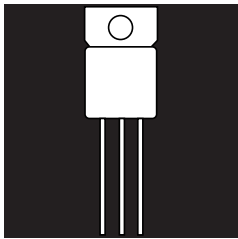


COM140T COM340T  
COM240T COM440T

## (COTS) COMMERCIAL OFF-THE-SHELF POWER MOSFETS IN TO-257AA PACKAGE



100V Thru 500V, Up To 14 Amp, N-Channel  
MOSFETs In Hermetic Metal Package

### FEATURES

- Isolated Hermetic Metal Package
- Fast Switching
- Low  $R_{DS(on)}$

### DESCRIPTION

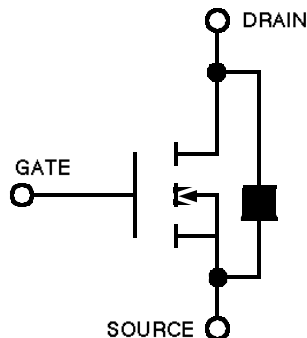
This series of hermetically packaged products feature the latest advanced MOS-FET and packaging technology. They are ideally suited for Military requirements where small size, high performance and high reliability are required, and in applications such as switching power supplies, motor controls, inverters, choppers, audio amplifiers and high energy pulse circuits.

### MAXIMUM RATINGS @ 25°C

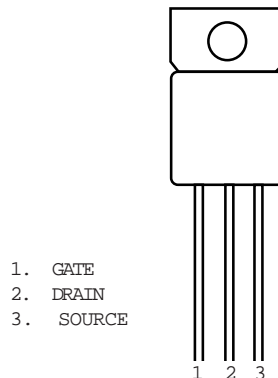
PART NUMBER	$V_{DS}$	$R_{DS(on)}$	$I_D(MAX)$
COM140T	100V	.12	14A
COM240T	200V	.21	14A
COM340T	400V	.59	10A
COM440T	500V	.90	7A

3.1

### SCHEMATIC



### CONNECTION DIAGRAM



ELECTRICAL CHARACTERISTICS:  $T_C = 25^\circ$  unless otherwise noted  
 STATIC P/N COM140T

Parameter	Min.	Typ.	Max.	Units	Test Conditions
$BV_{DSS}$ Drain-Source Breakdown Voltage	100			V	$V_{GS} = 0$ , $I_D = 250$ mA
$V_{GS(th)}$ Gate-Threshold Voltage	2.0		4.0	V	$V_{DS} = V_{GS}$ , $I_D = 250$ mA
$I_{SSP}$ Gate-Body Leakage Forward			100	nA	$V_{GS} = 20$ V
$I_{SSR}$ Gate-Body Leakage Reverse			-100	nA	$V_{GS} = -20$ V
$I_{SS}$ Zero Gate Voltage Drain Current		0.1 0.2	0.25 1.0	m A m A	$V_{DS} = \text{Max. Rat.}, V_{GS} = 0$ $V_{DS} = 0.8 \text{ Max. Rat.}, V_{GS} = 0$ , $T_C = 125^\circ \text{ C}$
$I_{(on)}$ On-State Drain Current <sup>1</sup>	14			A	$V_{DS} = 2 V_{DS(on)}, V_{GS} = 10$ V
$V_{DS(on)}$ Static Drain-Source On-State Voltage <sup>1</sup>		1.40	1.73	V	$V_{GS} = 10$ V, $I_D = 15$ A
$R_{DS(on)}$ Static Drain-Source On-State Resistance <sup>1</sup>			.12		$V_{GS} = 10$ V, $I_D = 15$ A
$R_{DS(on)}$ Static Drain-Source On-State Resistance <sup>1</sup>			.22		$V_{GS} = 10$ V, $I_D = 15$ A, $T_C = 125$ C

DYNAMIC

$g_b$ Forward Transconductance <sup>1</sup>	10			S (M)	$V_{DS} = 2 V_{DS(on)}, I_D = 15$ A
$C_{iss}$ Input Capacitance		1275		pF	$V_{GS} = 0$
$C_{oss}$ Output Capacitance		550		pF	$V_{DS} = 25$ V
$C_{iss}$ Reverse Transfer Capacitance		160		pF	$f = 1$ MHz
$T_{d(on)}$ Turn-On Delay Time		16		ns	$V_{DD} = 30$ V, $I_D @ 5$ A
$t_r$ Rise Time		19		ns	$R_\theta = 5$ W, $V_{GS} = 10$ V
$T_{d(off)}$ Turn-Off Delay Time		42		ns	(MOSFET) switching times are essentially independent of operating temperature.
$t_f$ Fall Time		24		ns	

BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS

$I_S$ Continuous Source Current (Body Diode)			-27	A	Modified MOSPOWER symbol showing the integral P-N Junction rectifier.
$I_{SM}$ Source Current <sup>1</sup> (Body Diode)			-108	A	
$V_{SD}$ Diode Forward Voltage <sup>1</sup>			-2.0	V	$T_C = 25$ C, $I_S = -24$ A, $V_{GS} = 0$
$t_r$ Reverse Recovery Time		200		ns	$T_C = 150$ C, $I_F = I_S$ , $d_V/ds = 100$ A/ms

<sup>1</sup> Pulse Test: Pulse Width 300msec, Duty Cycle 2%.

