

# Standard Power MOSFET

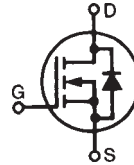
## IXTH 60N25

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

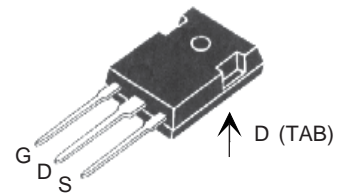
$$I_{D(\text{cont})} = 60 \text{ A}$$

$$R_{DS(\text{on})} = 46 \text{ m}\Omega$$

N-Channel Enhancement Mode



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	60	A
$I_{DM}$	$T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$	240	A
$I_{AR}$		60	A
$E_{AR}$	$T_C = 25^\circ\text{C}$	50	mJ
$E_{AS}$	$T_C = 25^\circ\text{C}$	1.5	J
$dv/dt$	$I_S \leq I_{DM}$ , $di/dt \leq 100 \text{ A}/\mu\text{s}$ , $V_{DD} \leq V_{DSS}$ $T_J \leq 150^\circ\text{C}$ , $R_G = 2 \Omega$	5	V/ns
$P_D$	$T_C = 25^\circ\text{C}$	400	W
$T_J$		-55 ... +150	$^\circ\text{C}$
$T_{JM}$		150	$^\circ\text{C}$
$T_{stg}$		-55 ... +150	$^\circ\text{C}$
$M_d$	Mounting torque	1.13/10	Nm/lb.in.
<b>Weight</b>	TO-264	6	g
Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s		300	$^\circ\text{C}$

**TO-247 AD**


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

### Features

- Low  $R_{DS(\text{on})}$  HDMOS™ process
- Rugged polysilicon gate cell structure
- International standard package JEDEC TO-247 AD
- Fast switching times
- High commutating  $dv/dt$  rating

### Applications

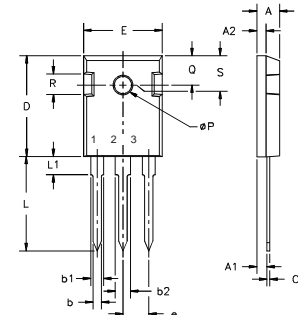
- Motor controls
- DC choppers
- Switched-mode and resonant-mode power supplies
- Uninterruptible Power Supplies (UPS)

### Advantages

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

Symbol	Test Conditions	Characteristic Values		
		Min.	Typ.	Max.
$(T_J = 25^\circ\text{C unless otherwise specified})$				
$V_{DSS}$	$V_{GS} = 0 \text{ V}$ , $I_D = 250 \mu\text{A}$	250		V
$V_{GS(\text{th})}$	$V_{DS} = V_{GS}$ , $I_D = 250 \mu\text{A}$	2.0		4.0 V
$I_{GSS}$	$V_{GS} = \pm 20 \text{ V DC}$ , $V_{DS} = 0$			$\pm 100 \text{ nA}$
$I_{DSS}$	$V_{DS} = V_{DSS}$ $V_{GS} = 0 \text{ V}$			25 $\mu\text{A}$ 250 $\mu\text{A}$
$R_{DS(\text{on})}$	$V_{GS} = 10 \text{ V}$ , $I_D = 15 \text{ A}$ Pulse test, $t \leq 300 \text{ ms}$ , duty cycle $d \leq 2\%$			46 $\text{m}\Omega$

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ unless otherwise specified)	Characteristic values		
		Min.	Typ.	Max.
$g_{fs}$	$V_{DS} = 10\text{ V}; I_D = 0.5 I_{D25}$ , pulse test	28	36	S
$C_{iss}$ $C_{oss}$ $C_{rss}$	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		4400	pF
			800	pF
			290	pF
$t_{d(on)}$ $t_r$ $t_{d(off)}$ $t_f$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25}$ $R_G = 2.0\ \Omega$ (External)		23	ns
			23	ns
			60	ns
			17	ns
$Q_{g(on)}$ $Q_{gs}$ $Q_{gd}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25}$		164	nC
			30	nC
			85	nC
$R_{thJC}$ $R_{thCK}$		0.25	0.31	K/W K/W

