



# High Voltage Power MOSFETs

**IXTA/IXTP 3N120**  
**IXTA/IXTP 3N110**

N-Channel Enhancement Mode  
Avalanche Rated, High dv/dt

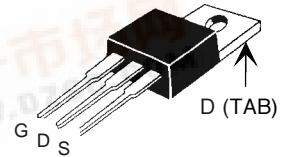
Preliminary Data Sheet



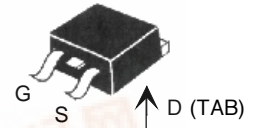
$V_{DSS}$	$I_{D25}$	$R_{DS(on)}$
1200 V	3 A	4.5 $\Omega$
1100 V	3 A	4.0 $\Omega$

Symbol	Test Conditions	Maximum Ratings		
$V_{DSS}$	$T_J = 25^\circ\text{C to } 150^\circ\text{C}$	3N120	1200	V
		3N110	1100	V
$V_{DGR}$	$T_J = 25^\circ\text{C to } 150^\circ\text{C}; R_{GS} = 1 \text{ M}\Omega$	3N120	1200	V
		3N110	1100	V
$V_{GS}$	Continuous		$\pm 20$	V
$V_{GSM}$	Transient		$\pm 30$	V
$I_{D25}$	$T_C = 25^\circ\text{C}$		3	A
$I_{DM}$	$T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$		12	A
$I_{AR}$	$T_C = 25^\circ\text{C}$		3	A
$E_{AR}$	$T_C = 25^\circ\text{C}$		20	mJ
$E_{AS}$			700	mJ
dv/dt	$I_S \leq I_{DM}$ , $di/dt \leq 100 \text{ A}/\mu\text{s}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 150^\circ\text{C}$ , $R_G = 2 \Omega$		5	V/ns
$P_D$	$T_C = 25^\circ\text{C}$		150	W
$T_J$			-55 to +150	$^\circ\text{C}$
$T_{JM}$			150	$^\circ\text{C}$
$T_{stg}$			-55 to +150	$^\circ\text{C}$
$T_L$	1.6 mm (0.063 in) from case for 10 s		300	$^\circ\text{C}$
$M_d$	Mounting torque (TO-220)		1.13/10	Nm/lb.in.
Weight	TO-220		4	g
	TO-263		2	g

TO-220 (IXTP)



TO-263 (IXTA)



G = Gate      D = Drain  
S = Source      TAB = Drain

### Features

- International standard packages
- Low  $R_{DS(on)}$
- Rated for unclamped inductive load switching (UIS)
- Molding epoxies meet UL 94 V-0 flammability classification

