

# High Current MegaMOS™ FET

## IXTK 120N25

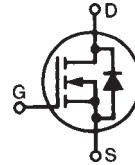
$$V_{DSS} = 250 \text{ V}$$

$$I_{D25} = 120 \text{ A}$$

$$R_{DS(on)} = 20 \text{ m}\Omega$$

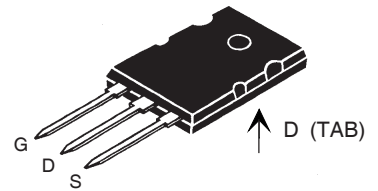
N-Channel Enhancement Mode

Preliminary Data Sheet



Symbol	Test conditions	Maximum ratings	
$V_{DSS}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	250	V
$V_{DGR}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1.0 \text{ M}\Omega$	250	V
$V_{GS}$	Continuous	$\pm 20$	V
$V_{GSM}$	Transient	$\pm 30$	V
$I_{D25}$	$T_C = 25^\circ\text{C}$ MOSFET chip capability	120	A
$I_{D(RMS)}$	External lead current limit	75	A
$I_{DM}$	$T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$	480	A
$I_{AR}$	$T_C = 25^\circ\text{C}$	90	A
$E_{AR}$	$T_C = 25^\circ\text{C}$	80	mJ
$E_{AS}$	$T_C = 25^\circ\text{C}$	4.0	J
$dv/dt$	$I_S \leq I_{DM}$ , $di/dt \leq 100 \text{ A}/\mu\text{s}$ , $V_{DD} \leq V_{DSS}$ $T_J \leq 150^\circ\text{C}$ , $R_G = 2 \Omega$	10	V/ns
$P_D$	$T_C = 25^\circ\text{C}$	730	W
$T_J$		-55 ... +150	$^\circ\text{C}$
$T_{JM}$		150	$^\circ\text{C}$
$T_{stg}$		-55 ... +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	0.7/6	Nm/lb.in.
<b>Weight</b>	TO-264	10	g

TO-264 AA (IXTK)



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

### Features

- Low  $R_{DS(on)}$  HDMOS™ process
- Rugged polysilicon gate cell structure
- International standard package
- Fast switching times

### Applications

- Motor controls
- DC choppers
- Switched-mode power supplies

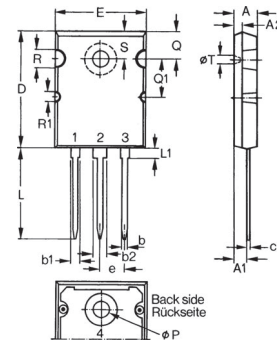
### Advantages

- Easy to mount with one screw (isolated mounting screw hole)
- Space savings
- High power density

Symbol	Test Conditions	Characteristic Values		
		Min.	Typ.	Max.
$(T_J = 25^\circ\text{C}$ unless otherwise specified)				
$V_{DSS}$	$V_{GS} = 0 \text{ V}$ , $I_D = 1 \text{ mA}$	250		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 250 \mu\text{A}$	2.0		4.0 V
$I_{GSS}$	$V_{GS} = \pm 20 \text{ V DC}$ , $V_{DS} = 0$			$\pm 200 \text{ nA}$
$I_{DSS}$	$V_{DS} = V_{DSS}$ $V_{GS} = 0 \text{ V}$	$T_J = 25^\circ\text{C}$		50 $\mu\text{A}$
		$T_J = 125^\circ\text{C}$		3 mA
$R_{DS(on)}$	$V_{GS} = 10 \text{ V}$ , $I_D = 0.5 I_{D25}$ Pulse test, $t \leq 300 \text{ ms}$ , duty cycle $d \leq 2\%$			20 m $\Omega$