**TO-247 AD Outline**


Terminals: 1 - Gate    2 - Drain  
3 - Source    Tab - Drain

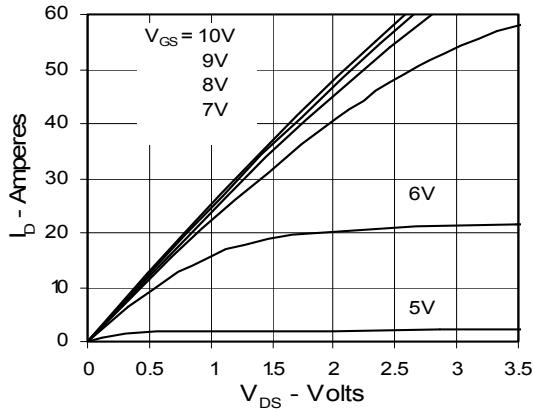
Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.7	5.3	.185	.209
A <sub>1</sub>	2.2	2.54	.087	.102
A <sub>2</sub>	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b <sub>1</sub>	1.65	2.13	.065	.084
b <sub>2</sub>	2.87	3.12	.113	.123
C	.4	.8	.016	.031
D	20.80	21.46	.819	.845
E	15.75	16.26	.610	.640
e	5.20	5.72	0.205	0.225
L	19.81	20.32	.780	.800
L1		4.50		.177
ØP	3.55	3.65	.140	.144
Q	5.89	6.40	0.232	0.252
R	4.32	5.49	.170	.216
S	6.15	BSC	242	BSC

**Source-Drain Diode**
**Ratings and Characteristics**  
( $T_J = 25^\circ\text{C}$  unless otherwise specified)

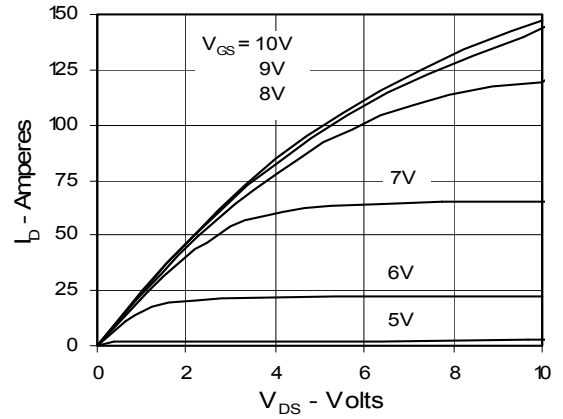
Symbol	Test Conditions	Min.	Typ.	Max.
$I_S$	$V_{GS} = 0\text{ V}$			60 A
$I_{SM}$	Repetitive; pulse width limited by $T_{JM}$			240 A
$V_{SD}$	$I_F = I_S, V_{GS} = 0\text{ V}$ , Pulse test, $t \leq 300\ \mu\text{s}$ , duty cycle $d \leq 2\%$			1.5 V
$t_{rr}$	$I_F = 25\text{ A}, -di/dt = 100\text{ A}/\mu\text{s}, V_R = 100\text{ V}$		300	ns
$Q_{rr}$			3.0	$\mu\text{C}$

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

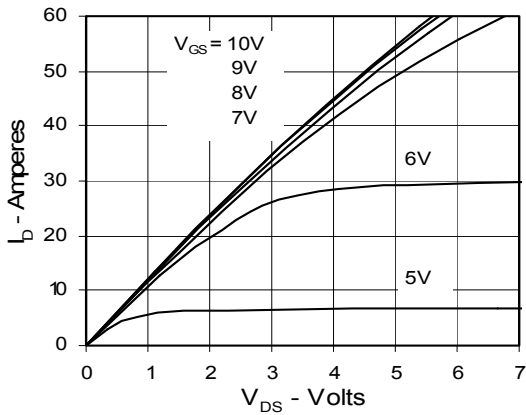
**Fig. 1. Output Characteristics  
@ 25 Deg. C**



