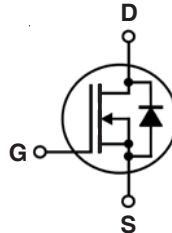


## Depletion Mode MOSFET

**IXTY08N50D2**  
**IXTA08N50D2**  
**IXTP08N50D2**

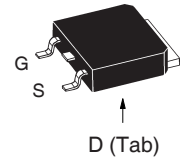
$V_{DSX} = 500V$   
 $I_{D(on)} \geq 800mA$   
 $R_{DS(on)} \leq 4.6\Omega$

### N-Channel

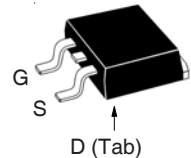


Symbol	Test Conditions	Maximum Ratings	
$V_{DSX}$	$T_J = 25^\circ C$ to $150^\circ C$	500	V
$V_{GSX}$	Continuous	$\pm 20$	V
$V_{GSM}$	Transient	$\pm 30$	V
$P_D$	$T_C = 25^\circ C$	60	W
$T_J$		- 55 ... +150	$^\circ C$
$T_{JM}$		150	$^\circ C$
$T_{stg}$		- 55 ... +150	$^\circ C$
$T_L$	Maximum Lead Temperature for Soldering	300	$^\circ C$
$T_{SOLD}$	Plastic Body for 10s	260	$^\circ C$
$M_d$	Mounting Torque (TO-220)	1.13 / 10	Nm/lb.in.
Weight	TO-252	0.35	g
	TO-263	2.50	g
	TO-220	3.00	g

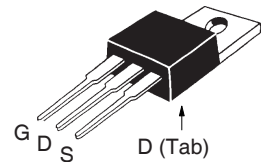
### TO-252 (IXTY)



### TO-263 (IXTA)



### TO-220 (IXTP)



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

Symbol	Test Conditions ( $T_J = 25^\circ C$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$BV_{DSX}$	$V_{GS} = -5V, I_D = 25\mu A$	500		V
$V_{GS(off)}$	$V_{DS} = 25V, I_D = 25\mu A$	- 2.5		- 4.5 V
$I_{GSX}$	$V_{GS} = \pm 20V, V_{DS} = 0V$			$\pm 50$ nA
$I_{DSX(off)}$	$V_{DS} = V_{DSX}, V_{GS} = -5V$ $T_J = 125^\circ C$			1 $\mu A$ 10 $\mu A$
$R_{DS(on)}$	$V_{GS} = 0V, I_D = 400mA, \text{ Note 1}$			4.6 $\Omega$
$I_{D(on)}$	$V_{GS} = 0V, V_{DS} = 25V, \text{ Note 1}$	800		mA

### Features

- Normally ON Mode
- International Standard Packages
- Molding Epoxies Meet UL 94 V-0 Flammability Classification

### Advantages

- Easy to Mount
- Space Savings
- High Power Density

### Applications

- Audio Amplifiers
- Start-up Circuits
- Protection Circuits
- Ramp Generators
- Current Regulators
- Active Loads

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$g_{fs}$	$V_{DS} = 30\text{V}$ , $I_D = 400\text{mA}$ , Note 1	340	570	mS
$C_{iss}$	$V_{GS} = -10\text{V}$ , $V_{DS} = 25\text{V}$ , $f = 1\text{MHz}$		312	pF
$C_{oss}$			35	pF
$C_{rss}$			11	pF
$t_{d(on)}$	<b>Resistive Switching Times</b> $V_{GS} = \pm 5\text{V}$ , $V_{DS} = 250\text{V}$ , $I_D = 400\text{mA}$ $R_G = 10\Omega$ (External)		28	ns
$t_r$			54	ns
$t_{d(off)}$			35	ns
$t_f$			52	ns
$Q_{g(on)}$	$V_{GS} = 5\text{V}$ , $V_{DS} = 250\text{V}$ , $I_D = 400\text{mA}$		12.7	nC
$Q_{gs}$			1.2	nC
$Q_{gd}$			7.3	nC
$R_{thJC}$	TO-220			2.08 $^\circ\text{C/W}$
$R_{thCS}$			0.50	$^\circ\text{C/W}$

