IXYS

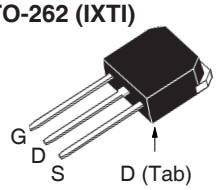
TrenchT2™ Power MOSFET

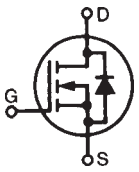
N-Channel Enhancement Mode
Avalanche Rated

IXTI90N055T2
IXTY90N055T2
IXTA90N055T2
IXTP90N055T2

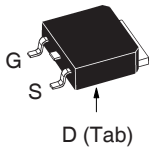
V_{DSS} = 55V
I_{D25} = 90A
$R_{DS(on)}$ ≤ 8.4mΩ

TO-262 (IXTI)

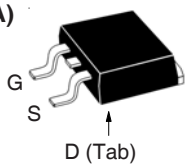




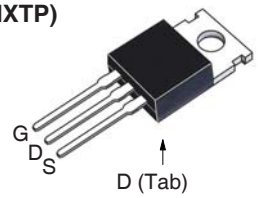
TO-252 (IXTY)



TO-263 (IXTA)



TO-220 (IXTP)



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

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 175°C	55	V
V_{DGR}	T_J = 25°C to 175°C, R_{GS} = 1MΩ	55	V
V_{GSM}	Transient	±20	V
I_{D25}	T_C = 25°C	90	A
I_{DM}	T_C = 25°C, Pulse Width Limited by T_{JM}	230	A
I_A	T_C = 25°C	50	A
E_{AS}	T_C = 25°C	300	mJ
P_D	T_C = 25°C	150	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}	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)	1.13 / 10	Nm/lb.in
Weight	TO-252	0.35	g
	TO-262 (Lead)	0.40	g
	TO-263	2.50	g
	TO-220	3.00	g

Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0V, I_D = 250μA	55			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 250μA	2.0		4.0	V
I_{GSS}	V_{GS} = ± 20V, V_{DS} = 0V			±200	nA
I_{DSS}	$V_{DS} = V_{DSS}$, V_{GS} = 0V			2	μA
	T_J = 150°C			200	μA
$R_{DS(on)}$	V_{GS} = 10V, I_D = 25A, Notes 1 & 2		7.0	8.4	mΩ

Features

- International Standard Packages
- Avalanche Rated
- Low Package Inductance
- Fast Intrinsic Rectifier
  175°C Operating Temperature
- High Current Handling Capability
- ROHS Compliant
- High Performance Trench
  Technology for extremely low $R_{DS(on)}$

Advantages

- High Power Density
- Easy to Mount
- Space Savings

Applications

- Automotive Engine Control
- Synchronous Buck Converter
  (for Notebook SystemPower &
  General Purpose Point & Load)
- DC/DC Converters
- High Current Switching Applications
- Power Train Management
- Distributed Power Architecture

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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 = 45A, Note 1	25	43		S
C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		2770		pF
C_{oss}			420		pF
C_{rss}			102		pF
$t_{d(on)}$	**Resistive Switching Times**		19		ns
t_r	V_{GS} = 10V, V_{DS} = 30V, I_D = 25A		21		ns
$t_{d(off)}$	R_G = 5Ω (External)		39		ns
t_f			19		ns
$Q_{g(on)}$	V_{GS} = 10V, V_{DS} = 30V, I_D = 25A		42		nC
Q_{gs}			14		nC
Q_{gd}			8.5		nC
R_{thJC}				1.00	°C/W
R_{thCS}	TO-220		0.50		°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			90	A
I_{SM}	Repetitive, Pulse Width Limited by T_{JM}			360	A
V_{SD}	I_F = 25A, V_{GS} = 0V, Note 1		0.85	1.00	V
t_{rr}	I_F = 45A, V_{GS} = 0V,		37		ns
I_{RM}	-di/dt = 100A/μs, V_R = 27V		2.2		A
Q_{RM}			40		nC

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

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 4,860,072 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

