

2N6661

N-Channel Enhancement Mode MOSPOWER



SOLID STATE INC.

46 FARRAND STREET
BLOOMFIELD, NEW JERSEY 07003

www.solidstateinc.com

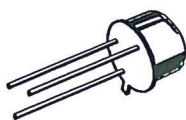
APPLICATIONS

- Switching Regulators
- Converters
- Motor Drivers

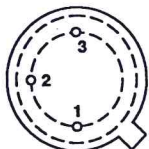
PRODUCT SUMMARY

Part Number	BV_{DSS} Volts	$r_{DS(ON)}$ (ohms)	Package
2N6661	90	4	T0-205AD

TO-39 (TO-205AD)



BOTTOM VIEW

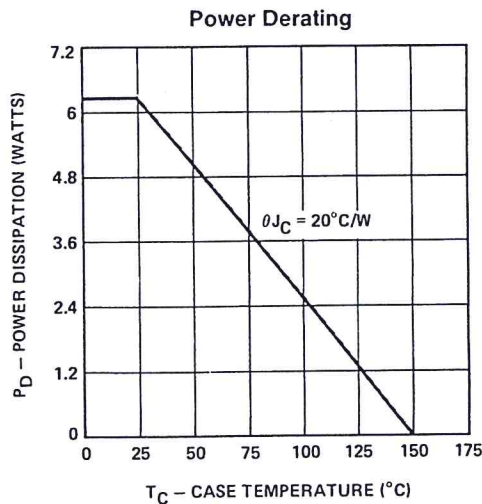
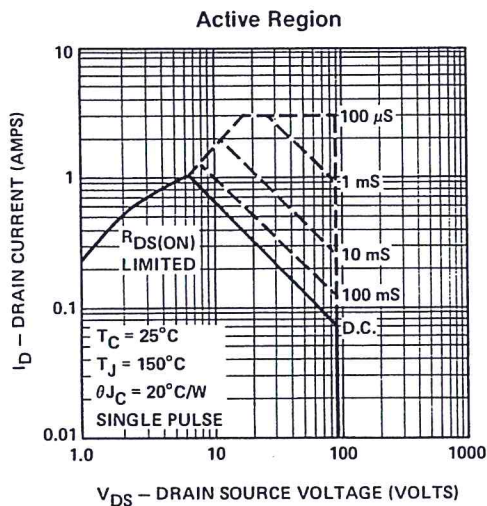


- 1 SOURCE
2 GATE
3 & CASE-DRAIN

ABSOLUTE MAXIMUM RATINGS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Parameter	2N6661	Units
V_{DS} Drain-Source Voltage	90	V
V_{DGR} Drain-Gate Voltage ($R_{GS} = 1\text{ M}\Omega$)	90	V
$I_D @ T_C = 25^\circ\text{C}$ Continuous Drain Current	± 0.9	A
$I_D @ T_C = 100^\circ\text{C}$ Continuous Drain Current	± 0.7	A
I_{DM} Pulsed Drain Current ¹	± 3	A
V_{GS} Gate-Source Voltage	± 40	V
$P_D @ T_C = 25^\circ\text{C}$ Max. Power Dissipation	6.25	W
$P_D @ T_C = 100^\circ\text{C}$ Max. Power Dissipation	2.5	W
Junction to Case Linear Derating Factor	0.05	W/ $^\circ\text{C}$
Junction to Ambient Linear Derating Factor	0.006	W/ $^\circ\text{C}$
T_J Operating and Storage Temperature Range	-55 To +150	$^\circ\text{C}$
Lead Temperature (1/16" from case for 10 secs.)	300	$^\circ\text{C}$