#### Safe-Operating-Area Specification

Symbol	Test Conditions	Characteristic Values		
		Min.	Typ.	Max.
SOA	$V_{DS} = 400\text{V}$ , $I_D = 90\text{mA}$ , $T_C = 75^\circ\text{C}$ , $T_p = 5\text{s}$	36		W

#### Source-Drain Diode

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$V_{SD}$	$I_F = 800\text{mA}$ , $V_{GS} = -10\text{V}$ , Note 1		0.8	1.3 V
$t_{rr}$	$I_F = 800\text{mA}$ , $-di/dt = 100\text{A}/\mu\text{s}$ $V_R = 100\text{V}$ , $V_{GS} = -10\text{V}$		400	ns
$I_{RM}$			5.2	A
$Q_{RM}$			1.04	$\mu\text{C}$

Note 1. Pulse test,  $t \leq 300\mu\text{s}$ , duty cycle,  $d \leq 2\%$ .

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 @  $T_J = 25^\circ\text{C}$

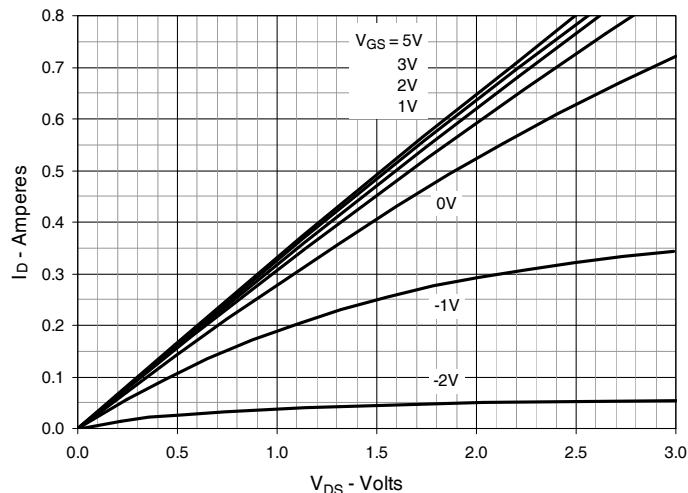


Fig. 2. Extended Output Characteristics @  $T_J = 25^\circ\text{C}$

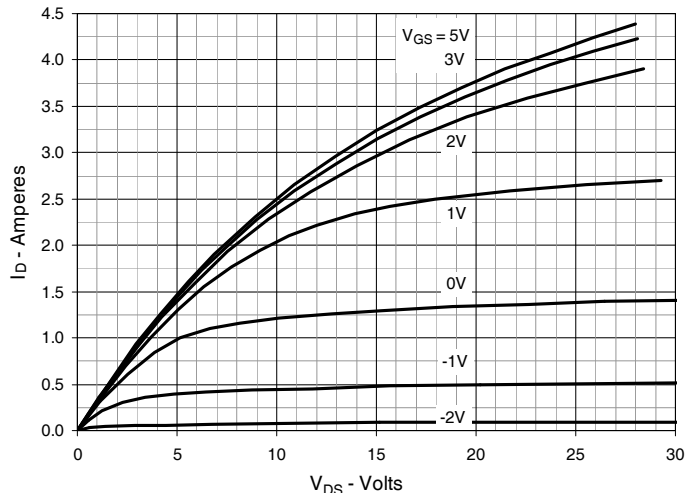


Fig. 3. Output Characteristics @  $T_J = 125^\circ\text{C}$

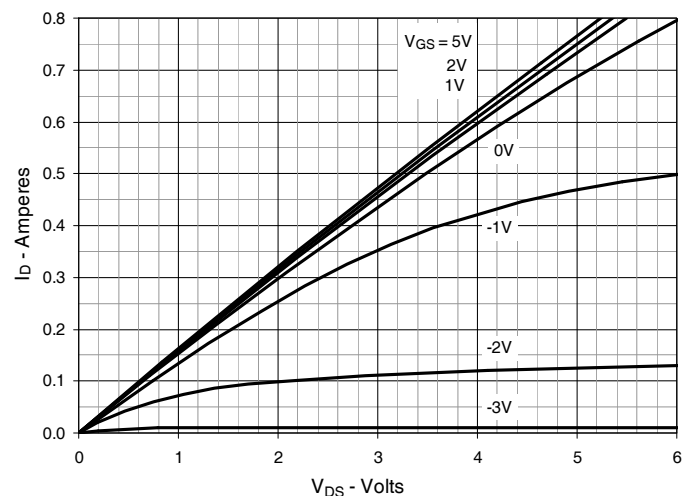


Fig. 4. Drain Current @  $T_J = 25^\circ\text{C}$

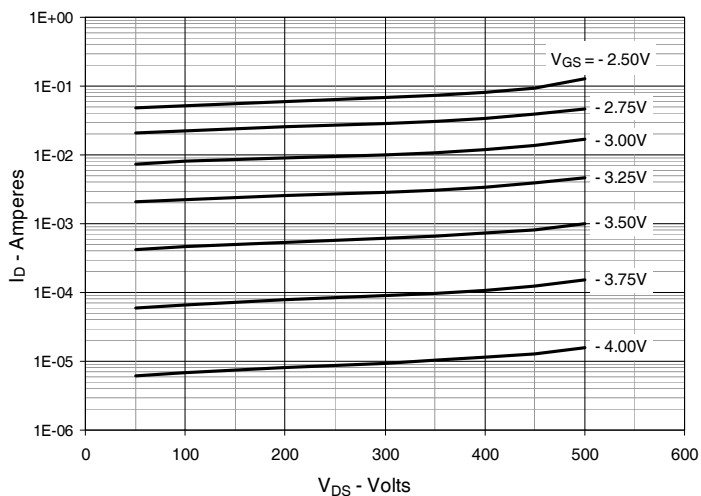


Fig. 5. Drain Current @  $T_J = 100^\circ\text{C}$

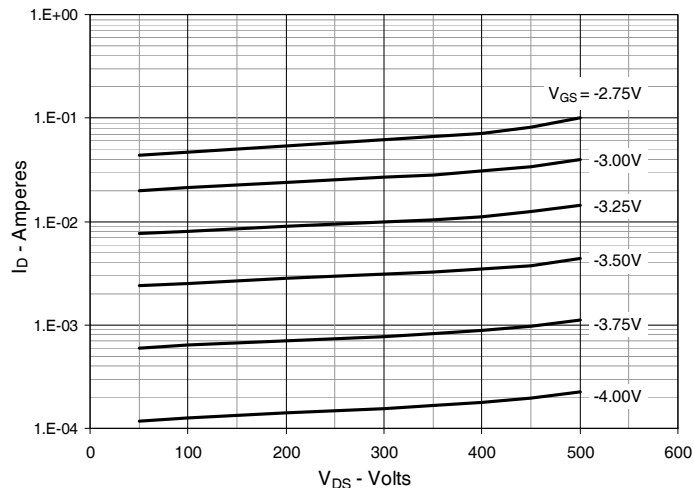
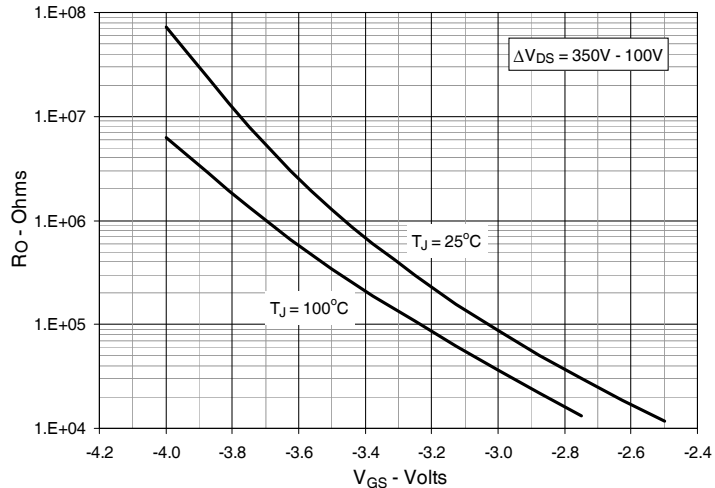
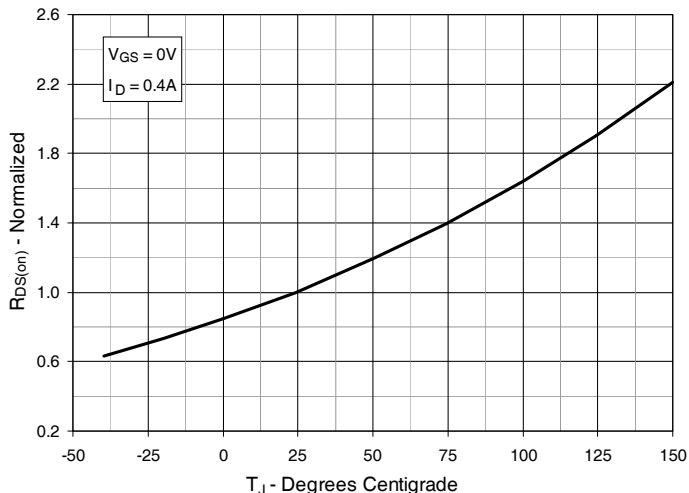