Symbol	Test Conditions	Characteristic values		
		Min.	Typ.	Max.
$g_{fs}$	$V_{DS} = 10\text{ V}; I_D = 0.5 I_{D25}$ , pulse test	65	98	S
$C_{iss}$ $C_{oss}$ $C_{rss}$	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		7700	pF
			1700	pF
			600	pF
$t_{d(on)}$ $t_r$ $t_{d(off)}$ $t_f$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25}$ $R_G = 1.5\ \Omega$ (External)		35	ns
			38	ns
			175	ns
			35	ns
$Q_{g(on)}$ $Q_{gs}$ $Q_{gd}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25}$		360	nC
			63	nC
			180	nC
$R_{thJC}$ $R_{thCK}$		0.15	0.17 K/W	K/W

TO-264 AA Outline



Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.82	5.13	.190	.202
A1	2.54	2.89	.100	.114
A2	2.00	2.10	.079	.083
b	1.12	1.42	.044	.056
b1	2.39	2.69	.094	.106
b2	2.90	3.09	.114	.122
c	0.53	0.83	.021	.033
D	25.91	26.16	1.020	1.030
E	19.81	19.96	.780	.786
e	5.46BSC		.215BSC	
J	0.00	0.25	.000	.010
K	0.00	0.25	.000	.010
L	20.32	20.83	.800	.820
L1	2.29	2.59	.090	.102
P	3.17	3.66	.125	.144
Q	6.07	6.27	.239	.247
Q1	8.38	8.69	.330	.342
R	3.81	4.32	.150	.170
R1	1.78	2.29	.070	.090
S	6.04	6.30	.238	.248
T	1.57	1.83	.062	.072

### Source-Drain Diode

### Ratings and Characteristics

( $T_J = 25^\circ\text{C}$  unless otherwise specified)

Symbol	Test Conditions	Min.	Typ.	Max.
$I_S$	$V_{GS} = 0\text{ V}$			120 A
$I_{SM}$	Repetitive; pulse width limited by $T_{JM}$			480 A
$V_{SD}$	$I_F = I_S, V_{GS} = 0\text{ V}$ , Pulse test, $t \leq 300\ \mu\text{s}$ , duty cycle $d \leq 2\%$			1.5 V
$t_{rr}$	$I_F = 25\text{ A}, -di/dt = 100\text{ A}/\mu\text{s}, V_R = 100\text{ V}$		350	ns
$Q_{rr}$			4	$\mu\text{C}$

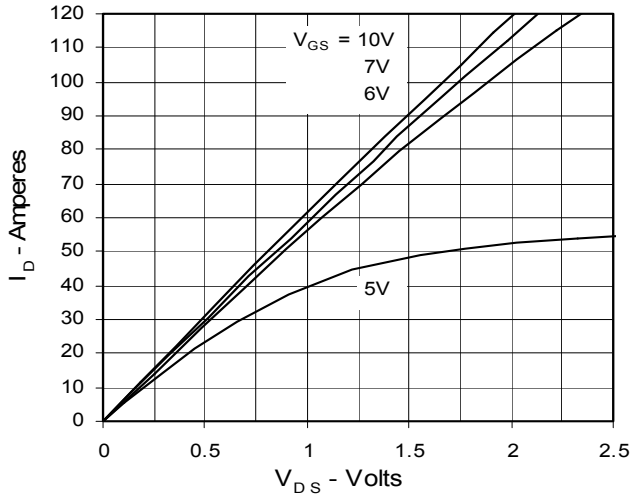
IXYS MOSFETS and IGBTs are covered by one or more of the following U.S. patents:

4,835,592    4,881,106    5,017,508    5,049,961    5,187,117    5,486,715  
4,850,072    4,931,844    5,034,796    5,063,307    5,237,481    5,381,025

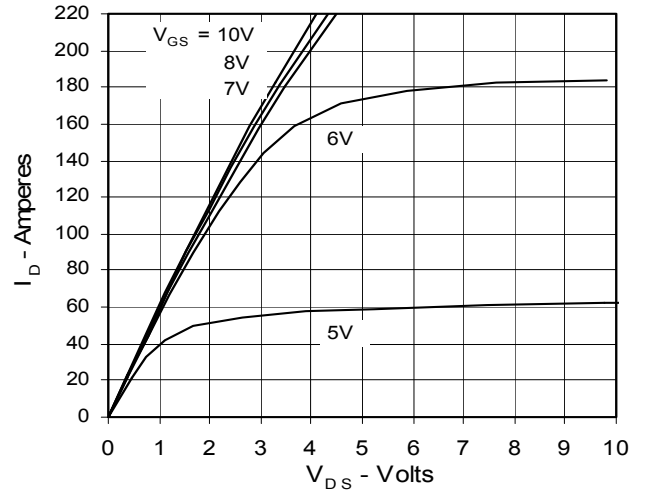
6,306,728B1

IXYS reserves the right to change limits, test conditions, and dimensions.