ELECTRICAL CHARACTERISTICS:  $T_C = 25^\circ$  unless otherwise noted  
 STATIC P/N COM240T

Parameter	Min.	Typ.	Max.	Units	Test Conditions
$BV_{DSS}$ Drain-Source Breakdown Voltage	200			V	$V_{GS} = 0$ , $I_D = 250$ mA
$V_{GS(th)}$ Gate-Threshold Voltage	2.0		4.0	V	$V_{DS} = V_{GS}$ , $I_D = 250$ mA
$I_{SSP}$ Gate-Body Leakage Forward			100	nA	$V_{GS} = 20$ V
$I_{SSR}$ Gate-Body Leakage Reverse			-100	nA	$V_{GS} = -20$ V
$I_{SS}$ Zero Gate Voltage Drain Current		0.1 0.2	0.25 1.0	m A m A	$V_{DS} = \text{Max. Rat.}, V_{GS} = 0$ $V_{DS} = 0.8 \text{ Max. Rat.}, V_{GS} = 0$ , $T_C = 125^\circ \text{ C}$
$I_{(on)}$ On-State Drain Current <sup>1</sup>	14			A	$V_{DS} = 2 V_{DS(on)}, V_{GS} = 10$ V
$V_{DS(on)}$ Static Drain-Source On-State Voltage <sup>1</sup>		1.8	2.1	V	$V_{GS} = 10$ V, $I_D = 10$ A
$R_{DS(on)}$ Static Drain-Source On-State Resistance <sup>1</sup>			0.21		$V_{GS} = 10$ V, $I_D = 10$ A
$R_{DS(on)}$ Static Drain-Source On-State Resistance <sup>1</sup>			0.41		$V_{GS} = 10$ V, $I_D = 10$ A, $T_C = 125$ C

DYNAMIC

$g_b$ Forward Transconductance <sup>1</sup>	6.0			S (M)	$V_{DS} = 2 V_{DS(on)}, I_D = 10$ A
$C_{iss}$ Input Capacitance		1000		pF	$V_{GS} = 0$
$C_{oss}$ Output Capacitance		250		pF	$V_{DS} = 25$ V
$C_{iss}$ Reverse Transfer Capacitance		100		pF	$f = 1$ MHz
$T_{d(on)}$ Turn-On Delay Time		17		ns	$V_{DD} = 75$ V, $I_D @ 18$ A
$t_r$ Rise Time		52		ns	$R_\theta = 5$ W, $V_{GS} = 10$ V
$T_{d(off)}$ Turn-Off Delay Time		36		ns	(MOSFET) switching times are essentially independent of operating temperature.
$t_f$ Fall Time		30		ns	

BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS

$I_S$ Continuous Source Current (Body Diode)			-18	A	Modified MOSPOWER symbol showing the integral P-N Junction rectifier.
$I_{SM}$ Source Current <sup>1</sup> (Body Diode)			-72	A	
$V_{SD}$ Diode Forward Voltage <sup>1</sup>			-1.5	V	$T_C = 25$ C, $I_S = -18$ A, $V_{GS} = 0$
$t_r$ Reverse Recovery Time		350		ns	$T_C = 150$ C, $I_F = I_S$ , $d_V/ds = 100$ A/ms

<sup>1</sup> Pulse Test: Pulse Width 300msec, Duty Cycle 2%.

