

Electrical Characteristics @ $T_J = 25^\circ\text{C}$ (Unless Otherwise Specified)

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS}	Drain-to-Source Breakdown Voltage	-200	—	—	V	$V_{GS} = 0\text{V}$, $I_D = -1.0\text{mA}$
$\Delta BV_{DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	-0.22	—	V/ $^\circ\text{C}$	Reference to 25°C , $I_D = -1.0\text{mA}$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	0.80	Ω	$V_{GS} = -10\text{V}$, $I_{D2} = -2.4\text{A}$ ④
		—	—	0.83		$V_{GS} = -10\text{V}$, $I_{D1} = -4.0\text{A}$ ④
$V_{GS(th)}$	Gate Threshold Voltage	-2.0	—	-4.0	V	$V_{DS} = V_{GS}$, $I_D = -250\mu\text{A}$
I_{DSS}	Zero Gate Voltage Drain Current	—	—	-25	μA	$V_{DS} = -160\text{V}$, $V_{GS} = 0\text{V}$
		—	—	-250		$V_{DS} = -160\text{V}$, $V_{GS} = 0\text{V}$, $T_J = 125^\circ\text{C}$
I_{GSS}	Gate-to-Source Leakage Forward	—	—	-100	nA	$V_{GS} = -20\text{V}$
	Gate-to-Source Leakage Reverse	—	—	100		$V_{GS} = 20\text{V}$
Q_G	Total Gate Charge	14.7	—	34.8	nC	$I_{D1} = -4.0\text{A}$
Q_{GS}	Gate-to-Source Charge	0.8	—	6.1		$V_{DS} = -100\text{V}$
Q_{GD}	Gate-to-Drain ('Miller') Charge	5.0	—	20.5		$V_{GS} = -10\text{V}$
$t_{d(on)}$	Turn-On Delay Time	—	—	50	ns	$V_{DD} = -75\text{V}$
t_r	Rise Time	—	—	100		$I_{D1} = -4.0\text{A}$
$t_{d(off)}$	Turn-Off Delay Time	—	—	80		$R_G = 7.5\Omega$
t_f	Fall Time	—	—	80		$V_{GS} = -10\text{V}$
$L_s + L_D$	Total Inductance	—	7.0	—	nH	Measured from Drain lead (6mm / 0.25 in from package) to Source lead (6mm / 0.25 in from package) with Source wire internally bonded from Source pin to Drain pin
C_{iss}	Input Capacitance	—	700	—	pF	$V_{GS} = 0\text{V}$
C_{oss}	Output Capacitance	—	200	—		$V_{DS} = -25\text{V}$
C_{rss}	Reverse Transfer Capacitance	—	40	—		$f = 1.0\text{MHz}$