### Advantages

- Easy to mount
- Space savings
- High power density

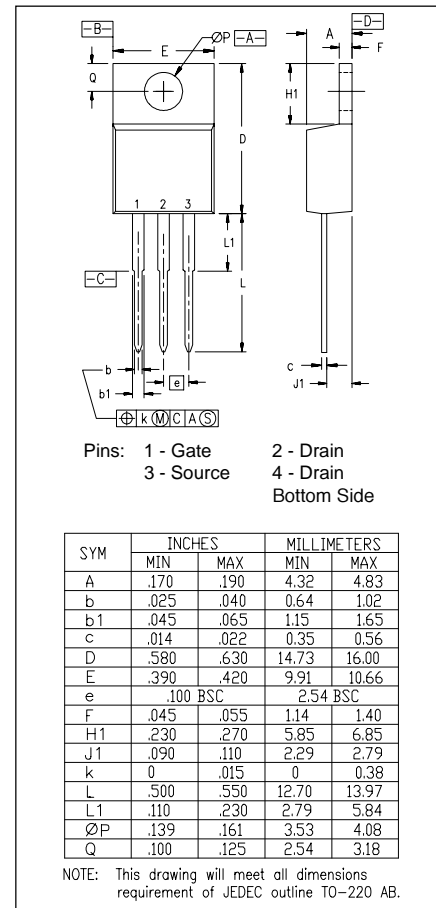
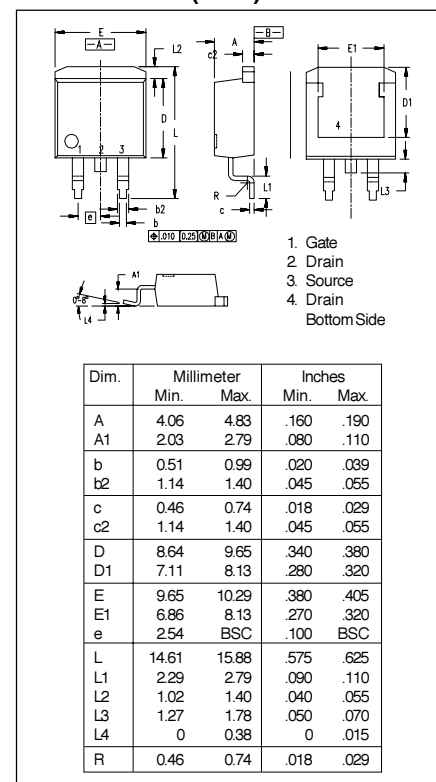
Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$V_{DSS}$	$V_{GS} = 0 \text{ V}$ , $I_D = 1 \text{ mA}$	3N120	1200	V
		3N110	1100	V
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 250 \mu\text{A}$		2.5	V
$I_{GSS}$	$V_{GS} = \pm 20 \text{ V}_{DC}$ , $V_{DS} = 0$			$\pm 100 \text{ nA}$
$I_{DSS}$	$V_{DS} = 0.8 V_{DSS}$ , $V_{GS} = 0 \text{ V}$	$T_J = 25^\circ\text{C}$		25 $\mu\text{A}$
		$T_J = 125^\circ\text{C}$		1 mA
$R_{DS(on)}$	$V_{GS} = 10 \text{ V}$ , $I_D = 0.5 I_{D25}$ Note 1	3N120		4.5 $\Omega$
		3N110		4.0 $\Omega$



Symbol	Test Conditions	Characteristic Values		
		$(T_J = 25^\circ\text{C}, \text{ unless otherwise specified})$		
		min.	typ.	max.
$g_{fs}$	$V_{DS} = 10\text{ V}; I_D = 0.5 \cdot I_{D25}, \text{ Note 1}$	1.5	2.2	S
$C_{iss}$	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		1050	1300 pF
$C_{oss}$			100	125 pF
$C_{rss}$			25	50 pF
$t_{d(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$ $R_G = 4.7\ \Omega \text{ (External)},$		17	ns
$t_r$			15	ns
$t_{d(off)}$			32	ns
$t_f$			18	ns
$Q_{g(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$		39	nC
$Q_{gs}$			9	nC
$Q_{gd}$			22	nC
$R_{thJC}$			0.8	K/W
$R_{thCK}$	(TO-220)		0.25	K/W

Symbol	Test Conditions	Characteristic Values		
		$(T_J = 25^\circ\text{C}, \text{ unless otherwise specified})$		
		min.	typ.	max.
$I_S$	$V_{GS} = 0\text{ V}$			3 A
$I_{SM}$	Repetitive; pulse width limited by $T_{JM}$			12 A
$V_{SD}$	$I_F = I_S, V_{GS} = 0\text{ V}, \text{ Note 1}$			1.5 V
$t_{rr}$	$I_F = I_S, -di/dt = 100\text{ A}/\mu\text{s}, V_R = 100\text{ V}$		700	ns