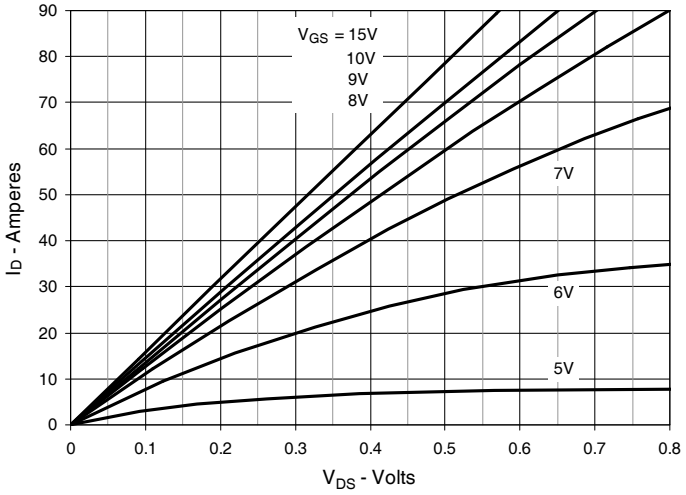


Fig. 2. Extended Output Characteristics @ T_J = 25°C

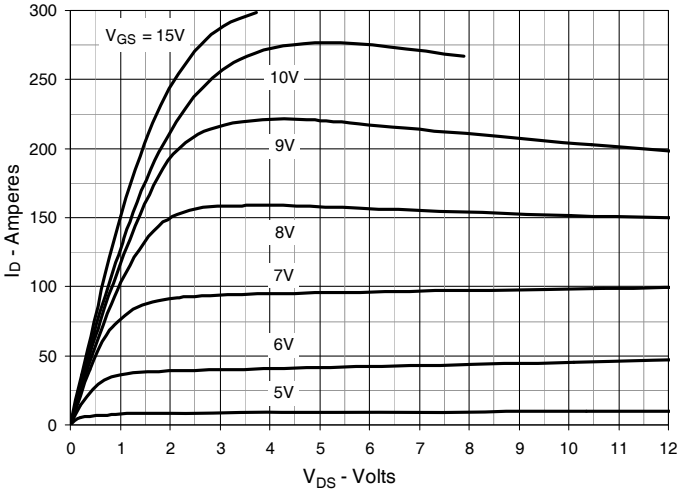


Fig. 3. Output Characteristics @ T_J = 150°C

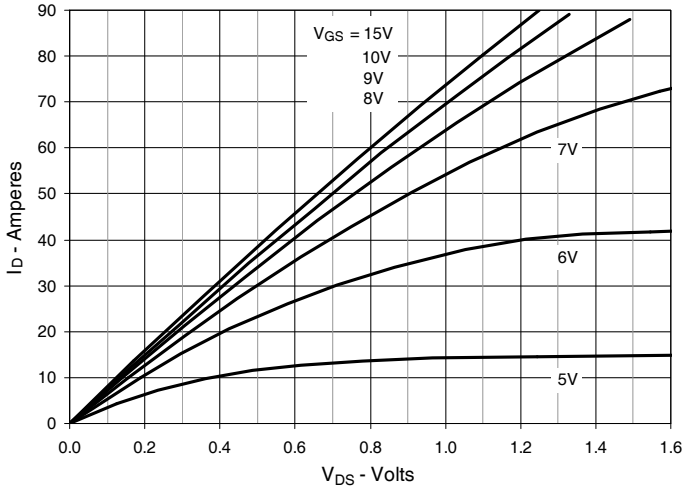


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 45A Value vs. Junction Temperature