1 Pulse Test: Pulsewidth $\leq 300\mu\text{sec}$, Duty Cycle $\leq 2\%$



ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

STATIC

Parameter	Type	Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS} Drain-Source Breakdown Voltage	2N6661	90	110		V	$V_{GS} = 0$ $I_D = 10\text{ }\mu\text{A}$
$V_{GS(th)}$ Gate-Threshold Voltage	2N6661	0.8	1.5	2	V	$V_{DS} = V_{GS}$, $I_D = 1\text{ mA}$
I_{GSSF} Gate-Body Leakage Forward	2N6661		1 5	100 500	nA	$V_{GS} = +15\text{V}$, $V_{DS} = 0$ $V_{GS} = +15\text{V}$, $V_{DS} = 0$, $T_A = 125^\circ\text{C}$
I_{GSSR} Gate-Body Leakage Reverse	2N6661		-1	-100	nA	$V_{GS} = -15\text{V}$, $V_{DS} = 0$
I_{DSS} Zero Gate Voltage Drain Current	2N6661		1	10	μA	$V_{DS} = \text{Max. Rating}$, $V_{GS} = 0$
	2N6661		50	500	μA	$V_{DS} = 0.8\text{ Max. Rating}$, $V_{GS} = 0$ $T_C = 125^\circ\text{C}$
$I_{D(on)}$ On-State Drain Current ¹	2N6661	1.5	1.7		A	$V_{DS} \geq 2V_{DS(ON)}$, $V_{GS} = 10\text{V}$
$V_{DS(on)}$ Static Drain-Source On-State Voltage ¹	2N6661		1.2	1.6	V	$V_{GS} = 5\text{V}$, $I_D = 0.3\text{A}$
	2N6661		3	4	V	$V_{GS} = 10\text{V}$, $I_D = 1\text{A}$
$R_{DS(on)}$ Static Drain-Source On-State Resistance ¹	2N6661		4	5.3	Ω	$V_{GS} = 5\text{V}$, $I_D = 0.3\text{A}$
	2N6661		3	4	Ω	$V_{GS} = 10\text{V}$, $I_D = 1\text{A}$
$R_{DS(on)}$ Static Drain-Source On-State Resistance ¹	2N6661		4.1	5.5	Ω	$V_{GS} = 10\text{V}$, $I_D = 1\text{A}$, $T_C = 125^\circ\text{C}$

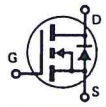
DYNAMIC

g_{fs} Forward Transconductance ¹	2N6661	170	195		mS (m Ω)	$V_{DS} \geq 2V_{DS(ON)}$, $I_D = 0.5\text{A}$
C_{iss} Input Capacitance	2N6661		35	50	pF	$V_{GS} = 0$, $V_{DS} = 25\text{V}$ $f = 1\text{ MHz}$
C_{oss} Output Capacitance	2N6661		33	40	pF	
C_{rss} Reverse Transfer Capacitance	2N6661		2	10	pF	
$t_{d(on)}$ Turn-On Delay Time	2N6661		8	10	ns	$V_{DD} = 25\text{V}$, $I_D \cong 1\text{A}$ $R_g = 25\Omega$, $R_L = 23\Omega$ (MOSFET switching times are essentially independent of operating temperature.)
$t_{d(off)}$ Turn-Off Delay Time	2N6661		8	10	ns	

THERMAL RESISTANCE

R_{thJC} Junction-to-Case	2N6661			20	$^\circ\text{C/W}$	
R_{thJA} Junction-to-Ambient	2N6661			170	$^\circ\text{C/W}$	Free Air Operation

BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS

I_S Continuous Source Current (Body Diode)	2N6661			-0.9	A	Modified MOSPOWER symbol showing the integral P-N Junction rectifier 
I_{SM} Source Current ¹ (Body Diode)	2N6661			-3	A	
V_{SD} Diode Forward Voltage ¹	2N6661		-1.2		V	
						$T_C = 25^\circ\text{C}$, $I_S = -0.9\text{A}$, $V_{GS} = 0$

¹ Pulse Test: Pulse Width $\leq 300\text{ }\mu\text{sec}$, Duty Cycle $\leq 2\%$

TYPICAL PERFORMANCE CURVES (25°C unless otherwise noted)