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

**TO-220 (IXTP) Outline**

**TO-263 (IXTA) Outline**


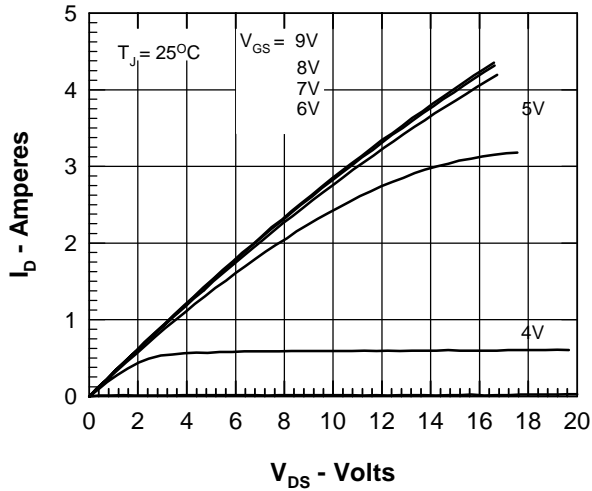


Fig. 1 Output Characteristics @  $T_J = 25^\circ\text{C}$

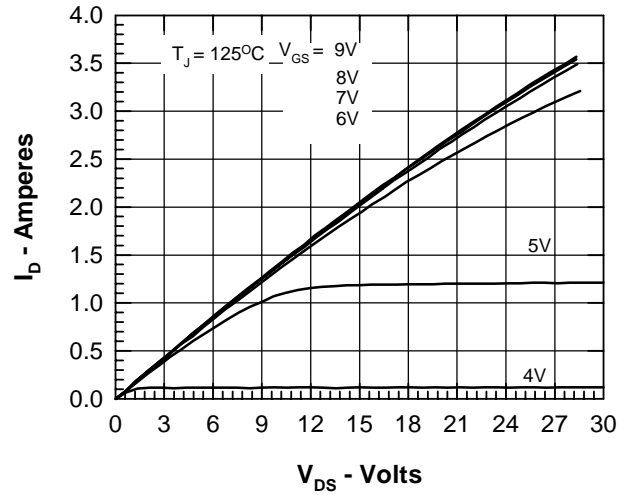


Fig. 2 Output Characteristics @  $T_J = 125^\circ\text{C}$

