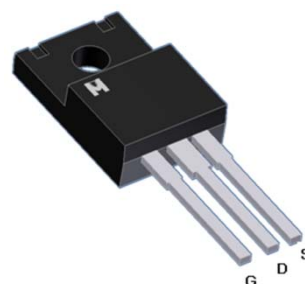
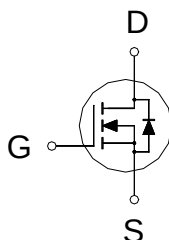


N-Channel Logic Level Enhancement Mode Field Effect Transistor

Product Summary:

BV_{DSS}	100V
$R_{DS(on)} (MAX.)$	4.0m Ω
I_D	87A



UIS, Rg 100% Tested

Pb-Free Lead Plating & Halogen Free



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ Unless Otherwise Noted)

PARAMETERS/TEST CONDITIONS		SYMBOL	LIMITS	UNIT
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current	$T_C = 25^\circ\text{C}$	I_D	87	A
	$T_C = 100^\circ\text{C}$		55	
Pulsed Drain Current ¹		I_{DM}	180	
Avalanche Current		I_{AS}	87	mJ
Avalanche Energy	$L = 0.1\text{mH}, I_D = 87\text{A}, R_G = 25\Omega$	E_{AS}	378	
Repetitive Avalanche Energy ²	$L = 0.05\text{mH}$	E_{AR}	189	
Power Dissipation	$T_C = 25^\circ\text{C}$	P_D	50	W
	$T_C = 100^\circ\text{C}$		20	
Operating Junction & Storage Temperature Range		T_{j}, T_{stg}	-55 to 150	$^\circ\text{C}$

100% UIS testing in condition of $V_D = 50\text{V}$, $L = 0.1\text{mH}$, $V_G = 10\text{V}$, $I_L = 60\text{A}$, Rated $V_{DS} = 100\text{V}$ N-CH

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	SYMBOL	TYPICAL	MAXIMUM	UNIT
Junction-to-Case	$R_{\theta JC}$		2.5	$^\circ\text{C} / \text{W}$
Junction-to-Ambient	$R_{\theta JA}$		65	

¹Pulse width limited by maximum junction temperature.

²Duty cycle $\leq 1\%$



ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$, Unless Otherwise Noted)

PARAMETER	SYMBOL	TEST CONDITIONS	LIMITS			UNIT
			MIN	TYP	MAX	
STATIC						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D = 250μA	100			V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	2	3	4	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0V, V _{GS} = ±20V			±100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 80V, V _{GS} = 0V			1	μA
		V _{DS} = 70V, V _{GS} = 0V, T _J = 125 °C			25	
On-State Drain Current ¹	I _{D(ON)}	V _{DS} = 10V, V _{GS} = 10V	87			A
Drain-Source On-State Resistance ¹	R _{DS(ON)}	V _{GS} = 10V, I _D = 20A		3.5	4.0	mΩ
Forward Transconductance ¹	g _{fs}	V _{DS} = 5V, I _D = 20A		90		S
DYNAMIC						
Input Capacitance	C _{iss}	V _{GS} = 0V, V _{DS} = 50V, f = 1MHz		7000		pF
Output Capacitance	C _{oss}			1574		
Reverse Transfer Capacitance	C _{rss}			234		
Gate Resistance	R _g	V _{GS} = 15mV, V _{DS} = 0V, f = 1MHz		0.8		Ω
Total Gate Charge ^{1,2}	Q _g	V _{DS} = 50V, V _{GS} = 10V, I _D = 20A		108		nC
Gate-Source Charge ^{1,2}	Q _{gs}			33		
Gate-Drain Charge ^{1,2}	Q _{gd}			36		
Turn-On Delay Time ^{1,2}	t _{d(on)}	V _{DS} = 50V, I _D = 20A, V _{GS} = 10V, R _{GS} = 6Ω		35		nS
Rise Time ^{1,2}	t _r			55		
Turn-Off Delay Time ^{1,2}	t _{d(off)}			90		
Fall Time ^{1,2}	t _f			55		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T _c = 25 °C)						
Continuous Current	I _S				87	A
Pulsed Current ³	I _{SM}				180	
Forward Voltage ¹	V _{SD}	I _F = 20A, V _{GS} = 0V			1.2	V
Reverse Recovery Time	t _{rr}	I _F = 30A, dI _F /dt = 500A / μS		64		nS
Reverse Recovery Charge	Q _{rr}			550		nC

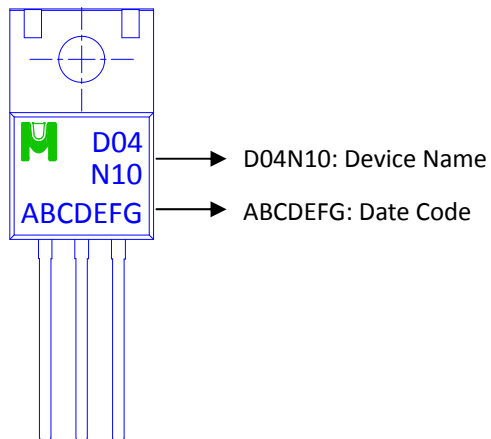
¹Pulse test : Pulse Width $\leq 300\mu\text{sec}$, Duty Cycle $\leq 2\%$.

²Independent of operating temperature.

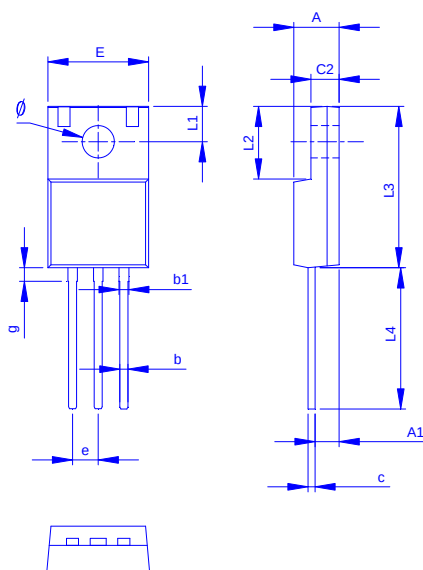
³Pulse width limited by maximum junction temperature.

Ordering & Marking Information:

Device Name: EMD04N10FN for TO-220F



Outline Drawing



Dimension in mm

Dimension	A	A1	b	b1	c	c2	E	L1	L2	L3	L4	ø	e	g
Min.	4.30	2.50	0.60	0.60	0.45	2.50	9.70	2.90	6.30	14.70	13.40	3.00	2.35	1.00
Max.	4.70	2.70	0.80	0.90	0.60	2.90	10.30	3.10	6.70	15.30	13.80	3.40	2.75	1.20



TYPICAL CHARACTERISTICS