ELECTRICAL CHARACTERISTICS:  $T_c = 25^\circ$  unless otherwise noted  
STATIC P/N COM340T

Parameter	Min.	Typ.	Max.	Units	Test Conditions
$BV_{DSS}$ Drain-Source Breakdown Voltage	400			V	$V_{GS} = 0, I_D = 250 \text{ mA}$
$V_{(th)}$ Gate-Threshold Voltage	2.0		4.0	V	$V_{GS} = V_{DS}, I_D = 250 \text{ mA}$
$I_{SSP}$ Gate-Body Leakage Forward			100	nA	$V_{GS} = 20 \text{ V}$
$I_{SSR}$ Gate-Body Leakage Reverse			-100	nA	$V_{GS} = -20 \text{ V}$
$I_{SS}$ Zero Gate Voltage Drain Current		0.1 0.2	0.25 1.0	m A	$V_{DS} = \text{Max. Rat.}, V_{GS} = 0, V_{GS} = 0.8 \text{ Max. Rat.}, V_{GS} = 0, T_c = 125^\circ \text{ C}$
$I_{(on)}$ On-State Drain Current <sup>1</sup>	10			A	$V_{DS} = 2 V_{(th)}, V_{GS} = 10 \text{ V}$
$V_{(on)}$ Static Drain-Source On-State Voltage <sup>1</sup>		2.5	2.9	V	$V_{GS} = 10 \text{ V}, I_D = 5 \text{ A}$
$R_{(on)}$ Static Drain-Source On-State Resistance <sup>1</sup>			0.59		$V_{GS} = 10 \text{ V}, I_D = 5 \text{ A}$
$R_{(on)}$ Static Drain-Source On-State Resistance <sup>1</sup>			1.2		$V_{GS} = 10 \text{ V}, I_D = 5 \text{ A}, T_c = 125 \text{ C}$

DYNAMIC

Parameter	Min.	Typ.	Max.	Units	Test Conditions
$g_{fs}$ Forward Transconductance <sup>1</sup>	4.0	4.4		S/M	$V_{GS} = 2 V_{(th)}, I_D = 5 \text{ A}$
$C_{iss}$ Input Capacitance		1150		pF	$V_{GS} = 0$
$C_{oss}$ Output Capacitance		165		pF	$V_{DS} = 25 \text{ V}$
$C_{rsw}$ Reverse Transfer Capacitance		70		pF	$f = 1 \text{ MHz}$
$T_{(on)}$ Turn-On Delay Time		17		ns	$V_{DS} = 175 \text{ V}, I_D = 5 \text{ A}$
$t_r$ Rise Time		12		ns	$R_{\theta} = 5 \text{ W}, V_{DS} = 10 \text{ V}$
$T_{(off)}$ Turn-Off Delay Time		45		ns	
$t_f$ Fall Time		30		ns	

BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS

Parameter	Min.	Typ.	Max.	Units	Test Conditions
$I_S$ Continuous Source Current (Body Diode)			-10	A	Modified MOSPOWER symbol showing the integral P-N Junction rectifier.
$I_{SM}$ Source Current <sup>1</sup> (Body Diode)			-40	A	
$V_{SD}$ Diode Forward Voltage <sup>1</sup>			-2	V	$T_c = 25 \text{ C}, I_S = -10 \text{ A}, V_{GS} = 0$
$t_r$ Reverse Recovery Time		530		ns	$T_c = 150 \text{ C}, I_S = I_{SM}, d_f/ds = 100 \text{ A/ms}$

<sup>1</sup> Pulse Test: Pulse Width 300msec, Duty Cycle 2%.

ELECTRICAL CHARACTERISTICS:  $T_c = 25^\circ$  unless otherwise noted  
STATIC P/N COM440T

Parameter	Min.	Typ.	Max.	Units	Test Conditions
$BV_{DSS}$ Drain-Source Breakdown Voltage	500			V	$V_{GS} = 0, I_D = 250 \text{ mA}$
$V_{(th)}$ Gate-Threshold Voltage	2.0		4.0	V	$V_{GS} = V_{DS}, I_D = 250 \text{ mA}$
$I_{SSP}$ Gate-Body Leakage Forward			100	nA	$V_{GS} = 20 \text{ V}$
$I_{SSR}$ Gate-Body Leakage Reverse			-100	nA	$V_{GS} = -20 \text{ V}$
$I_{SS}$ Zero Gate Voltage Drain Current		0.1 0.2	0.25 1.0	m A	$V_{DS} = \text{Max. Rat.}, V_{GS} = 0, V_{GS} = 0.8 \text{ Max. Rat.}, V_{GS} = 0, T_c = 125^\circ \text{ C}$
$I_{(on)}$ On-State Drain Current <sup>1</sup>	4.5			A	$V_{DS} = 2 V_{(th)}, V_{GS} = 10 \text{ V}$
$V_{(on)}$ Static Drain-Source On-State Voltage <sup>1</sup>		3.2	3.52	V	$V_{GS} = 10 \text{ V}, I_D = 4 \text{ A}$
$R_{(on)}$ Static Drain-Source On-State Resistance <sup>1</sup>			0.90		$V_{GS} = 10 \text{ V}, I_D = 4 \text{ A}$
$R_{(on)}$ Static Drain-Source On-State Resistance <sup>1</sup>			1.8		$V_{GS} = 10 \text{ V}, I_D = 4 \text{ A}, T_c = 125 \text{ C}$