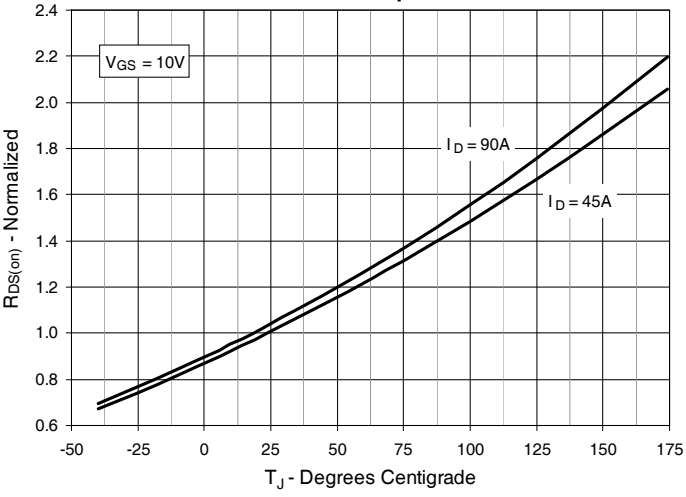


Fig. 5. $R_{DS(on)}$ Normalized to I_D = 45A Value vs. Drain Current

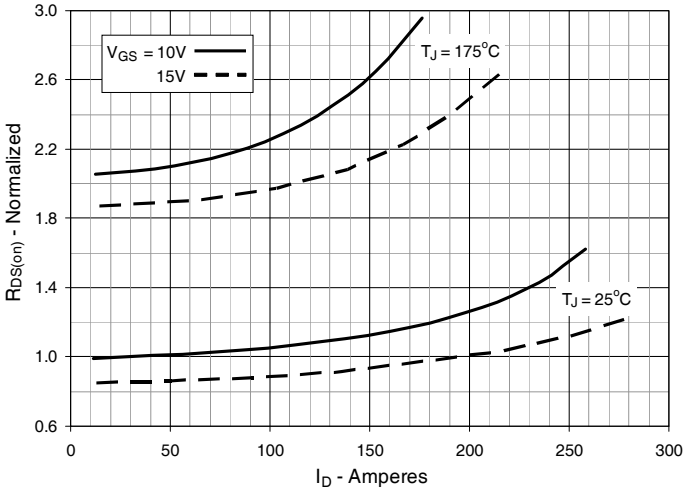
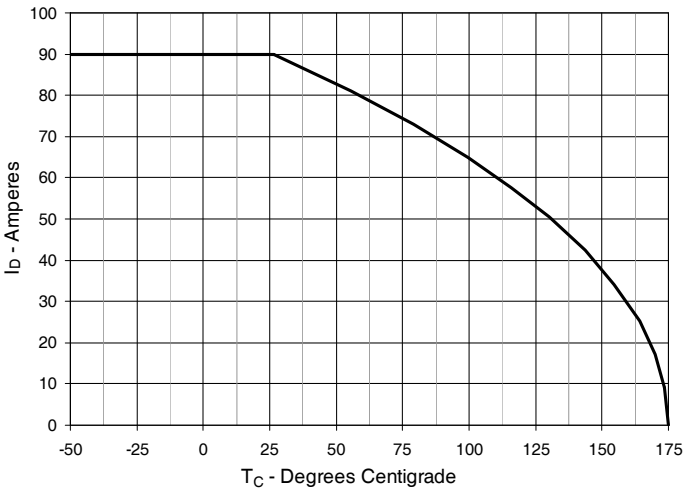