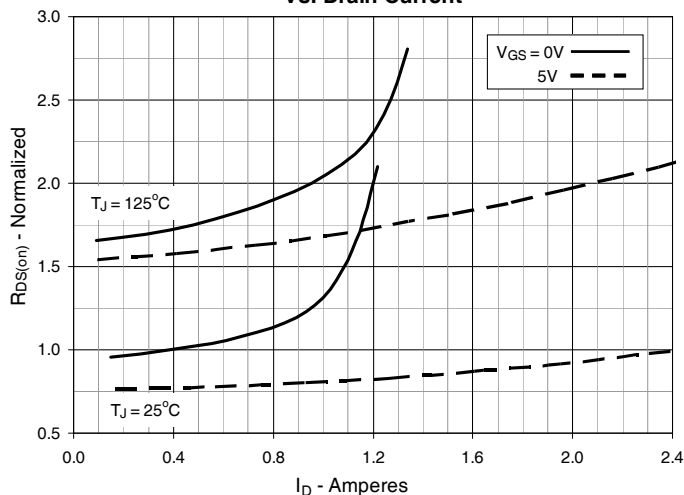
Fig. 6. Dynamic Resistance vs. Gate Voltage



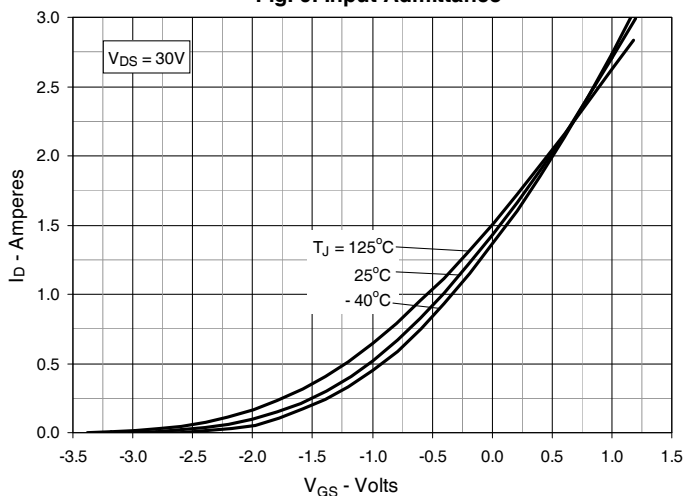
**Fig. 7. Normalized  $R_{DS(on)}$  vs. Junction Temperature**



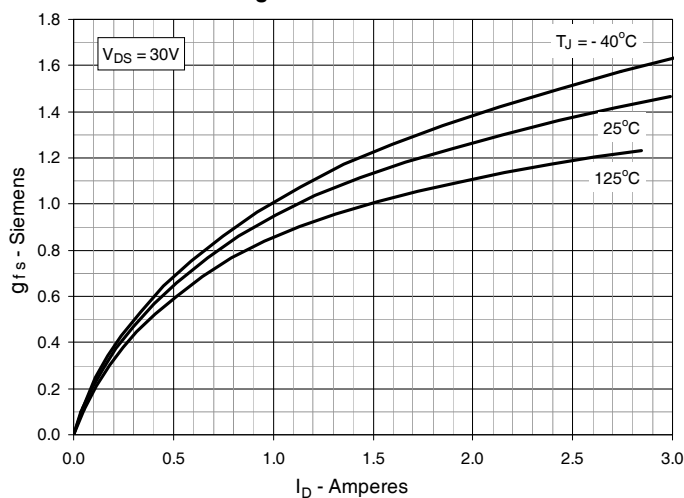
**Fig. 8.  $R_{DS(on)}$  Normalized to  $I_D = 0.4A$  Value vs. Drain Current**