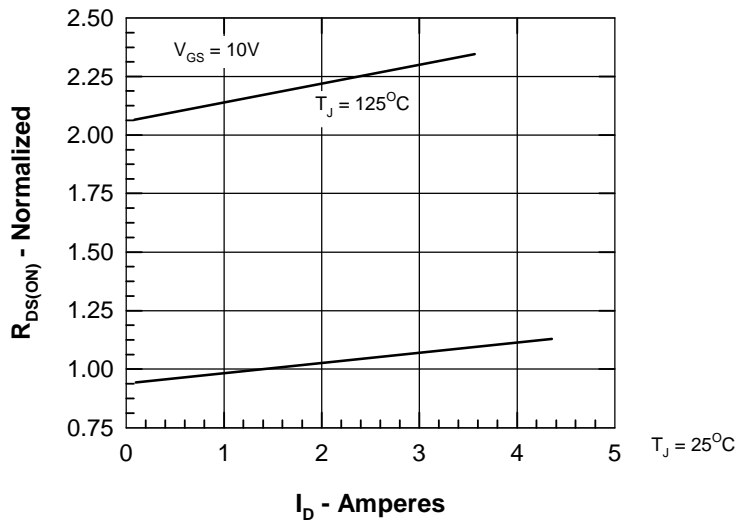


Fig. 3  $R_{DS(on)}$  vs. Drain Current

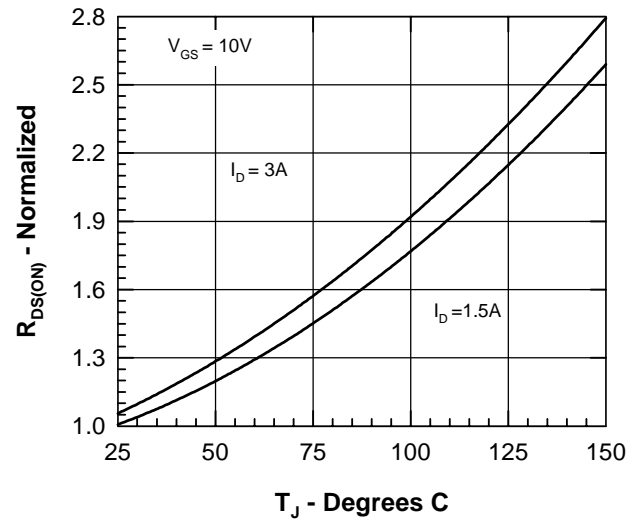


Fig. 4 Temperature Dependence of Drain to Source Resistance

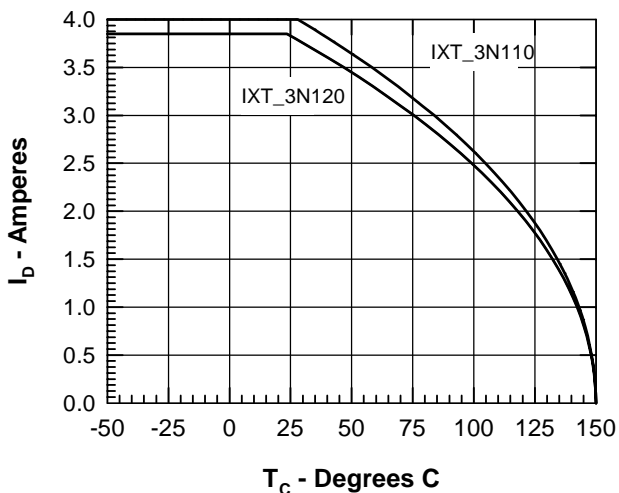


Fig. 5 Drain Current vs. Case Temperature

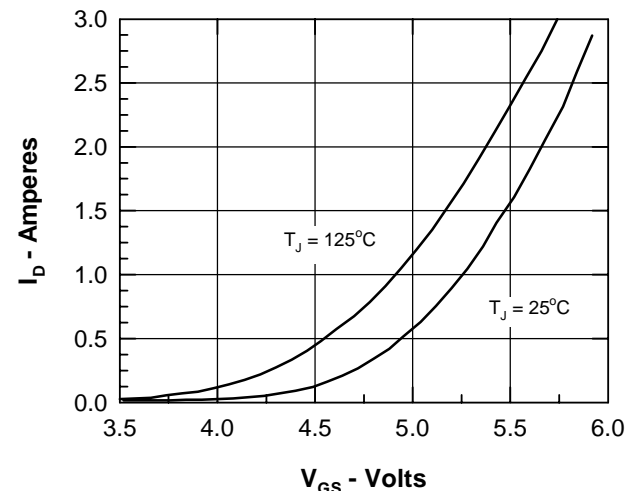


Fig. 6 Drain Current vs Gate Source Voltage