FIGURE 1. Ohmic Region

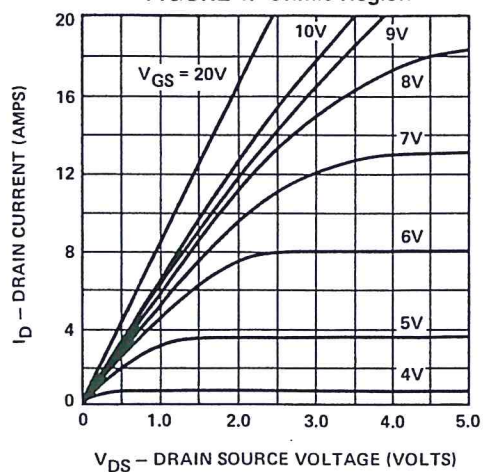


FIGURE 2. Transfer Characteristics

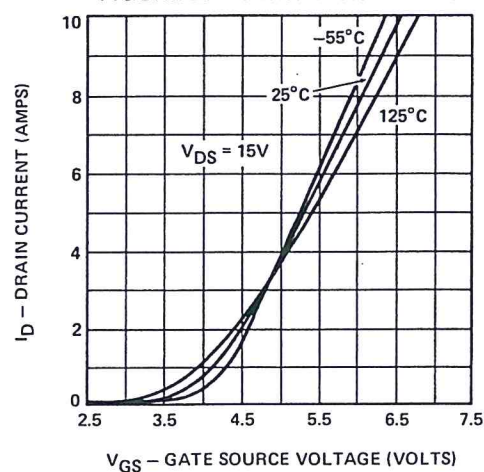


FIGURE 3. Temperature Effects on $r_{DS(on)}$

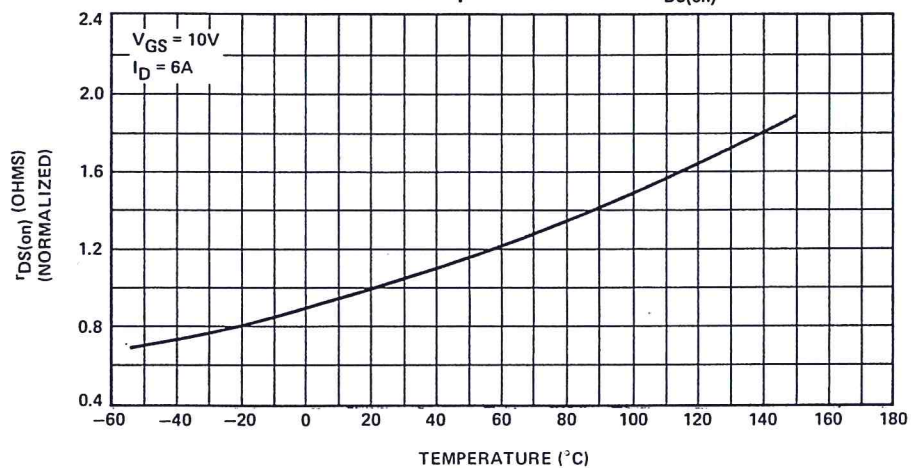


FIGURE 4. Output Characteristics

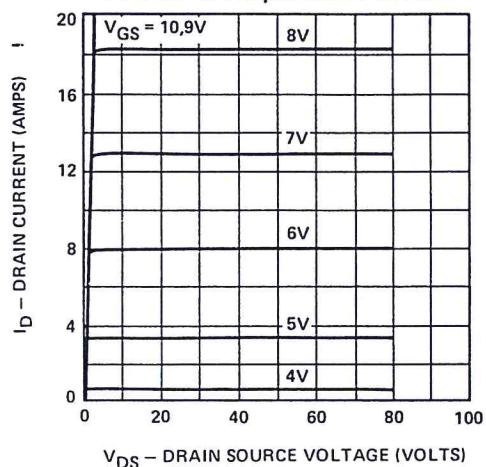
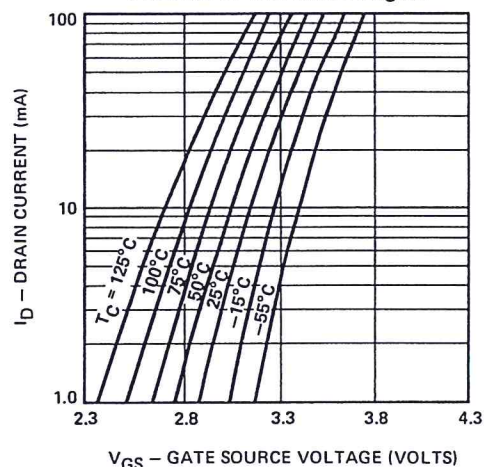