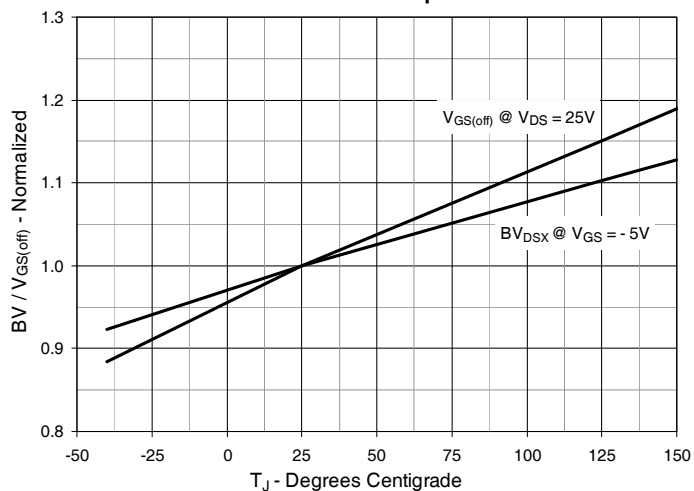
**Fig. 9. Input Admittance**



**Fig. 10. Transconductance**



**Fig. 11. Breakdown and Threshold Voltages vs. Junction Temperature**



**Fig. 12. Forward Voltage Drop of Intrinsic Diode**

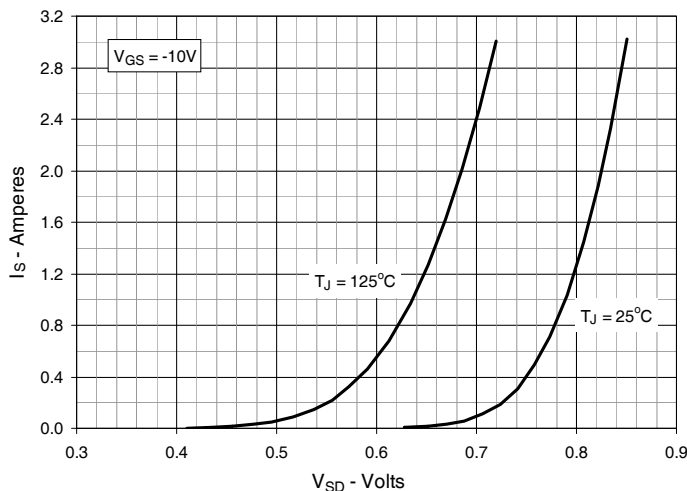


Fig. 13. Capacitance

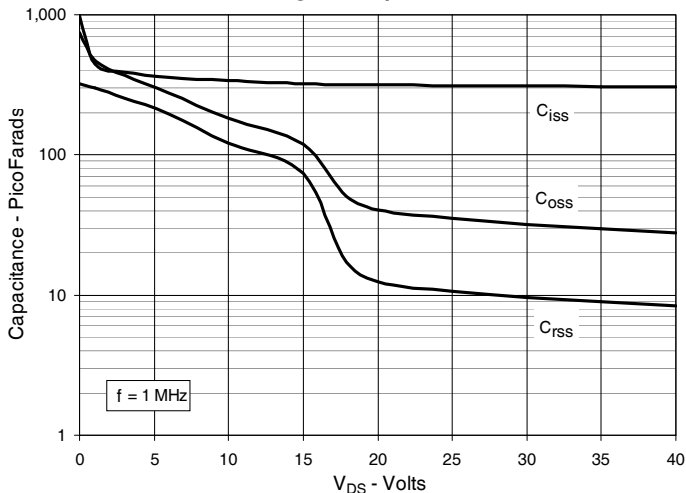


Fig. 14. Gate Charge

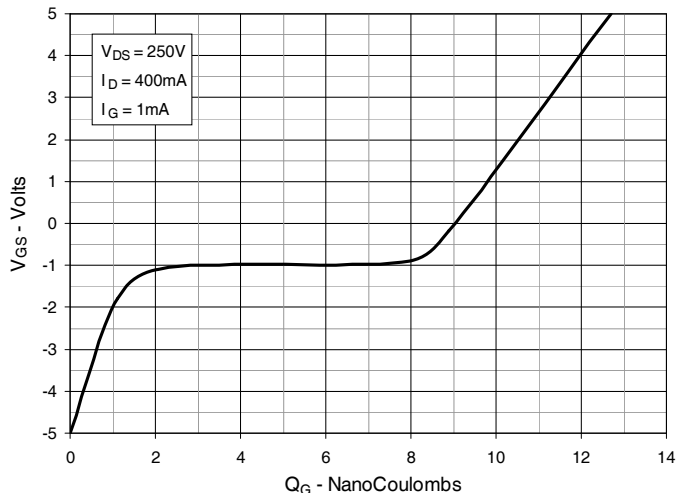


Fig. 15. Forward-Bias Safe Operating Area @ T<sub>C</sub> = 25°C

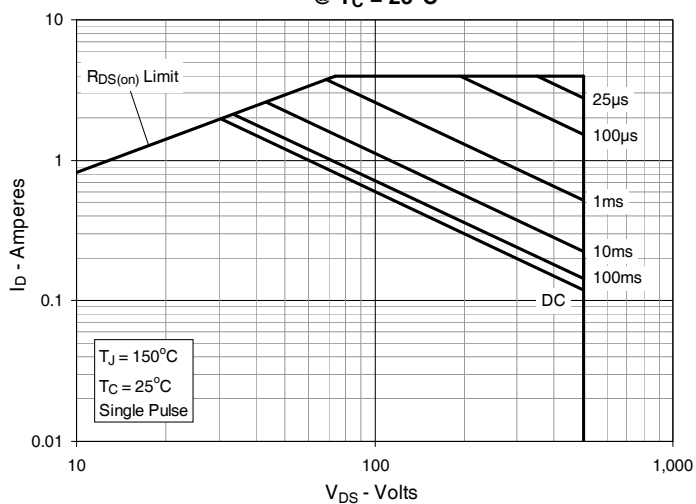