Source-Drain Diode Ratings and Characteristics

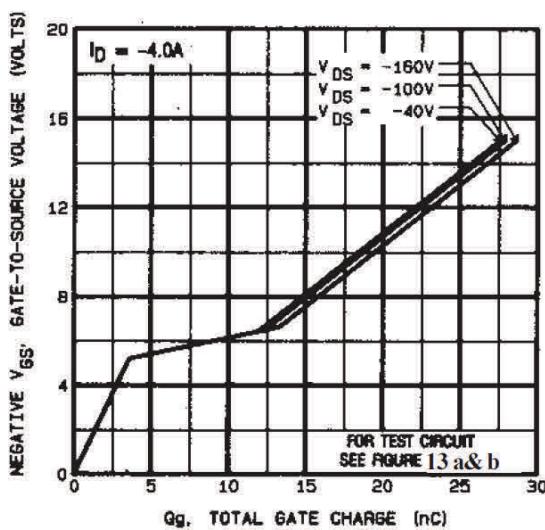
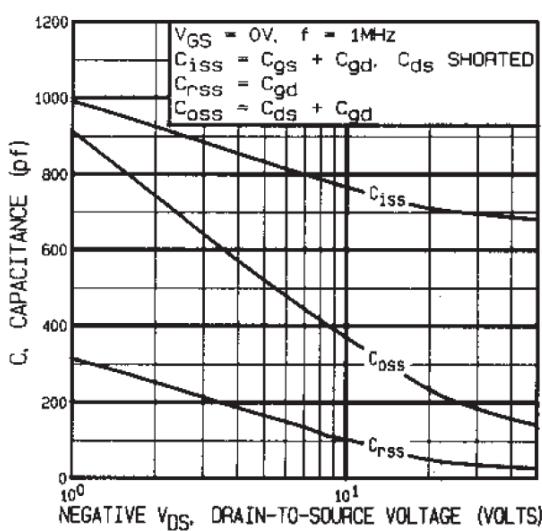
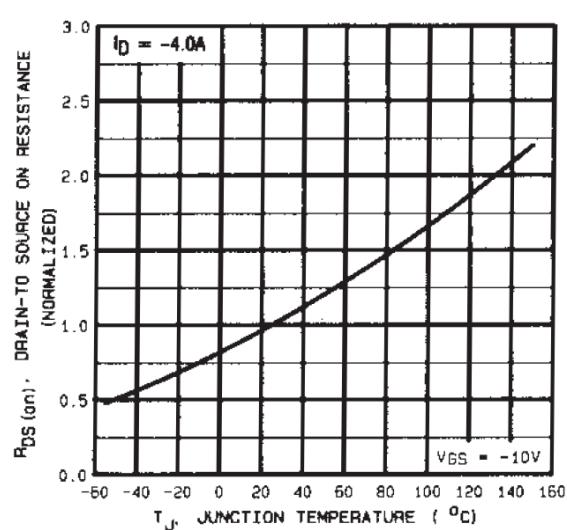
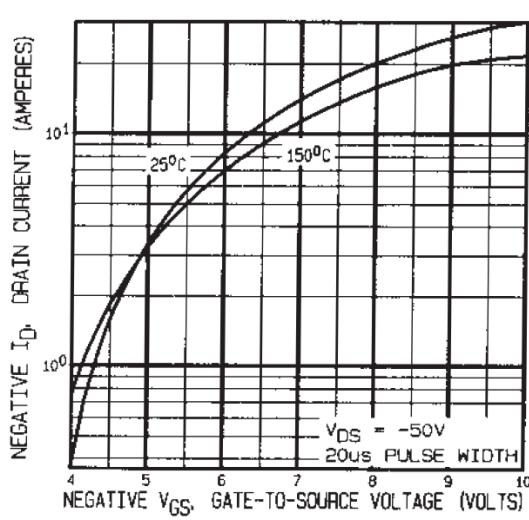
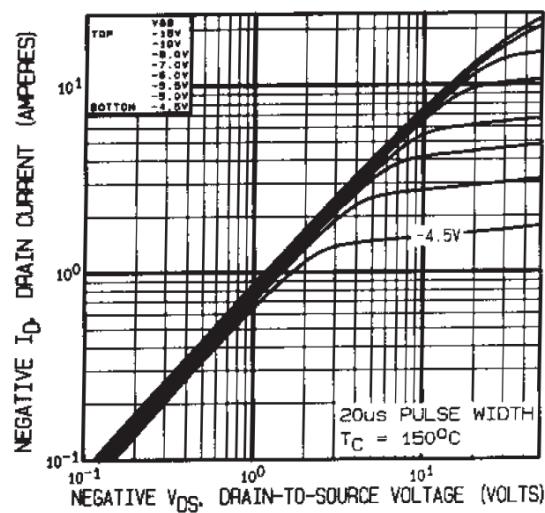
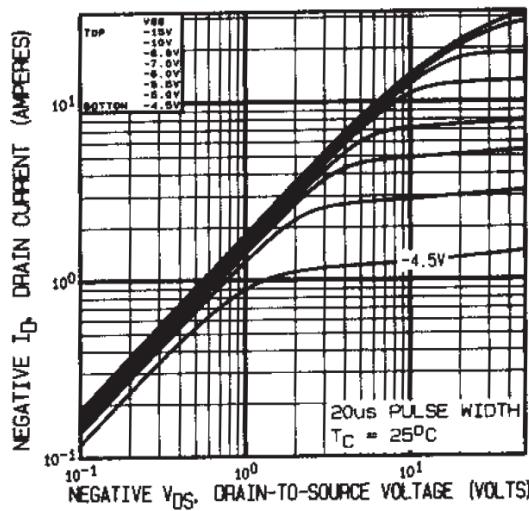
Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
I_S	Continuous Source Current (Body Diode)	—	—	-4.0	A	
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	-20		
V_{SD}	Diode Forward Voltage	—	—	-5.6	V	$T_J = 25^\circ\text{C}$, $I_S = -4.0\text{A}$, $V_{GS} = 0\text{V}$ ④
t_{rr}	Reverse Recovery Time	—	—	400	ns	$T_J = 25^\circ\text{C}$, $I_F = -4.0\text{A}$, $V_{DD} \leq -50\text{V}$
Q_{rr}	Reverse Recovery Charge	—	—	4.0		$di/dt = -100\text{A}/\mu\text{s}$ ④
t_{on}	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by $L_s + L_D$)				