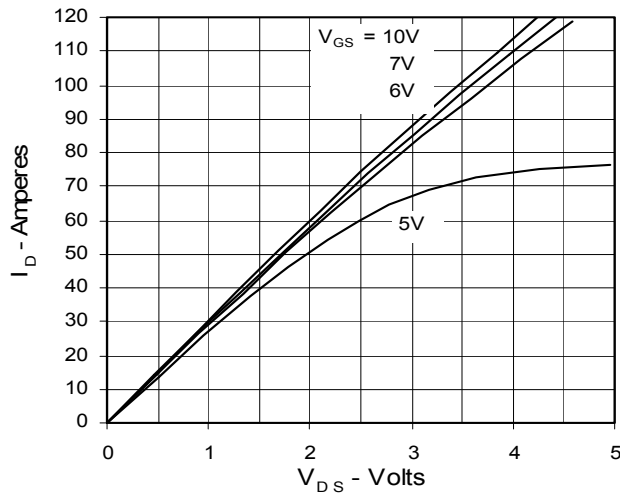
**Fig. 1. Output Characteristics  
@ 25 Deg. C**



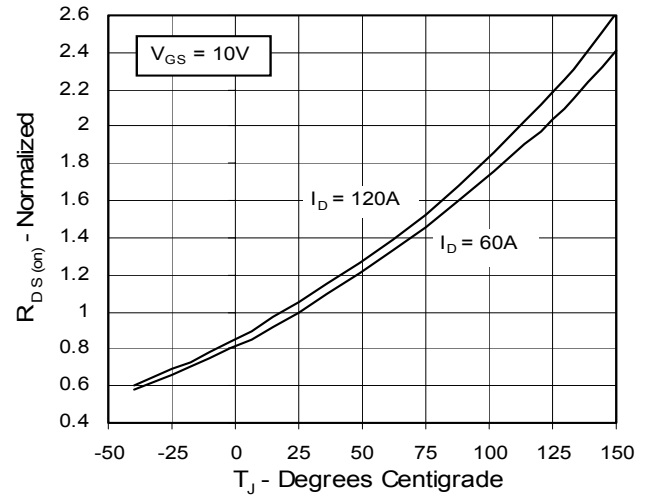
**Fig. 2. Extended Output Characteristics  
@ 25 deg. C**



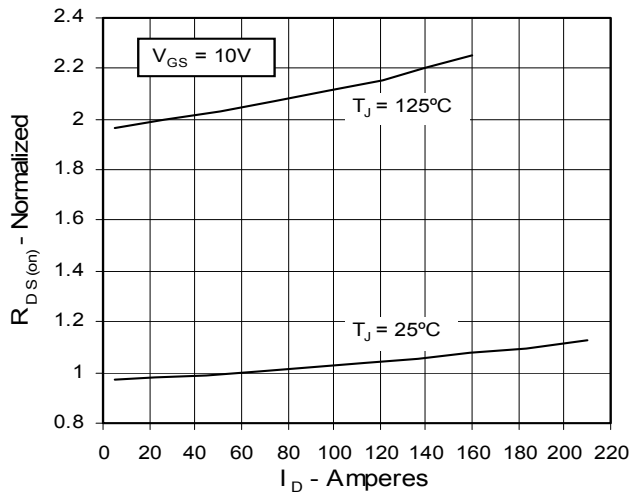
**Fig. 3. Output Characteristics  
@ 125 Deg. C**



