

X2-Class **Power MOSFET**

IXTA12N65X2 IXTP12N65X2 IXTH12N65X2

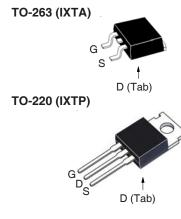
N-Channel Enhancement Mode

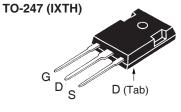


Symbol	Test Conditions	Maximum	Ratings
V _{DSS}	$T_J = 25^{\circ}C \text{ to } 150^{\circ}C$	650	V
V _{DGR}	$T_{_J} = 25^{\circ}C$ to 150°C, $R_{_{GS}} = 1M\Omega$	650	V
V _{GSS}	Continuous	±30	V
V _{GSM}	Transient	±40	V
I _{D25}	T _C = 25°C	12	A
I _{DM}	$\rm T_{\rm C}$ = 25°C, Pulse Width Limited by $\rm T_{\rm JM}$	24	Α
I _A	T _C = 25°C	6	A
E _{as}	$T_{c} = 25^{\circ}C$	300	mJ
dv/dt	$I_{S} \leq I_{DM}, V_{DD} \leq V_{DSS}, T_{J} \leq 150^{\circ}C$	15	V/ns
$\overline{\mathbf{P}_{D}}$	T _C = 25°C	180	W
T _J		-55 +150	°C
T_{JM}		150	°C
T _{stg}		-55 +150	°C
T _L	Maximum Lead Temperature for Soldering	ng 300	°C
T _{SOLD}	1.6 mm (0.062in.) from Case for 10s	260	°C
F _c M _d	Mounting Force (TO-263) Mounting Torque (TO-220 & TO-247)	10.65 / 2.214.6 1.13 / 10	N/lb Nm/lb.in
Weight	TO-263 TO-220 TO-247	2.5 3.0 6.0	

Symbol (T _J = 25°C,	Test Conditions Unless Otherwise Specified)	Charac Min.	cteristic Typ.	Values Max	(.
BV _{DSS}	$V_{GS} = 0V, I_{D} = 250\mu A$	650			V
$V_{\rm GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\mu A$	2.5		4.5	V
I _{GSS}	$V_{GS} = \pm 30V, V_{DS} = 0V$			±100	nA
I _{DSS}	$V_{DS} = V_{DSS}, V_{GS} = 0V$ $T_{J} = 125^{\circ}C$				μ Α μ Α
R _{DS(on)}	$V_{GS} = 10V, I_{D} = 0.5 \cdot I_{D25}, Note 1$			300	mΩ

650V **12A** $300 \text{m}\Omega$ R_{DS(on)}





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

Features

- International Standard Packages
- Low $R_{DS(ON)}$ and Q_G Avalanche Rated
- Low Package Inductance

Advantages

- High Power Density
- Easy to Mount
- Space Savings

Applications

- Switch-Mode and Resonant-Mode **Power Supplies**
- DC-DC Converters
- PFC Circuits
- AC and DC Motor Drives
- · Robotics and Servo Controls



Symbol	Symbol Test Conditions Cha		acteristic Values	
$(T_J = 25^{\circ}C,$	Unless Otherwise Specified)	Min.	Тур.	Max
g _{fs}	V _{DS} = 10V, I _D = 0.5 • I _{D25} , Note 1	6.6	11.0	S
R _{Gi}	Gate Input Resistance		4	Ω
C _{iss}			1100	pF
C _{oss}	$V_{GS} = 0V, V_{DS} = 25V, f = 1MHz$		830	pF
C _{rss}			1.5	pF
	Effective Output Capacitance			
$C_{o(er)}$	Energy related $\int V_{GS} = 0V$		53	pF
$\mathbf{C}_{o(tr)}$	Time related $\int V_{DS}^{GS} = 0.8 \cdot V_{DSS}$		190	pF
t _{d(on)}	Resistive Switching Times		23	ns
t, \	$V_{GS} = 10V, V_{DS} = 0.5 \cdot V_{DSS}, I_{D} = 0.5 \cdot I_{D25}$		24	ns
t _{d(off)}	$R_{G} = 20\Omega$ (External)		52	ns
t,	Ti _G = 2052 (External)		16	ns
$Q_{g(on)}$			17.7	nC
\mathbf{Q}_{gs}	$V_{GS} = 10V$, $V_{DS} = 0.5 \cdot V_{DSS}$, $I_{D} = 0.5 \cdot I_{D25}$		5.5	nC
\mathbf{Q}_{gd}			5.5	nC
R _{thJC}				0.69 °C/W
\mathbf{R}_{thCS}	TO-220		0.50	°C/W
	TO-247		0.21	°C/W

Source-Drain Diode

Symbol Test Conditions Chara		acteristic Values			
$(T_J = 25^{\circ}C, l)$	Unless Otherwise Specified)	Min.	Тур.	Max	
Is	$V_{GS} = 0V$			12	Α
SM	Repetitive, pulse Width Limited by $\mathrm{T_{_{JM}}}$			48	Α
V _{SD}	$I_F = I_S$, $V_{GS} = 0V$, Note 1			1.4	V
$\left. egin{array}{c} \mathbf{t}_{rr} & \ \mathbf{Q}_{RM} \ \mathbf{I}_{RM} & \end{array} ight. ight.$	$I_F = 6A$, $-di/dt = 100A/\mu s$ $V_R = 100V$		270 2.5 18.5		ns μC Α

Note 1. Pulse test, $t \le 300 \mu s$, duty cycle, $d \le 2\%$.