Thermal Resistance

Symbol	Parameter	Min.	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	—	—	5.0	$^\circ\text{C/W}$
$R_{\theta JA}$	Junction-to-Ambient (Typical Socket Mount)	—	—	175	

Footnotes:

- ① Repetitive Rating; Pulse width limited by maximum junction temperature.
- ② $V_{DD} = -50\text{V}$, starting $T_J = 25^\circ\text{C}$, Peak $I_L = -4.0\text{A}$, $V_{GS} = -10\text{V}$
- ③ $I_{SD} \leq -4.0\text{A}$, $di/dt \leq -120\text{A}/\mu\text{s}$, $V_{DD} \leq -200\text{V}$, $T_J \leq 150^\circ\text{C}$, Suggested $R_G = 7.5\Omega$
- ④ Pulse width $\leq 300\ \mu\text{s}$; Duty Cycle $\leq 2\%$



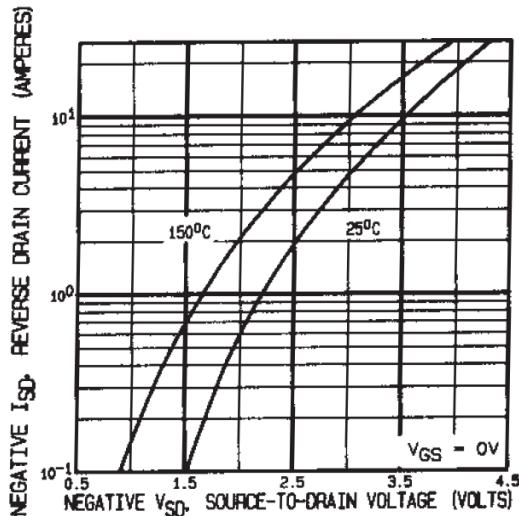


Fig 7. Typical Source-Drain Diode Forward Voltage