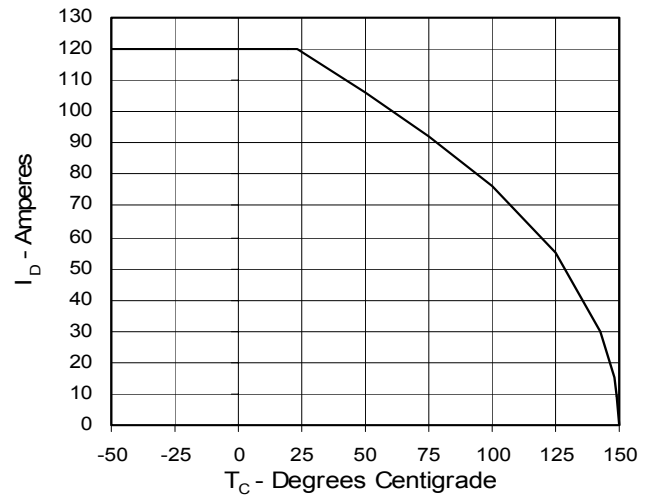
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_{D25}$  Value vs. Junction Temperature**



**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_{D25}$  Value vs.  $I_D$**



**Fig. 6. Drain Current vs. Case Temperature**



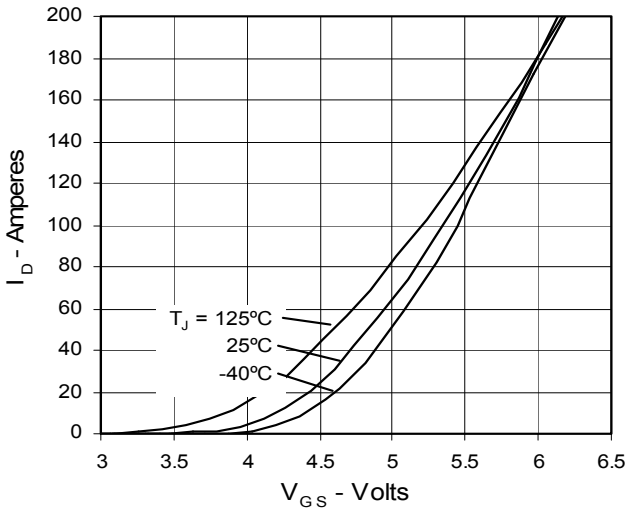
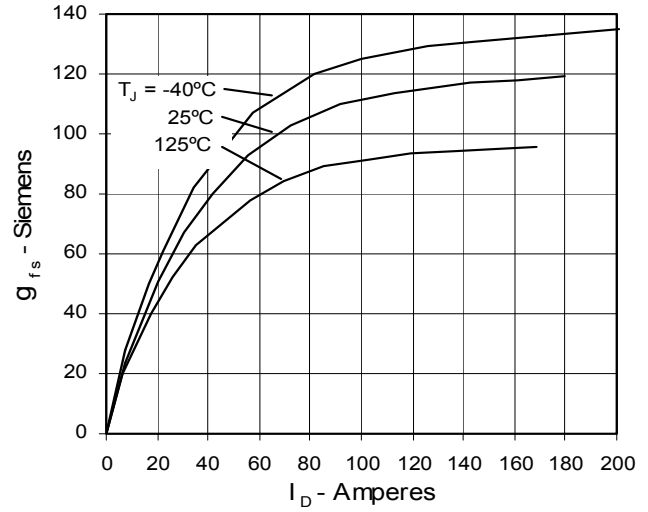
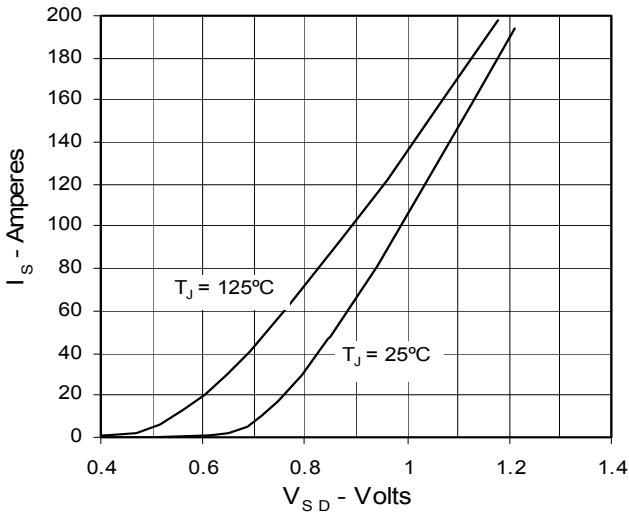