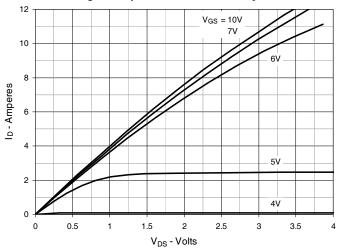


Fig. 2. Extended Output Characteristics @ T_J = 25°C

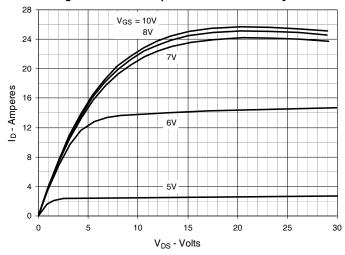


Fig. 3. Output Characteristics @ T_J = 125°C

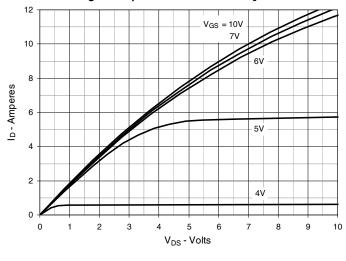


Fig. 4. $R_{DS(on)}$ Normalized to $I_D = 6A$ Value vs. Junction Temperature

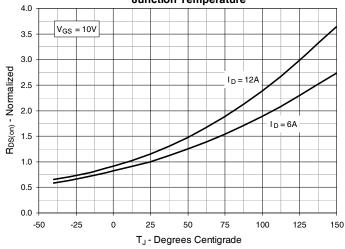


Fig. 5. $R_{DS(on)}$ Normalized to $I_D = 6A$ Value vs.