FIGURE 5. Threshold Region



TYPICAL PERFORMANCE CURVES—Continued

FIGURE 6. Off-State Current

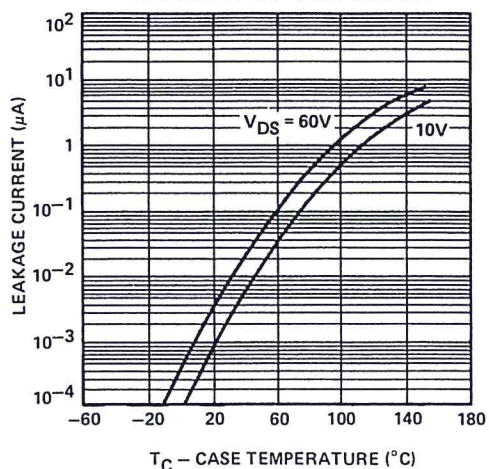


FIGURE 7. Capacitance

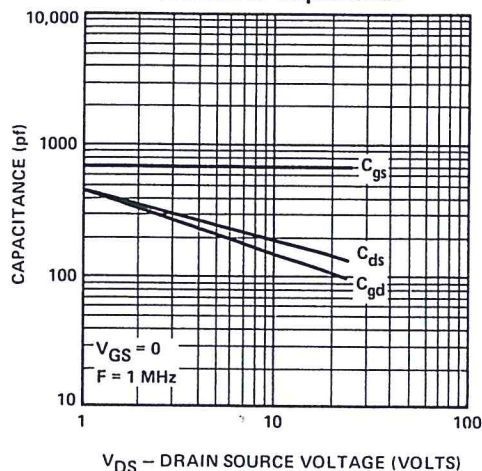


FIGURE 8. Effects on Load Conditions

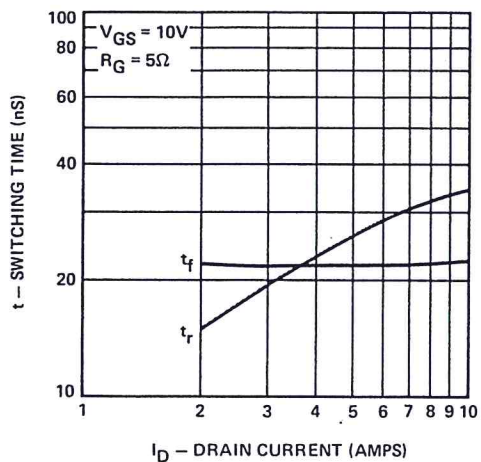


FIGURE 9. Effects of Drive Resistance

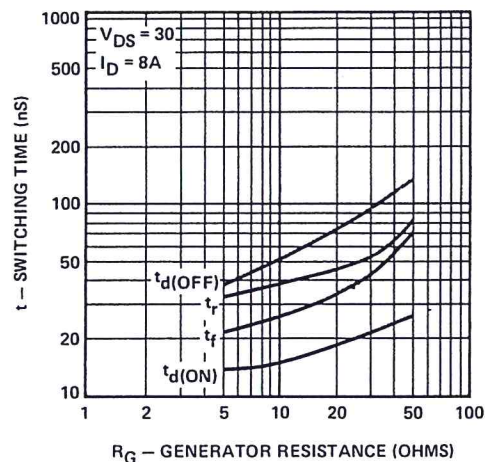
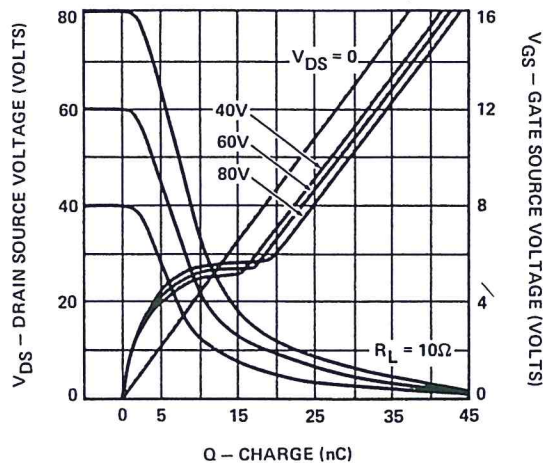
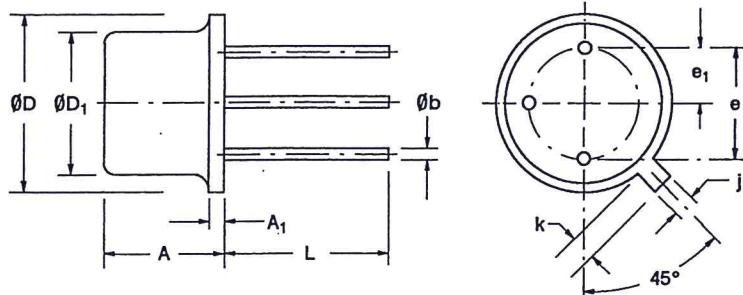


