



IXTH10N60, IXTM10N60

10 AMPS, 600 V, 0.55Ω/0.7Ω

T-39-15

MAXIMUM RATINGS

Parameter	Sym.	IXTH10N60 IXTM10N60	Unit
Drain-Source Voltage (1)	V_{DS}	600	V_{dc}
Drain-Gate Voltage ($R_{GS}=1.0\text{ M}\Omega$) (1)	V_{DGR}	600	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	10	A_{dc}
Drain Current Pulsed (3)	I_{DM}	40	A
Total Power Dissipation	P_D IXTH/IXTM	180/150	W
Power Dissipation Derating $>25^\circ\text{C}$	IXTH/IXTM	1.4/1.2	W/ $^\circ\text{C}$
Operating and Storage Temperature	T_J & T_{slg}	-65 to $+150$	$^\circ\text{C}$
Max. Lead Temp. for Soldering	T_L	300 (1.6mm from case for 10 sec.)	$^\circ\text{C}$

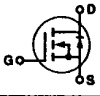
ELECTRICAL CHARACTERISTICS $T_c=25^\circ\text{C}$ unless otherwise specified

Parameter	Type	Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS} Drain-Source Breakdown Voltage	10N60, 60A	600	—	—	V	$V_{GS}=0V$, $I_D=250\mu A$
$V_{GS(th)}$ Gate Threshold Voltage	ALL	2.0	—	4.5	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_{DSS} 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)	10N60A	—	—	0.55	Ω	$V_{GS}=10V$, $I_D=5.0A$
	10N60	—	—	0.7	Ω	
G_{fs} Forward Transconductance (2)	ALL	5.0	7.0	—	S	$V_{DS}\geq 15V$, $I_D=5.0A$
C_{iss} Input Capacitance	ALL	—	2700	—	pF	$V_{GS}=0V$, $V_{DS}=25V$, $f=1.0\text{ MHz}$
C_{oss} Output Capacitance	ALL	—	270	—	pF	
C_{rss} Reverse Transfer Capacitance	ALL	—	65	—	pF	
$t_{d(on)}$ Turn-On Delay Time	ALL	—	20	35	ns	$V_{DS}=0.5 BV_{DSS}$, $I_D=5.0A$, $Z_o=5\Omega$
t_r Rise Time	ALL	—	25	45	ns	(MOSFET switching times are essentially independent of operating temperature. See Fig. 3, page 22 for test circuit.)
$t_{d(off)}$ Turn-Off Delay Time	ALL	—	70	100	ns	
t_f Fall Time	ALL	—	30	50	ns	
Q_g Total Gate Charge	ALL	—	—	120	nC	$V_{GS}=10V$, $I_D=5.0A$, $V_{DS}=0.8\text{ Max. Rating}$. (Gate charge is essentially independent of operating temperature. See Fig. 4, page 22 for test circuit.)
Q_{gs} Gate-Source Charge	ALL	—	—	40	nC	
Q_{gd} Gate-Drain ("Miller") Charge	ALL	—	—	60	nC	
W_{DSR} Unclamped Drain-to-Source Avalanche Energy	10N60R, 60AR 3N90R, 90AR	800	—	—	mJ	See Fig. 5, page 22 for test circuit.

THERMAL RESISTANCE

R_{thJC} Junction-to-Case	IXTM	—	—	0.83	$^\circ\text{C/W}$	
	IXTH	—	—	0.7	$^\circ\text{C/W}$	
R_{thJA} Junction-to-Ambient TO-204	IXTM	—	—	30.0	$^\circ\text{C/W}$	Free Air Operation
R_{thJA} Junction-to-Ambient TO-247	IXTH	—	—	60.0	$^\circ\text{C/W}$	Free Air Operation

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

I_S Continuous Source Current (Body Diode)	ALL	—	—	10.0	A	Modified MOSFET symbol showing the integral reverse P-N junction rectifier. 
I_{SM} Pulse Source Current (Body Diode) (1)	ALL	—	—	40.0	A	
V_{SD} Diode Forward Voltage (2)	ALL	—	—	1.5	V	$T_c=25^\circ\text{C}$, $I_f=10.0A$, $V_{GS}=0V$
t_{rr} Reverse Recovery Time	ALL	—	600	—	ns	$I_f=10.0A$, $di/dt=100A/\mu s$

(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.