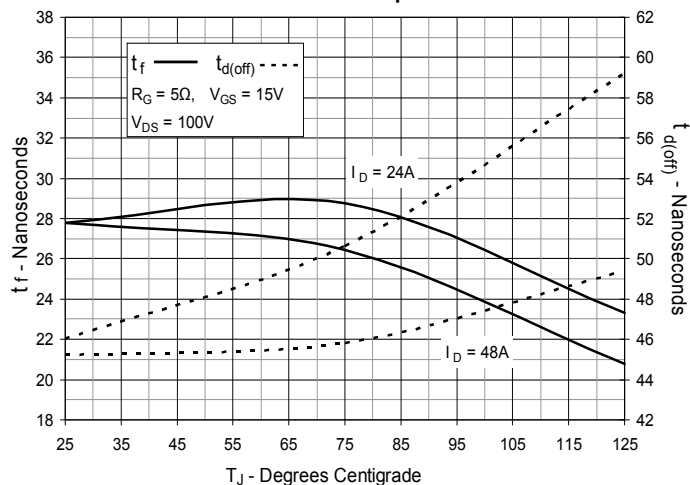
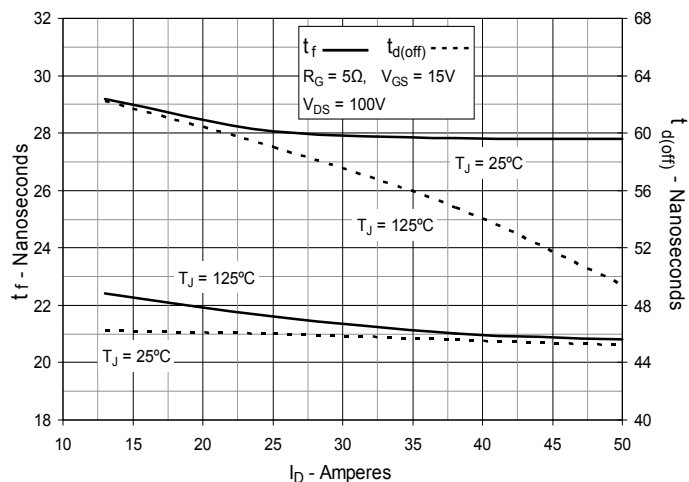
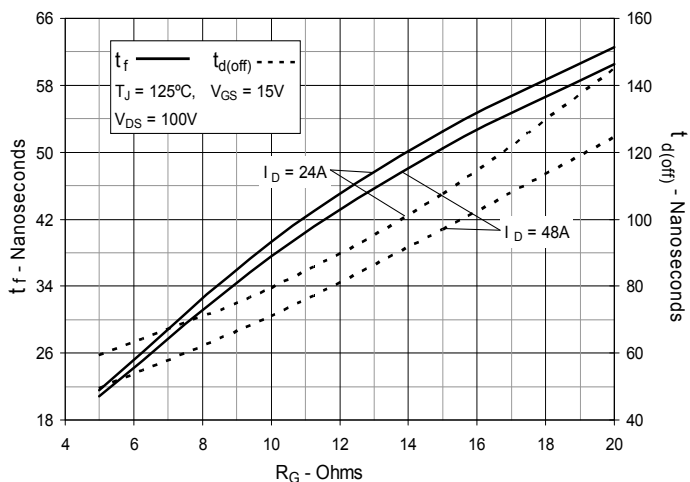


Fig. 12. Maximum Transient Thermal Impedance



**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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