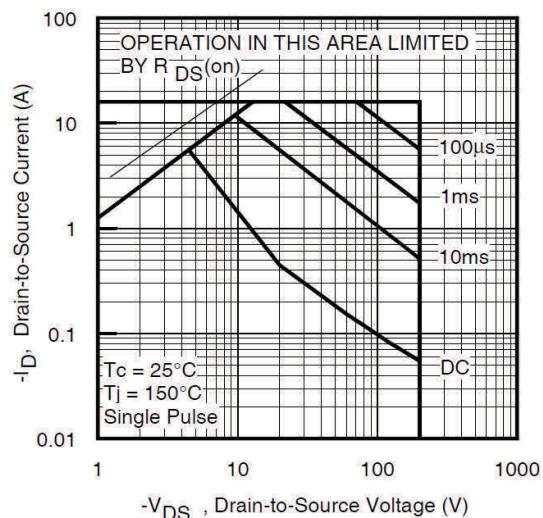


Fig 8. Maximum Safe Operating Area

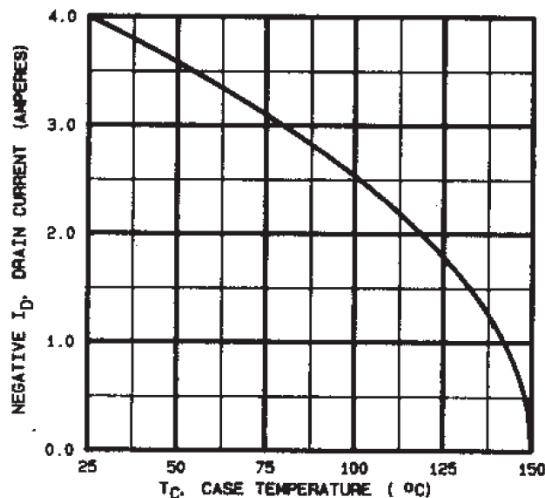


Fig 9. Maximum Drain Current Vs. Case Temperature

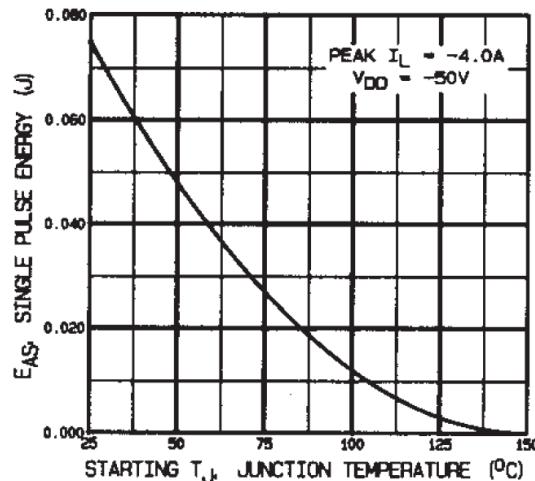


Fig 10. Maximum Avalanche Energy Vs. Drain Current

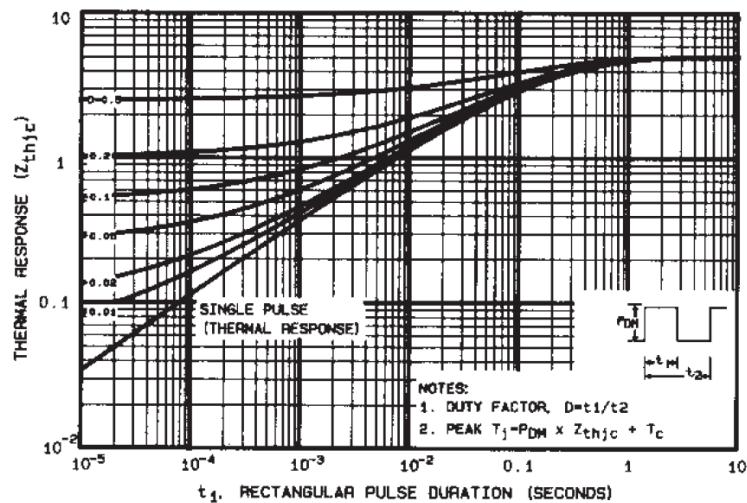


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

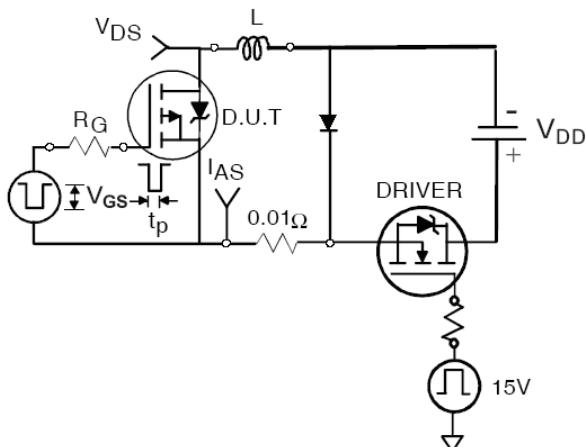


Fig 12a. Unclamped Inductive Test Circuit

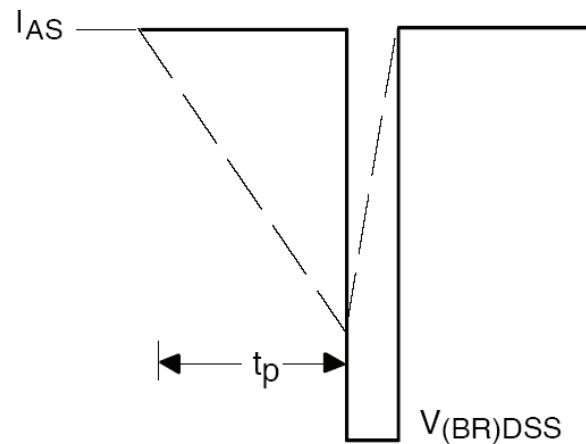


Fig 12b. Unclamped Inductive Waveforms

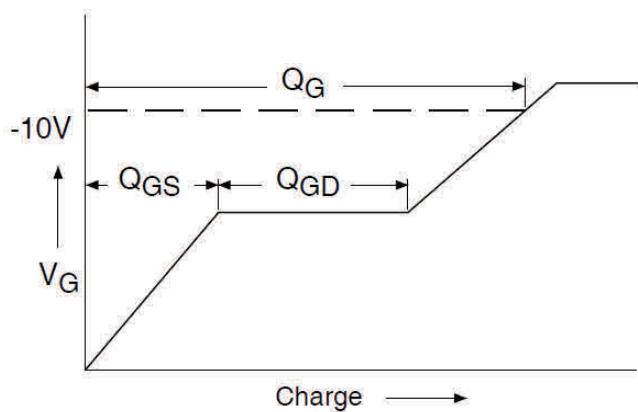


Fig 13a. Gate Charge Waveform

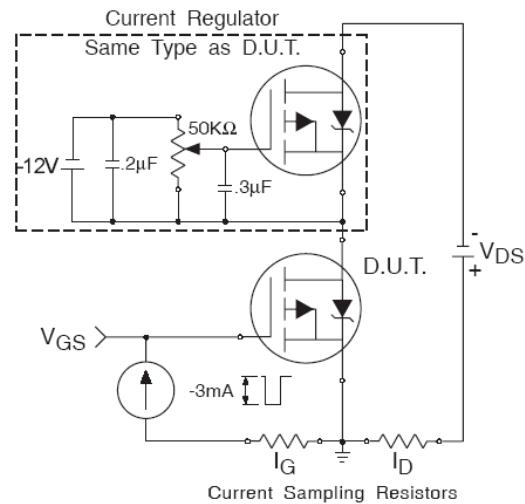


Fig 13b. Gate Charge Test Circuit

