



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}		± 20	V_{dc}
Gate-Source Voltage Transient	V_{GSM}		± 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.)	$^\circ\text{C}$

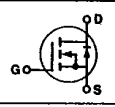
ELECTRICAL CHARACTERISTICS $T_C=25^\circ\text{C}$ unless otherwise specified

Parameter	Type	Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS} Drain-Source Breakdown Voltage	4N45, 45A	450	-	-	V	$V_{GS}=0V$ $I_D=250\mu A$
	4N50, 50A	500	-	-	V	
$V_{GS(th)}$ 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	μA	$V_{DS}=\text{Max. Rating}\times 0.8$, $V_{GS}=0V$
		-	-	1000	μA	$V_{DS}=\text{Max. Rating}\times 0.8$, $V_{GS}=0V$, $T_C=125^\circ\text{C}$
$R_{DS(on)}$ Static Drain-Source On-State Resistance (2)	4N45A, 50A	-	-	1.5	Ω	$V_{GS}=10V$, $I_D=2.0A$
	4N45, 50	-	-	2.0	Ω	
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_{riss} Reverse Transfer Capacitance	ALL	-	25	-	pF	
$t_{d(on)}$ Turn-On Delay Time	ALL	-	15	20	ns	$V_{DS}=0.5 BV_{DSS}$, $I_D=2.0A$, $Z_\theta=20\Omega$ (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	
Q_{gs} Gate-Source Charge	ALL	-	-	10	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_{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	Notes
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°C

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

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