Fig. 6. Drain Current vs. Case Temperature



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Fig. 7. Input Admittance

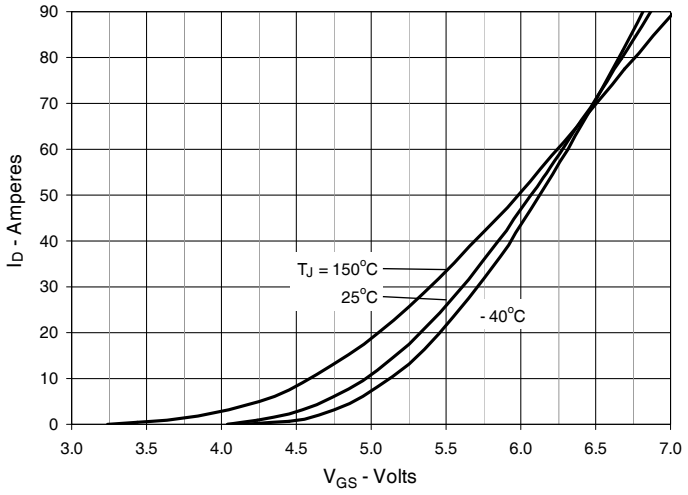


Fig. 8. Transconductance

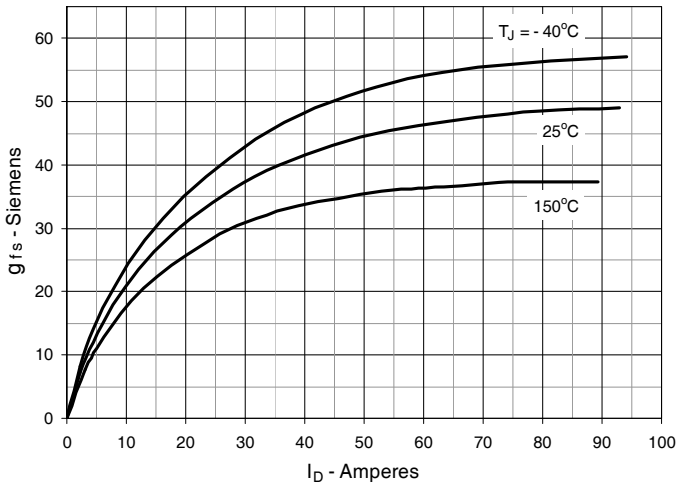