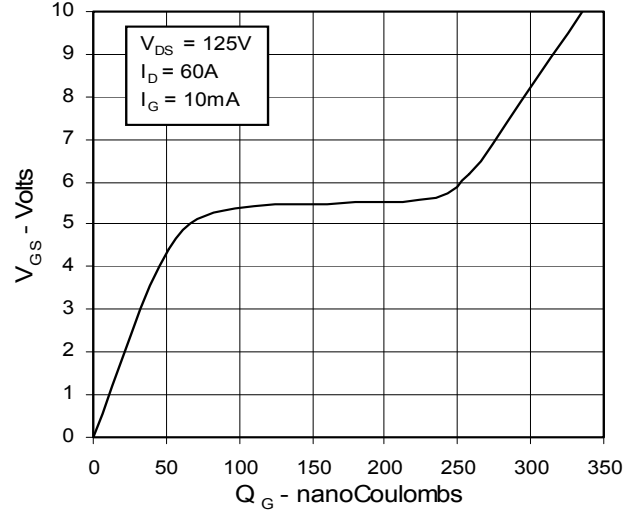
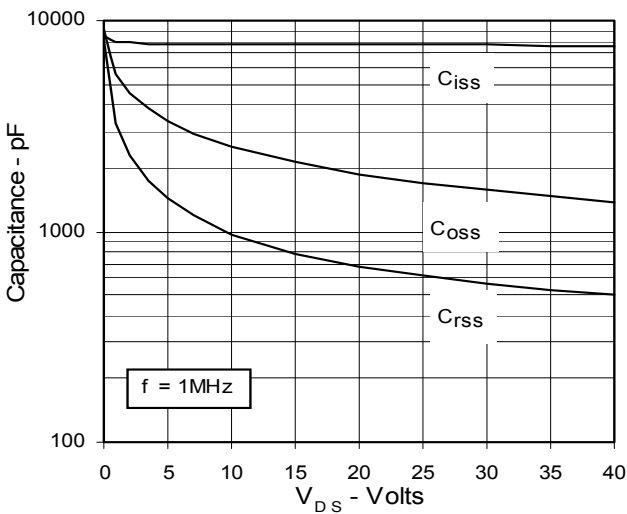
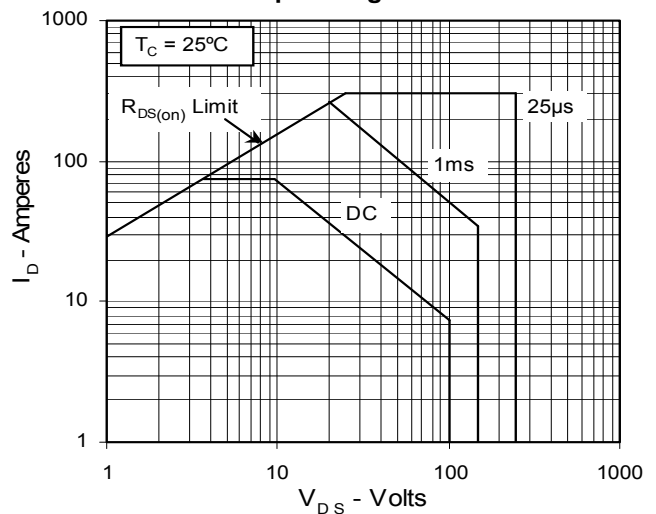
**Fig. 7. Input Admittance**

**Fig. 8. Transconductance**

**Fig. 9. Source Current vs. Source-To-Drain Voltage**

**Fig. 10. Gate Charge**

**Fig. 11. Capacitance**

**Fig. 12. Forward Bias Safe Operating Area**


Fig. 13. Maximum Transient Thermal Resistance