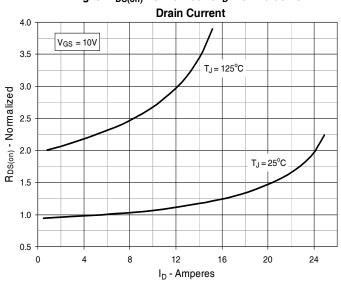


Fig. 6. Normalized Breakdown & Threshold Voltages

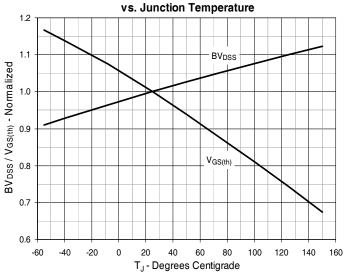




Fig. 7. Maximum Drain Current vs. Case Temperature

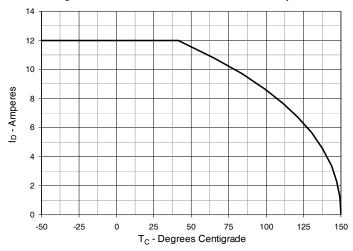


Fig. 8. Input Admittance

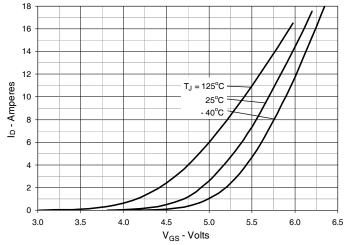


Fig. 9. Transconductance

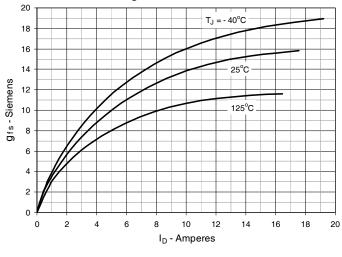


Fig. 10. Forward Voltage Drop of Intrinsic Diode

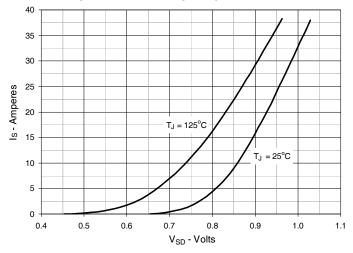


Fig. 11. Gate Charge

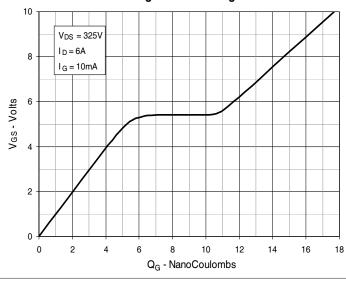
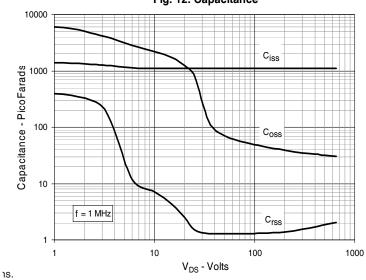
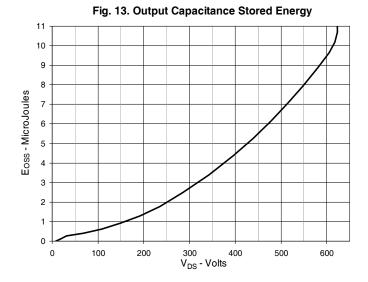
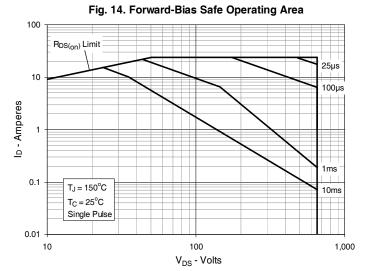


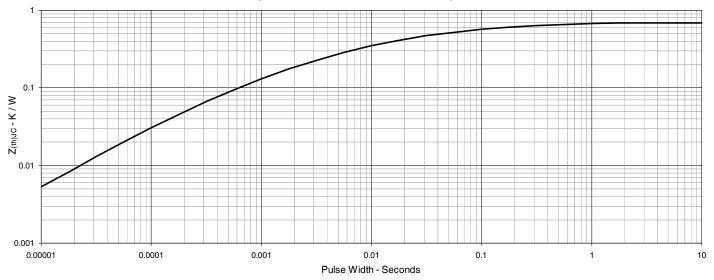
Fig. 12. Capacitance



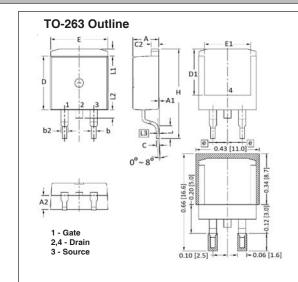




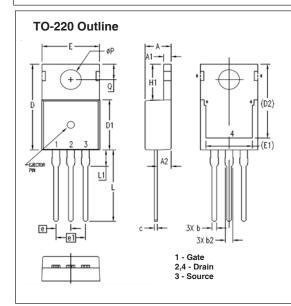




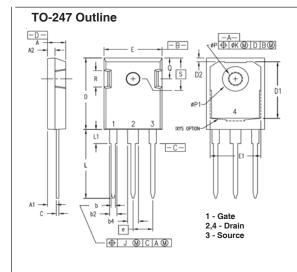




SYM	INCH	HES	MILLIMETE	
21M	MIN	MAX	MIN	MAX
A	.170	.185	4.30	4.70
Α1	.000	.008	0.00	0.20
A2	.091	.098	2.30	2.50
Ф	.028	.035	0.70	0.90
b2	.046	.060	1.18	1.52
O	.018	.024	0.45	0.60
C2	.049	.060	1.25	1.52
	.340	.370	8.63	9.40
D1	.300	.327	7.62	8.30
E	.380	.410	9.65	10.41
E1	.270	.330	6.86	8.38
e	.100	BSC	2.54 BSC	
Ι	.580	.620	14.73	15.75
┙	.075	.105	1.91	2.67
L1	.039	.060	1.00	1.52
L2	_	.070	_	1.77
L3	.010 BSC 0.254 BSC			BSC



MYZ	INC	HES	MILLIMETERS	
2114	MIN	MAX	MIN	MAX
Α	.169	.185	4.30	4.70
A1	.047	.055	1.20	1.40
A2	.079	.106	2.00	2.70
Ь	.024	.039	0.60	1.00
b2	.045	.057	1.15	1.45
С	.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
е	.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
ØΡ	.134	.150	3.40	3.80
Q	.106	.126	2.70	3.20



SYM	INCHES		MILLIMETERS		
STIM	MIN	MAX	MIN	MAX	
Α	.190	.205	4.83	5.21	
A1	.090	.100	2.29	2.54	
A2	.075	.085	1.91	2.16	
Ь	.045	.055	1.14	1.40	
b2	.075	.087	1.91	2.20	
b4	.115	.126	2.92	3.20	
С	.024	.031	0.61	0.80	
D	.819	.840	20.80	21.34	
D1	.650	.690	16.51	17.53	
D2	.035	.050	0.89	1.27	
E	.620	.635	15.75	16.13	
E1	.545	.565	13.84	14.35	
е	.215	BSC	5.45 BSC		
J		.010		0.25	
K	-	.025		0.64	
L	.780	.810	19.81	20.57	
L1	.150	.170	3.81	4.32	
ØΡ	.140	.144	3.55	3.65	
øP1	.275	.290	6.99	7.37	
Q	.220	.244	5.59	6.20	
R	.170	.190	4.32	4.83	
S	.242BSC 6.15 BSC			BSC	