Fig. 9. Forward Voltage Drop of Intrinsic Diode

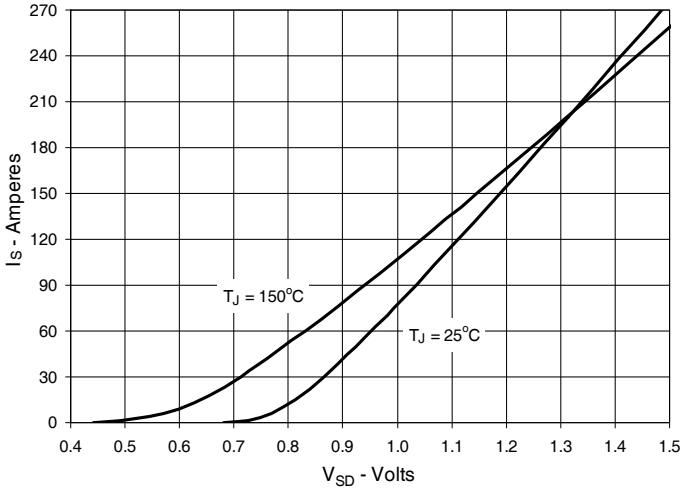


Fig. 10. Gate Charge

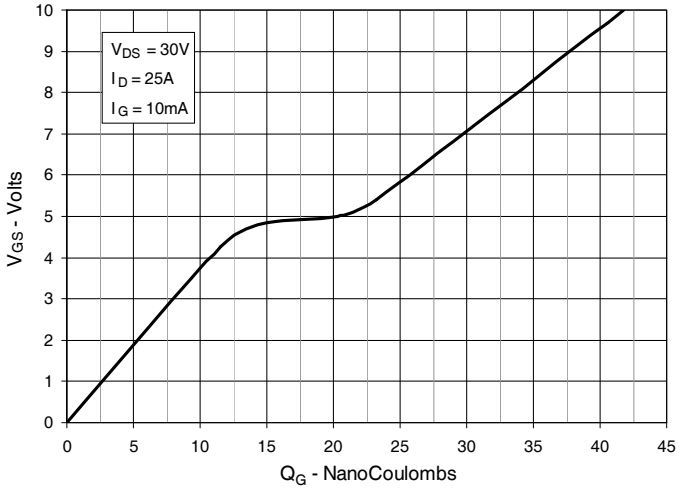


Fig. 11. Capacitance

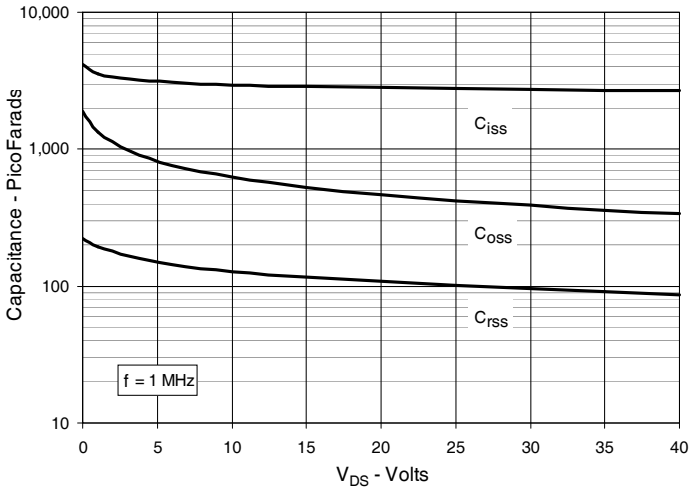
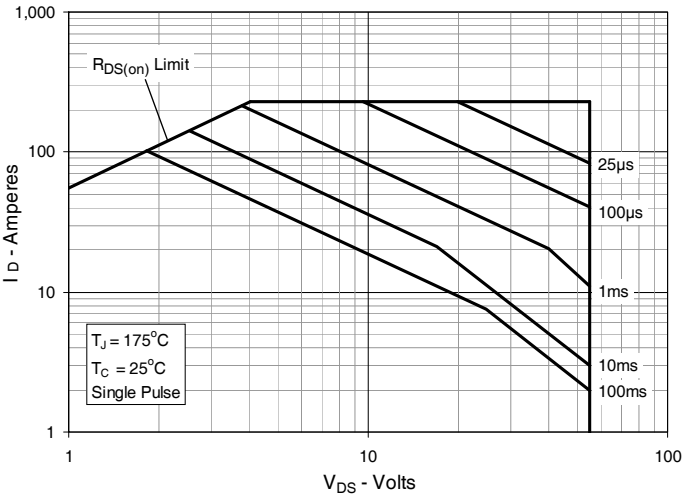