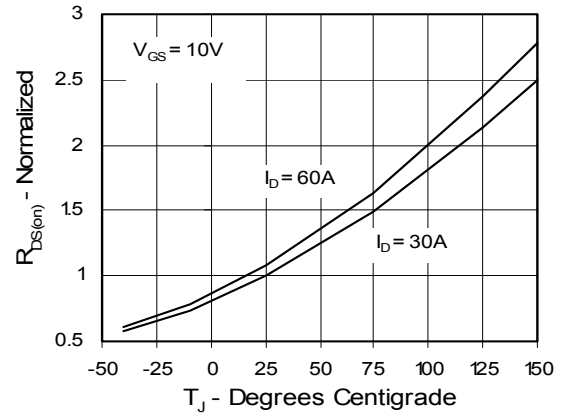
**Fig. 2. Extended Output Characteristics  
@ 25 deg. C**



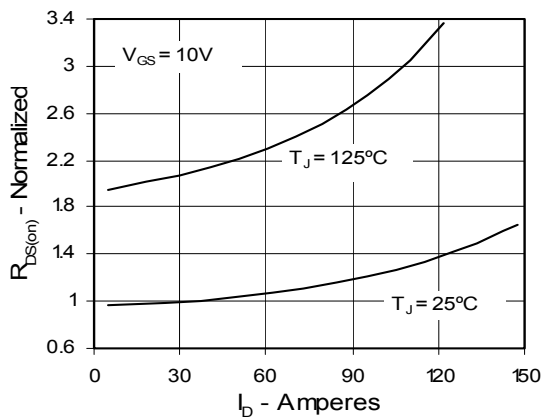
**Fig. 3. Output Characteristics  
@ 125 Deg. C**



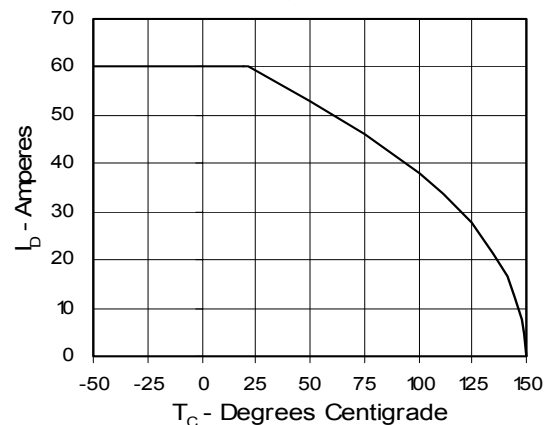
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_{D25}$  Value vs.  
Junction Temperature**



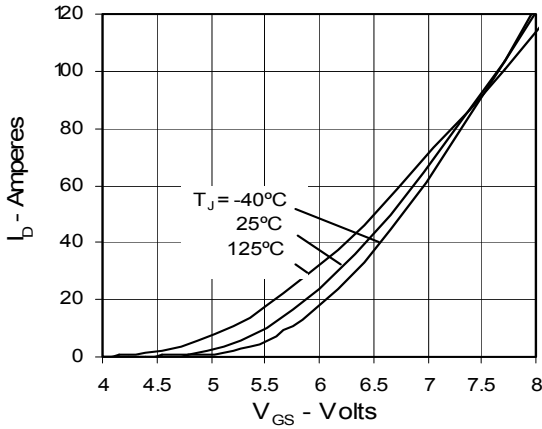
**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_{D25}$   
Value vs.  $I_D$**



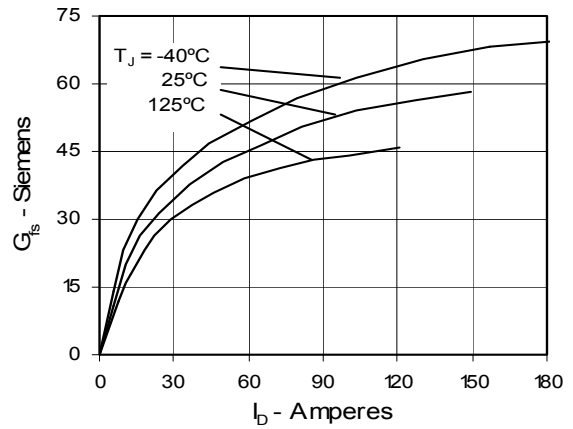
**Fig. 6. Drain Current vs. Case  
Temperature**