FIGURE 10. Turn-on Charge



TRANSIENT THERMAL RESPONSE CURVES

■ TO-39 (TO-205AD)



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	6.10	6.60	0.240	0.260
A ₁	0.23	1.04	0.009	0.041
Øb	0.41	0.53	0.016	0.021
ØD	8.51	9.39	0.335	0.370
ØD ₁	7.75	8.51	0.305	0.335
e	5.08 BSC		0.200 BSC	
e ₁	2.54 BSC		0.100 BSC	
j	0.72	0.86	0.028	0.034
k	0.74	1.14	0.029	0.045
L	12.70	19.05	0.500	0.750

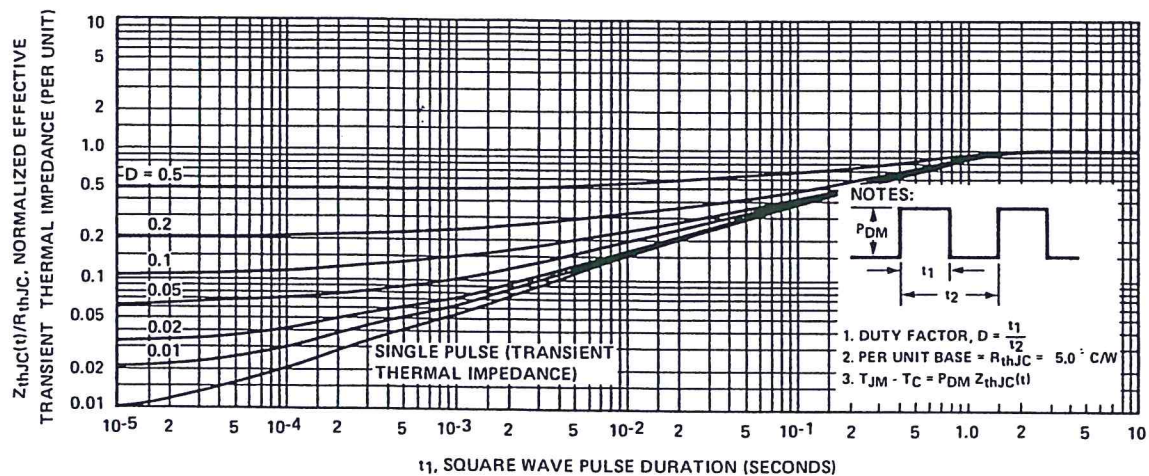


FIGURE 3. TO-39 Package