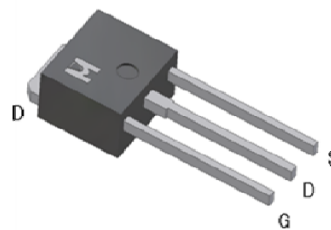
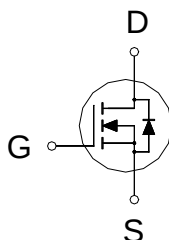


N-Channel Logic Level Enhancement Mode Field Effect Transistor

Product Summary:

BV_{DSS}	60V
$R_{DS(on)} (MAX.)$	60m Ω
I_D	12A



UIS, Rg 100% Tested

Pb-Free Lead Plating & Halogen Free



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

PARAMETERS/TEST CONDITIONS		SYMBOL	LIMITS	UNIT
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current	$T_C = 25\text{ }^{\circ}\text{C}$	I_D	12	A
	$T_C = 100\text{ }^{\circ}\text{C}$		8	
Pulsed Drain Current ¹		I_{DM}	30	
Avalanche Current		I_{AS}	12	mJ
Avalanche Energy	$L = 0.1\text{mH}, I_D = 12\text{A}, R_G = 25\Omega$	E_{AS}	7.2	
Repetitive Avalanche Energy ²	$L = 0.05\text{mH}$	E_{AR}	3.6	
Power Dissipation	$T_C = 25\text{ }^{\circ}\text{C}$	P_D	16.6	W
	$T_C = 100\text{ }^{\circ}\text{C}$		6.6	
Operating Junction & Storage Temperature Range		T_{j}, T_{stg}	-55 to 150	$^{\circ}\text{C}$

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	SYMBOL	TYPICAL	MAXIMUM	UNIT
Junction-to-Case	$R_{\theta JC}$		7.5	$^{\circ}\text{C} / \text{W}$
Junction-to-Ambient	$R_{\theta JA}$		80	

¹Pulse width limited by maximum junction temperature.

²Duty cycle $\leq 1\%$

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

PARAMETER	SYMBOL	TEST CONDITIONS	LIMITS			UNIT	
			MIN	TYP	MAX		
STATIC							
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	60			V	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.0	2.0	3.2		
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0V, V_{GS} = \pm 20V$			± 100	nA	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 48V, V_{GS} = 0V$			1	μA	
		$V_{DS} = 40V, V_{GS} = 0V, T_J = 125\text{ }^{\circ}C$			25		
On-State Drain Current ¹	$I_{D(ON)}$	$V_{DS} = 10V, V_{GS} = 10V$	12			A	
Drain-Source On-State Resistance ¹	$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 10A$		50	60	m Ω	
		$V_{GS} = 5V, I_D = 8A$		58	75		
Forward Transconductance ¹	g_{fs}	$V_{DS} = 5V, I_D = 10A$		19		S	
DYNAMIC							
Input Capacitance	C_{iss}	$V_{GS} = 0V, V_{DS} = 20V, f = 1MHz$		633		pF	
Output Capacitance	C_{oss}			67			
Reverse Transfer Capacitance	C_{rss}			44			
Gate Resistance	R_g	$V_{GS} = 15mV, V_{DS} = 0V, f = 1MHz$		2.5		Ω	
Total Gate Charge ^{1,2}	Q_g	$V_{DS} = 20V, V_{GS} = 10V,$ $I_D = 10A$		13.8		nC	
Gate-Source Charge ^{1,2}	Q_{gs}			2.8			
Gate-Drain Charge ^{1,2}	Q_{gd}			4.0			
Turn-On Delay Time ^{1,2}	$t_{d(on)}$	$V_{DS} = 20V,$ $I_D = 1A, V_{GS} = 10V, R_{GS} = 6\Omega$		10		nS	
Rise Time ^{1,2}	t_r			7.5			
Turn-Off Delay Time ^{1,2}	$t_{d(off)}$			18			
Fall Time ^{1,2}	t_f			6			
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T _C = 25 °C)							
Continuous Current	I_S				12	A	
Pulsed Current ³	I_{SM}				48		
Forward Voltage ¹	V_{SD}	$I_F = I_S, V_{GS} = 0V$			1.3	V	
Reverse Recovery Time	t_{rr}	$I_F = 5A, dI_F/dt = 100A / \mu S$		15		nS	
Reverse Recovery Charge	Q_{rr}			8		nC	

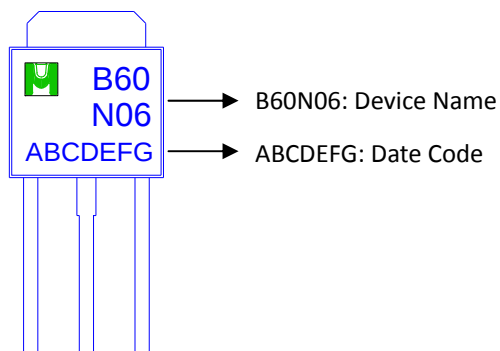
¹Pulse test : Pulse Width $\leq 300 \mu\text{sec}$, Duty Cycle $\leq 2\%$.

²Independent of operating temperature.

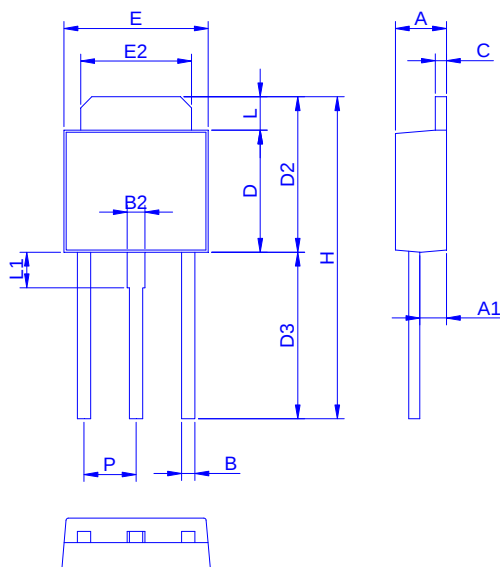
³Pulse width limited by maximum junction temperature.

Ordering & Marking Information:

Device Name: EMB60N06C for IPAK (TO-251)



Outline Drawing



Dimension in mm

Dimension	A	A1	B	B2	C	D	D2	D3	E	E2	H	L	L1	P
Min.	2.10	1.10	0.40	0.60	0.40	5.30	6.70	5.80	6.30	4.80	14.00	0.89	0.90	2.10
Max.	2.50	1.30	0.80	1.00	0.60	6.20	7.30	8.00	6.70	5.45	15.00	1.70	1.80	2.50



TYPICAL CHARACTERISTICS