Fig. 16. Forward-Bias Safe Operating Area @ T<sub>C</sub> = 75°C

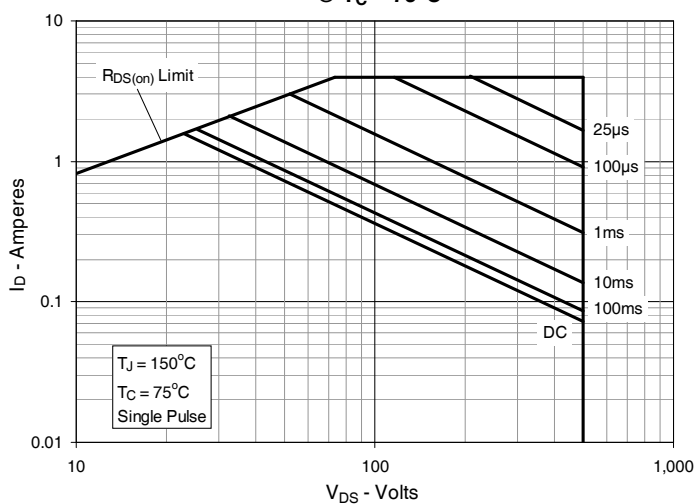
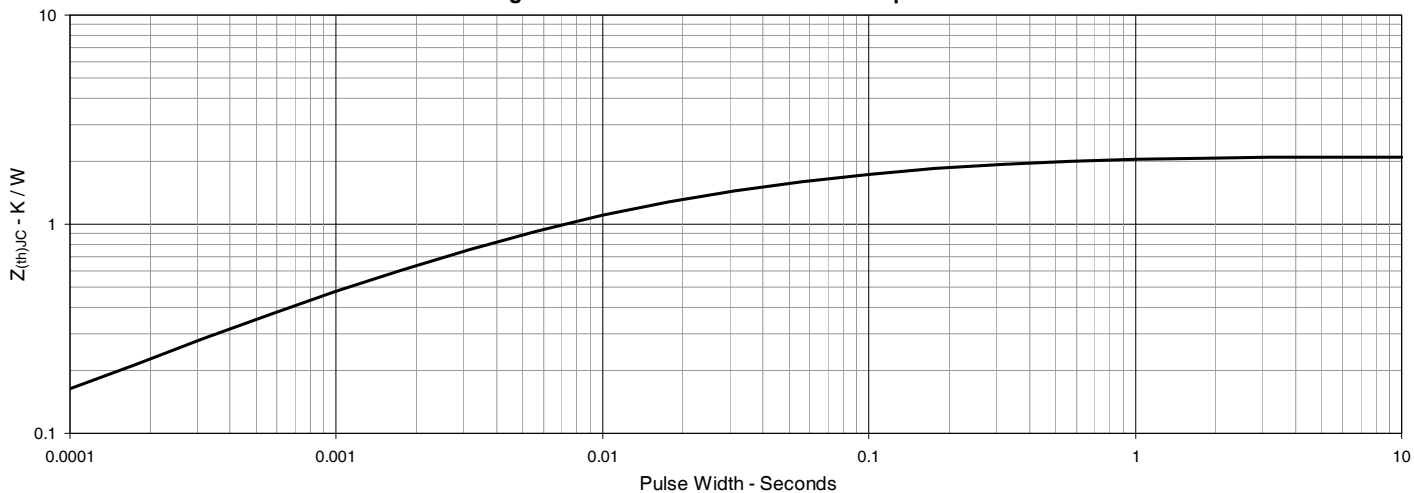
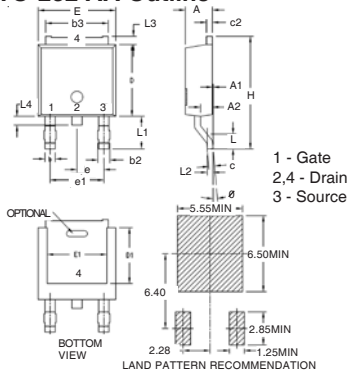


Fig. 17. Maximum Transient Thermal Impedance

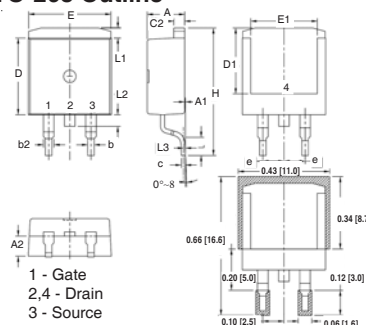


### TO-252 AA Outline



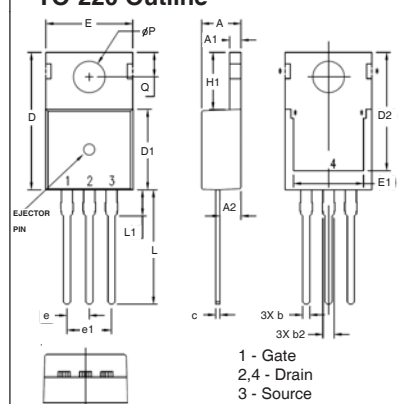
SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.086	.094	2.19	2.38
A1	0	.005	0	0.12
A2	.038	.046	0.97	1.17
b	.025	.035	0.64	0.89
b2	.030	.045	0.76	1.14
b3	.200	.215	5.08	5.46
c	.018	.024	0.46	0.61
c2	.018	.023	0.46	0.58
D	.235	.245	5.97	6.22
D1	.180	.205	4.57	5.21
E	.250	.265	6.35	6.73
E1	.170	.205	4.32	5.21
e	.090 BSC		2.28 BSC	
e1	.180 BSC		4.57 BSC	
H	.370	.410	9.40	10.42
L	.055	.070	1.40	1.78
L1	.100	.115	2.54	2.92
L2	.020 BSC		0.50 BSC	
L3	.025	.040	0.64	1.02
L4	.025	.040	0.64	1.02
ø	0°	10°	0°	10°

### TO-263 Outline



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



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
∅P	.134	.150	3.40	3.80
Q	.106	.126	2.70	3.20



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