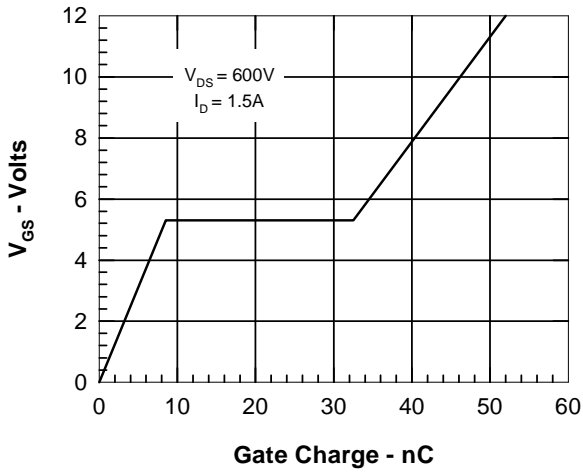


Fig. 7 Gate Charge Characteristic Curve

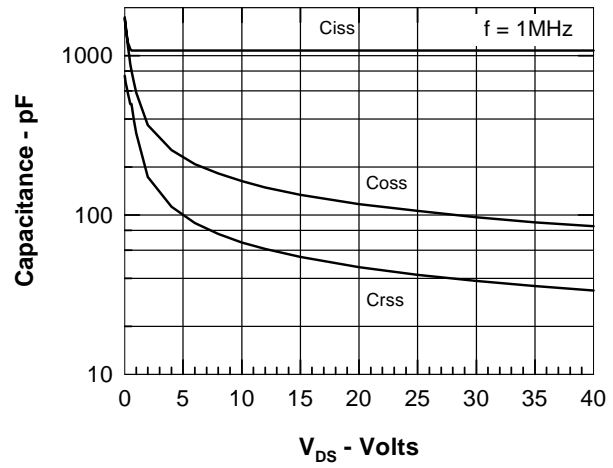


Fig. 8 Capacitance Curves

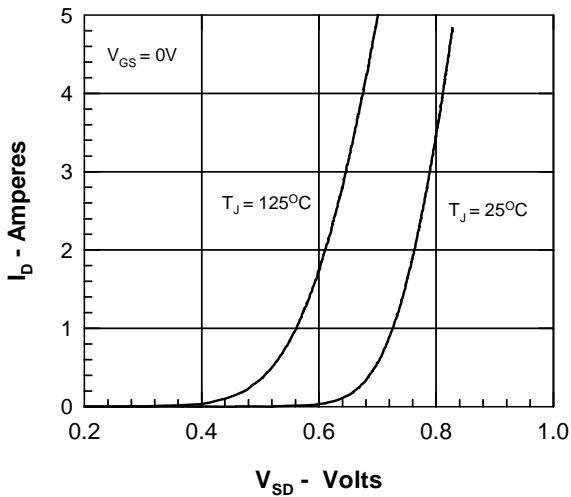


Fig. 9 Drain Current vs Drain to Source Voltage

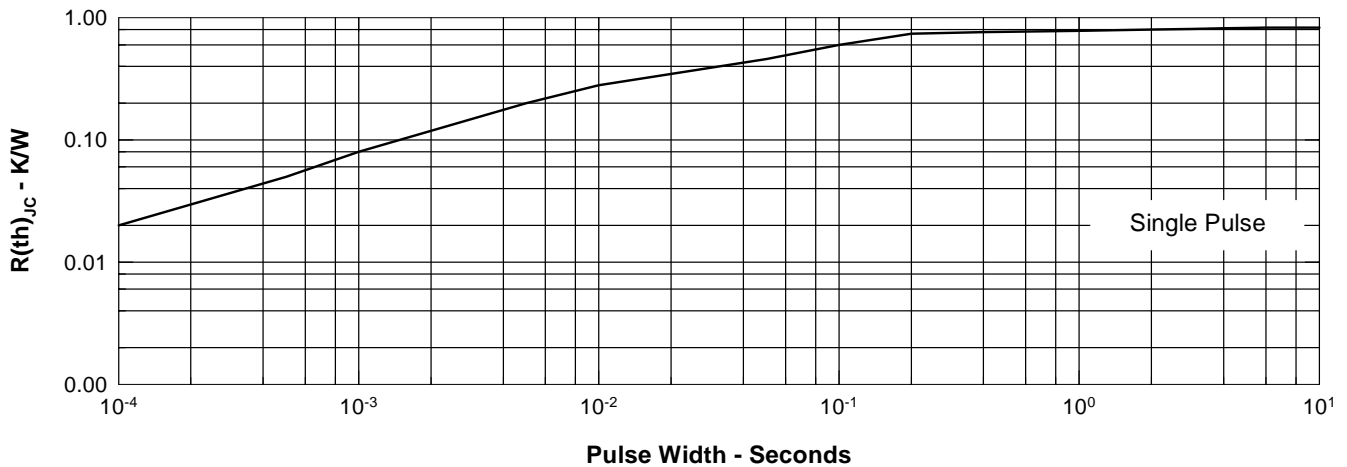


Fig. 10 Transient Thermal Impedance