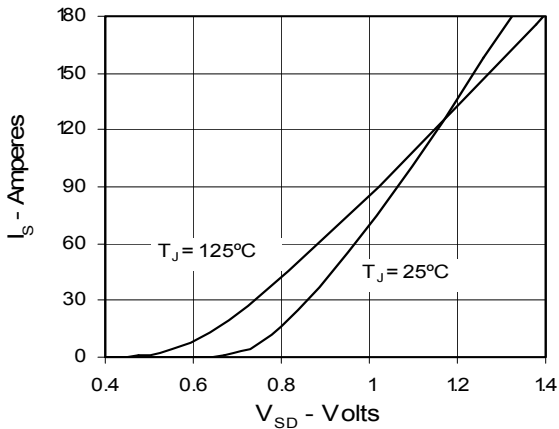
**Fig. 7. Input Admittance**



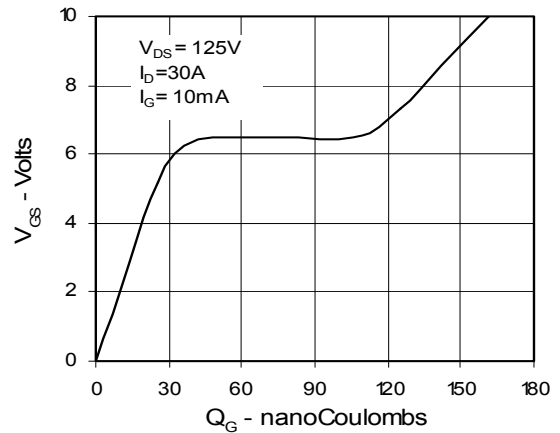
**Fig. 8. Transconductance**



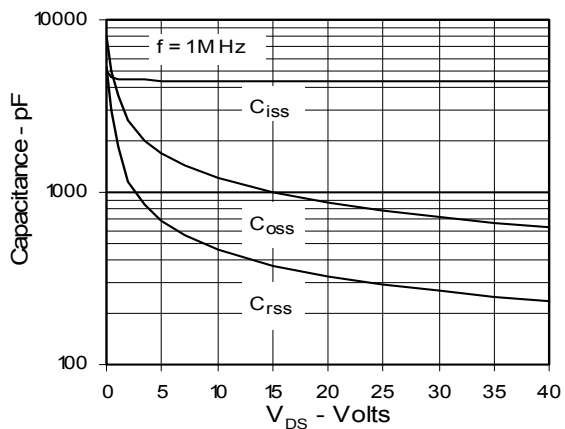
**Fig. 9. Source Current vs. Source-To-Drain Voltage**



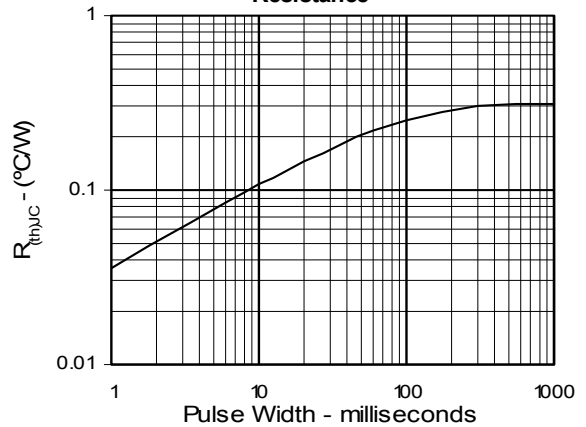
**Fig. 10. Gate Charge**



**Fig. 11. Capacitance**



**Fig. 12. Maximum Transient Thermal Resistance**



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IXYS MOSFETs and IGBTs are covered by one or more

4,835,592 4,881,106 5,017,508 5,049,961 5,187,117 5,486,715 6,306,728B1 6,259,123B1 6,306,728B1  
4,850,072 4,931,844 5,034,796 5,063,307 5,237,481 5,381,025 6,404,065B1 6,162,665 6,534,343