Fig. 12. Forward-Bias Safe Operating Area



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

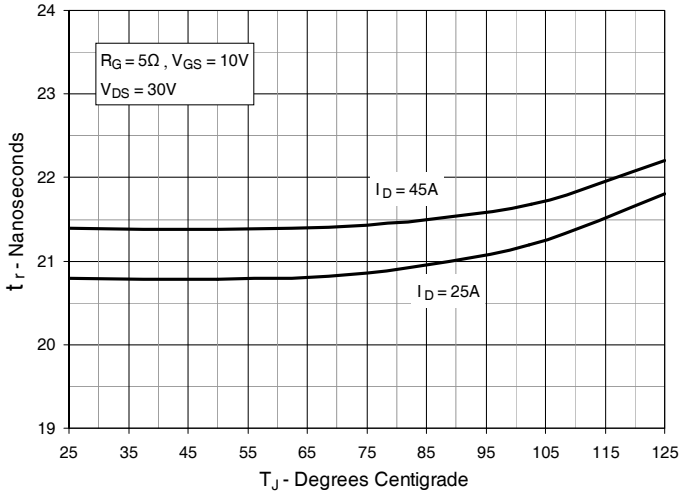


Fig. 14. Resistive Turn-on Rise Time vs. Drain Current

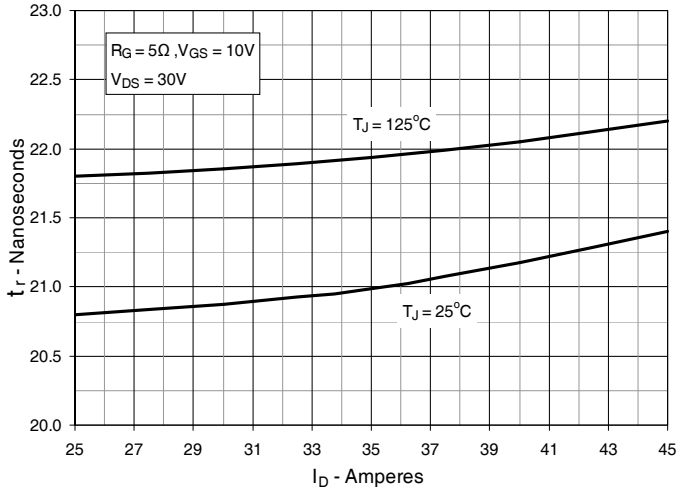


Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance

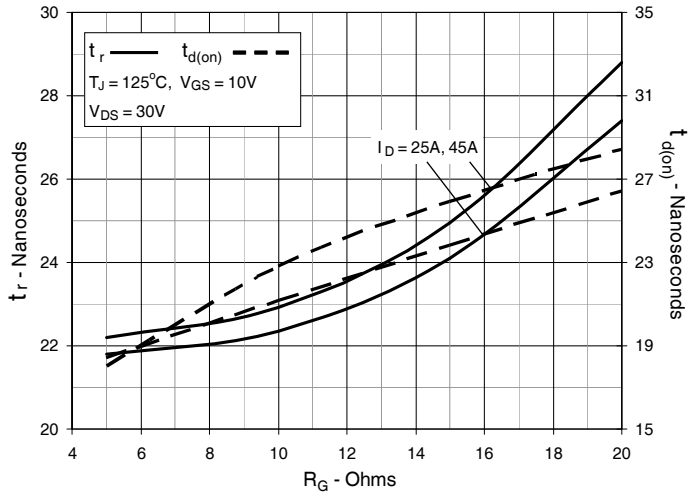


Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature

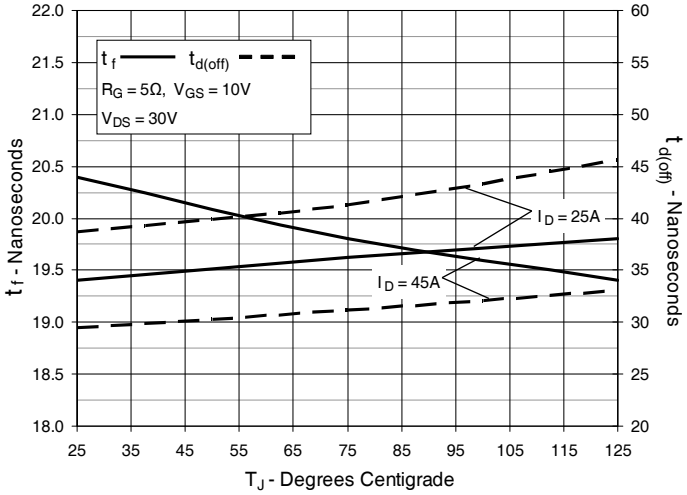


Fig. 17. Resistive Turn-off Switching Times vs. Drain Current

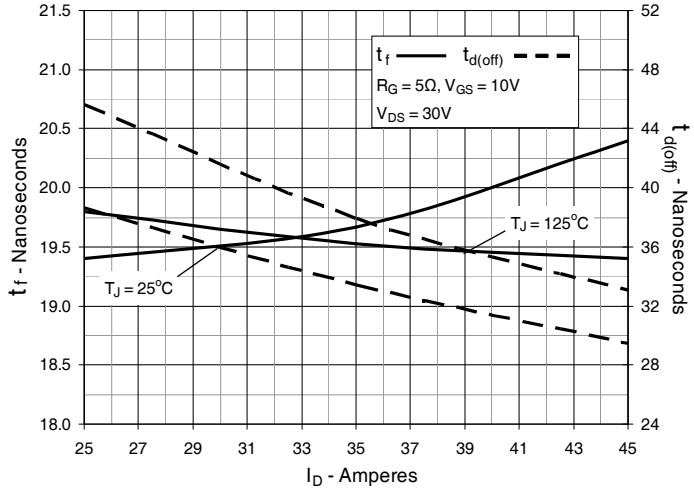
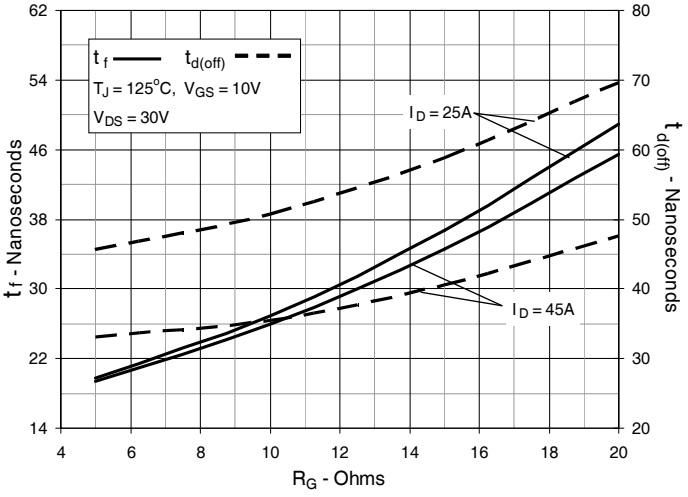
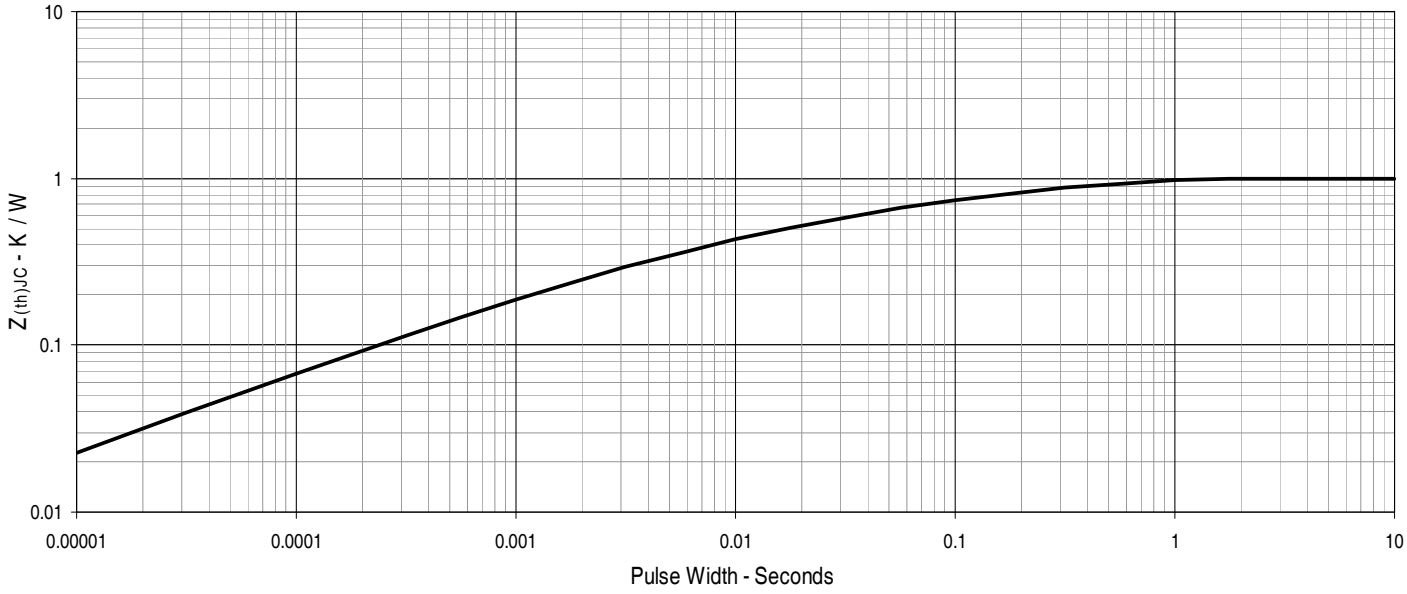


Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance

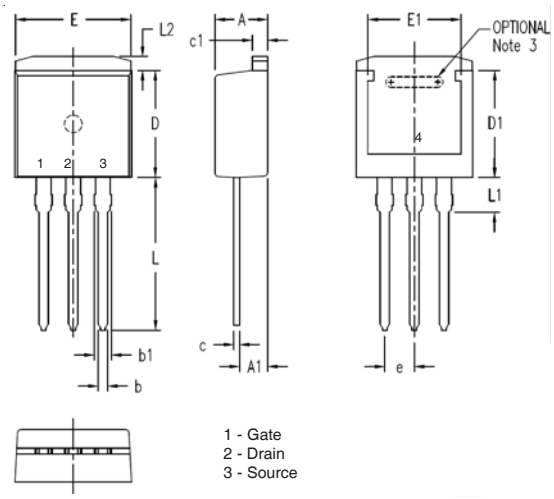


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Fig. 19. Maximum Transient Thermal Impedance



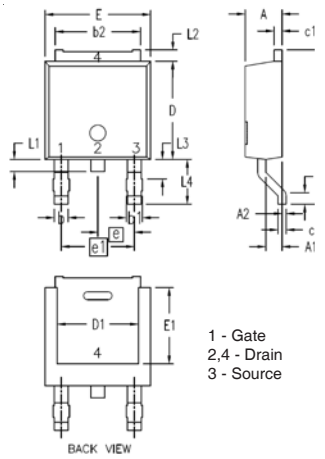
Leaded 262 (IXTI) Outline



1 - Gate
2 - Drain
3 - Source

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.160	.190	4.06	4.83
A1	.080	.110	2.03	2.79
b	.025	.035	0.64	0.88
b1	.025	.039	1.14	1.40
c	.018	.025	0.46	0.64
c1	.045	.055	1.14	1.40
D	.340	.380	8.64	9.65
D1	.270	.290	6.86	7.37
E	.380	.405	9.65	10.29
E1	.245	.320	6.22	8.13
e	.100 BSC		2.54 BSC	
L	.500	.560	12.70	14.22
L1	.100	.125	2.54	3.18
L2	.040	.055	1.02	1.40

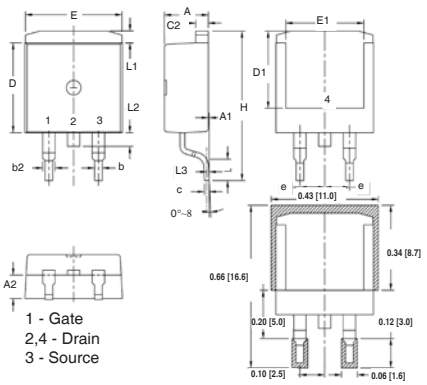
TO-252 Outline



1 - Gate
2,4 - Drain
3 - Source

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.086	.094	2.19	2.38
A1	.035	.045	0.89	1.14
A2	0	.004	0	0.10
b	.025	.035	0.64	0.89
b1	.030	.045	0.76	1.14
b2	.205	.215	5.21	5.46
c	.018	.023	0.46	0.58
c1	.018	.023	0.46	0.58
D	.235	.245	5.97	6.22
D1	.170	.205	4.32	5.21
E	.250	.265	6.35	6.73
E1	.170	.205	4.32	5.21
e	.090 BSC		2.28 BSC	
e1	.180 BSC		4.57 BSC	
H	.370	.410	9.40	10.42
L	.020	.040	0.51	1.02
L1	.025	.040	0.64	1.02
L2	.024	.036	0.60	0.90
L3	.045	.060	1.15	1.52
L4	.100	.115	2.54	2.92

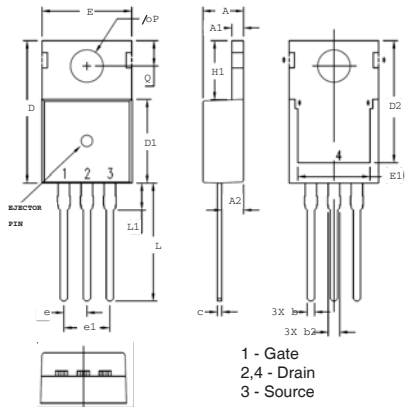
TO-263 Outline



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

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