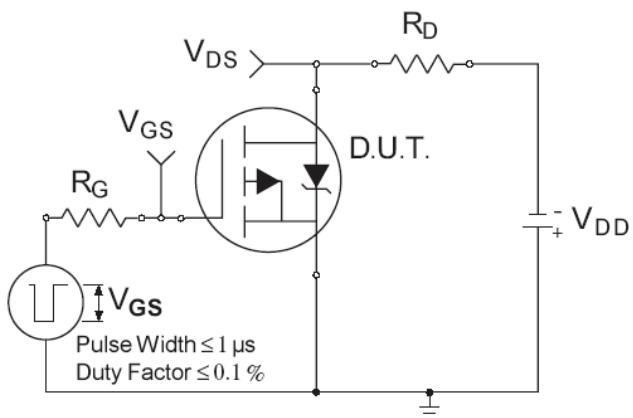


Fig 14a. Switching Time Test Circuit

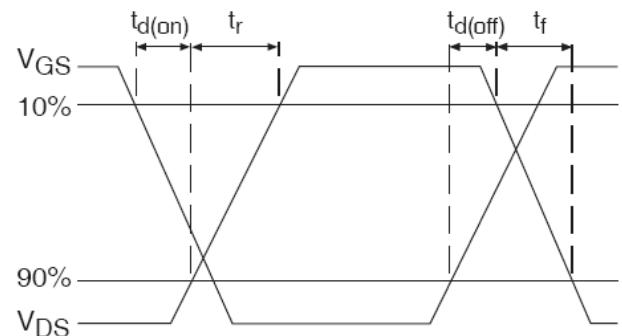
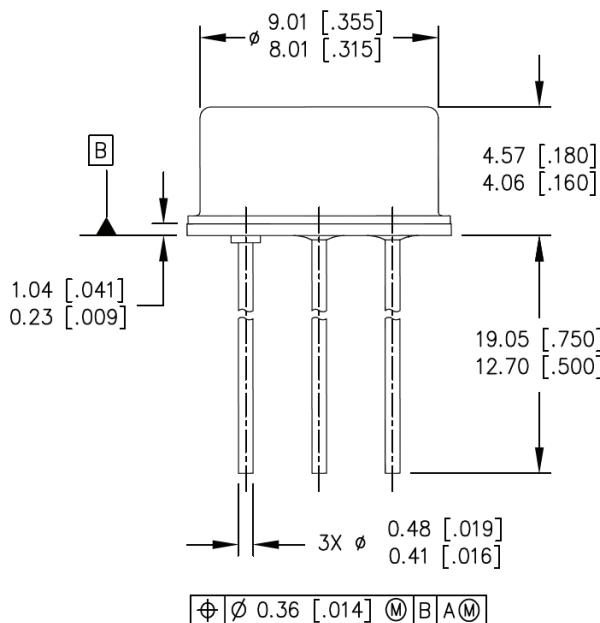


Fig 14b. Switching Time Waveforms

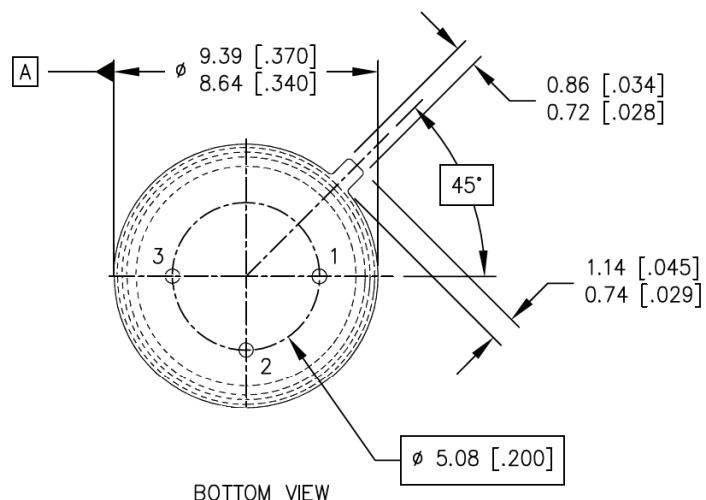
Case Outline and Dimensions - TO-205AF (TO-39)



SIDE VIEW

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME 14.5M-1994.
2. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
3. CONTROLLING DIMENSION: INCH.
4. CONFORMS TO JEDEC OUTLINE TO-205AF (TO-39).



BOTTOM VIEW

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- 1- SOURCE
- 2- GATE
- 3- DRAIN (CONNECTED TO THE CASE)

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