DYNAMIC

Parameter	Min.	Typ.	Max.	Units	Test Conditions
$g_{fs}$ Forward Transconductance <sup>1</sup>	4.0	4.8		S/M	$V_{GS} = 2 V_{(th)}, I_D = 4 \text{ A}$
$C_{iss}$ Input Capacitance		1225		pF	$V_{GS} = 0$
$C_{oss}$ Output Capacitance		200		pF	$V_{DS} = 25 \text{ V}$
$C_{rsw}$ Reverse Transfer Capacitance		85		pF	$f = 1 \text{ MHz}$
$T_{(on)}$ Turn-On Delay Time		17		ns	$V_{DS} = 200 \text{ V}, I_D = 4 \text{ A}$
$t_r$ Rise Time		5		ns	$R_{\theta} = 5 \text{ W}, V_{DS} = 10 \text{ V}$
$T_{(off)}$ Turn-Off Delay Time		42		ns	(MOSFET) switching times are essentially independent of operating temperature.
$t_f$ Fall Time		14		ns	

BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS

Parameter	Min.	Typ.	Max.	Units	Test Conditions
$I_S$ Continuous Source Current (Body Diode)			-8	A	Modified MOSPOWER symbol showing the integral P-N Junction rectifier.
$I_{SM}$ Source Current <sup>1</sup> (Body Diode)			-32	A	
$V_{SD}$ Diode Forward Voltage <sup>1</sup>			-2	V	$T_c = 25 \text{ C}, I_S = -18 \text{ A}, V_{GS} = 0$
$t_r$ Reverse Recovery Time		700		ns	$T_c = 150 \text{ C}, I_S = I_{SM}, d_f/ds = 100 \text{ A/ms}$

<sup>1</sup> Pulse Test: Pulse Width 300msec, Duty Cycle 2%.

COM140T - COM440T

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

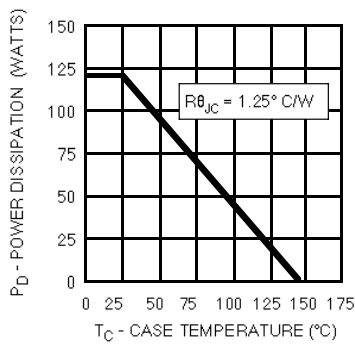
Parameter	COM140T	COM240T	COM340T	COM440T	Units
$V_{DS}$ Drain-Source Voltage	100	200	400	500	V
$V_{DGR}$ Drain-Gate Voltage ( $R_{GS} = 1\text{ M}$ )	100	200	400	500	V
$I_D @ T_C = 25^\circ\text{C}$ Continuous Drain Current <sup>2</sup>	$\pm 14$	$\pm 14$	$\pm 10$	$\pm 8$	A
$I_D @ T_C = 100^\circ\text{C}$ Continuous Drain Current <sup>2</sup>	$\pm 14$	$\pm 11$	$\pm 6$	$\pm 5$	A
$I_{DM}$ Pulsed Drain Current <sup>1</sup>	$\pm 56$	$\pm 56$	$\pm 40$	$\pm 32$	A
$V_{GS}$ Gate-Source Voltage	$\pm 20$	$\pm 20$	$\pm 20$	$\pm 20$	V
$P_D @ T_C = 25^\circ\text{C}$ Maximum Power Dissipation	125	125	125	125	W
$P_D @ T_C = 100^\circ\text{C}$ Maximum Power Dissipation	50	50	50	50	W
Junction To Case Linear Derating Factor	1.0	1.0	1.0	1.0	W/ $^\circ\text{C}$
Junction To Ambient Linear Derating Factor	.015	.015	.015	.015	W/ $^\circ\text{C}$
$T_J$ Operating and $T_{stg}$ Storage Temperature Range	-55 to 150	-55 to 150	-55 to 150	-55 to 150	$^\circ\text{C}$
Lead Temperature (1/16" from case for 10 secs.)	300	300	300	300	$^\circ\text{C}$

1 Pulse Test: Pulse width 300  $\mu\text{sec}$ . Duty Cycle 2%.  
2 Package pin limitation = 10 Amps

THERMAL RESISTANCE

$R_{thJC}$ Junction-to-Case	1.00	$^\circ\text{C/W}$	
$R_{thJA}$ Junction-to-Ambient	65	$^\circ\text{C/W}$	Free Air Operation

POWER DERATING



MECHANICAL OUTLINE

TO-257

