



**IXTP4N45, IXTP4N50, IXTM4N45, IXTM4N50**

4 AMPS, 450-500 V, 1.5Ω/2.0Ω

T-39-11

**MAXIMUM RATINGS**

Parameter	Sym.	IXTP4N45 IXTM4N45	IXTP4N50 IXTM4N50	Unit
Drain-Source Voltage (1)	$V_{DSS}$	450	500	$V_{dc}$
Drain-Gate Voltage ( $R_{GS}=1.0\text{ M}\Omega$ ) (1)	$V_{DGR}$	450	500	$V_{dc}$
Gate-Source Voltage Continuous	$V_{GS}$		$\pm 20$	$V_{dc}$
Gate-Source Voltage Transient	$V_{GSM}$		$\pm 30$	V
Drain Current Continuous ( $T_C=25^\circ\text{C}$ )	$I_D$		4	$A_{dc}$
Drain Current Pulsed (3)	$I_{DM}$		16	A
Total Power Dissipation	$P_D$		75	W
Power Dissipation Derating $>25^\circ\text{C}$			0.6	W/ $^\circ\text{C}$
Operating and Storage Temperature	$T_J$ & $T_{stg}$		-65 to +150	$^\circ\text{C}$
Max. Lead Temp. for Soldering	$T_L$		300 (1.6mm from case for 10 sec.)	$^\circ\text{C}$

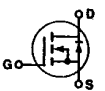
**ELECTRICAL CHARACTERISTICS**  $T_C=25^\circ\text{C}$  unless otherwise specified

Parameter	Type	Min.	Typ.	Max.	Units	Test Conditions
$BV_{DSS}$ Drain-Source Breakdown Voltage	4N45, 45A	450	-	-	V	$V_{GS}=0V$
	4N50, 50A	500	-	-	V	$I_D=250\mu A$
$V_{GS(th)}$ Gate Threshold Voltage	ALL	2.0	-	4.0	V	$V_{DS}=V_{GS}$ , $I_D=250\mu A$
$I_{GSS}$ Gate-Source Leakage Forward	ALL	-	-	100	nA	$V_{GS}=20V$
$I_{GSS}$ Gate-Source Leakage Reverse	ALL	-	-	100	nA	$V_{GS}=-20V$
$I_{OSS}$ Zero Gate Voltage Drain Current	ALL	-	-	200	$\mu A$	$V_{DS}=\text{Max. Rating}\times 0.8$ , $V_{GS}=0V$
		-	-	1000	$\mu A$	$V_{DS}=\text{Max. Rating}\times 0.8$ , $V_{GS}=0V$ , $T_C=125^\circ\text{C}$
$R_{DS(on)}$ Static Drain-Source On-State Resistance (2)	4N45A, 50A	-	-	1.5	$\Omega$	$V_{GS}=10V$ , $I_D=2.0A$
	4N45, 50	-	-	2.0	$\Omega$	
$G_{fs}$ Forward Transconductance (2)	ALL	2.0	3.5	-	S	$V_{DS}\geq 15V$ , $I_D=2.0A$
$C_{iss}$ Input Capacitance	ALL	-	700	-	pF	$V_{GS}=0V$ , $V_{DS}=25V$ , $f=1.0\text{ MHz}$
$C_{oss}$ Output Capacitance	ALL	-	75	-	pF	
$C_{rss}$ Reverse Transfer Capacitance	ALL	-	25	-	pF	
$t_{d(on)}$ Turn-On Delay Time	ALL	-	15	20	ns	$V_{DS}=0.5 BV_{DSS}$ , $I_D=2.0A$ , $Z_o=20\Omega$ (MOSFET switching times are essentially independent of operating temperature. See Fig. 3, page 22 for test circuit.)
$t_r$ Rise Time	ALL	-	15	20	ns	
$t_{d(off)}$ Turn-Off Delay Time	ALL	-	50	70	ns	
$t_f$ Fall Time	ALL	-	30	40	ns	
$Q_g$ Total Gate Charge	ALL	-	-	40	nC	$V_{GS}=10V$ , $I_D=4.0A$ , $V_{DS}=0.8\text{ Max. Rating}$ . (Gate charge is essentially independent of operating temperature. See Fig. 4, page 22 for test circuit.)
$Q_{gs}$ Gate-Source Charge	ALL	-	-	10	nC	
$Q_{gd}$ Gate-Drain ("Miller") Charge	ALL	-	-	15	nC	
$W_{DSR}$ Unclamped Drain-to-Source Avalanche Energy	4N45R, 45AR	270	-	-	mJ	See Fig. 5, page 22 for test circuit.
	4N50R, 50AR					

**THERMAL RESISTANCE**

Parameter	Type	Min.	Typ.	Max.	Units	Notes
$R_{thJC}$ Junction-to-Case	ALL	-	-	1.6	$^\circ\text{C/W}$	
$R_{thJA}$ Junction-to-Ambient TO-204	IXTM	-	-	30.0	$^\circ\text{C/W}$	Free Air Operation
$R_{thJA}$ Junction-to-Ambient TO-220	IXTP	-	-	80.0	$^\circ\text{C/W}$	Free Air Operation

**SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS**

Parameter	Type	Min.	Typ.	Max.	Units	Test Conditions
$I_S$ Continuous Source Current (Body Diode)	ALL	-	-	4.0	A	Modified MOSFET symbol showing the integral reverse P-N junction rectifier. 
$I_{SM}$ Pulse Source Current (Body Diode) (1)	ALL	-	-	16.0	A	
$V_{SD}$ Diode Forward Voltage (2)	ALL	-	-	1.5	V	$T_C=25^\circ\text{C}$ , $I_f=4.0A$ , $V_{GS}=0V$
$t_{rr}$ Reverse Recovery Time	ALL	-	400	-	ns	$I_f=4.0A$ , $di/dt=100A/\mu s$

(1)  $T_J=25^\circ\text{C}$  to  $150^\circ\text{C}$

(2) Pulse test: Pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$

(3) Repetitive rating: Pulse width limited by max. junction temperature.