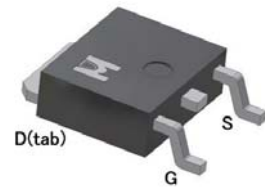
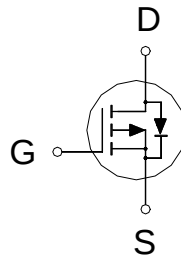


P-Channel Logic Level Enhancement Mode Field Effect Transistor

Product Summary:

BV_{DSS}	-40V
$R_{DS(on)} (MAX.)$	39m 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}	-48	
Avalanche Current		I_{AS}	-10	
Avalanche Energy	$L = 0.1\text{mH}$, $I_D = 10\text{A}$, $R_G = 25\Omega$	E_{AS}	5	mJ
Repetitive Avalanche Energy ²	$L = 0.05\text{mH}$	E_{AR}	2.5	
Power Dissipation	$T_C = 25\text{ }^{\circ}\text{C}$	P_D	30	W
	$T_C = 100\text{ }^{\circ}\text{C}$		12	
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	$R_{\theta JC}$		4.1	$^{\circ}\text{C} / \text{W}$
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	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	-40			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$	-2.0	-2.3	-3.2	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0V, V_{GS} = \pm 25V$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -32V, V_{GS} = 0V$			-1	μA
		$V_{DS} = -30V, V_{GS} = 0V, T_J = 125^\circ C$			-25	
On-State Drain Current ¹	$I_{D(ON)}$	$V_{DS} = -5V, V_{GS} = -4.5V$	-12			A
Drain-Source On-State Resistance ¹	$R_{DS(ON)}$	$V_{GS} = -10V, I_D = -10A$		34	39	m Ω
		$V_{GS} = -7V, I_D = -8A$		50	70	
Forward Transconductance ¹	g_{fs}	$V_{DS} = -5V, I_D = -10A$		11		S
DYNAMIC						
Input Capacitance	C_{iss}	$V_{GS} = 0V, V_{DS} = -20V, f = 1MHz$		1076		pF
Output Capacitance	C_{oss}			125		
Reverse Transfer Capacitance	C_{rss}			96		
Gate Resistance	R_g	$V_{GS} = 15mV, V_{DS} = 0V, f = 1MHz$		5.8		Ω
Total Gate Charge ^{1,2}	Q_g	$V_{DS} = -10V, V_{GS} = -4.5V,$ $I_D = -10A$		16.5		nC
Gate-Source Charge ^{1,2}	Q_{gs}			3.2		
Gate-Drain Charge ^{1,2}	Q_{gd}			3.8		
Turn-On Delay Time ^{1,2}	$t_{d(on)}$	$V_{DS} = -10V,$ $I_D = -1A, V_{GS} = -10V, R_{GS} = 6\Omega$		7		nS
Rise Time ^{1,2}	t_r			10		
Turn-Off Delay Time ^{1,2}	$t_{d(off)}$			20		
Fall Time ^{1,2}	t_f			12		
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

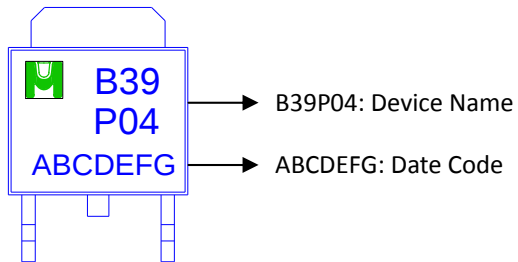
¹Pulse test : Pulse Width $\leq 300 \mu\text{sec}$, Duty Cycle $\leq 2\%$.

²Independent of operating temperature.

³Pulse width limited by maximum junction temperature.

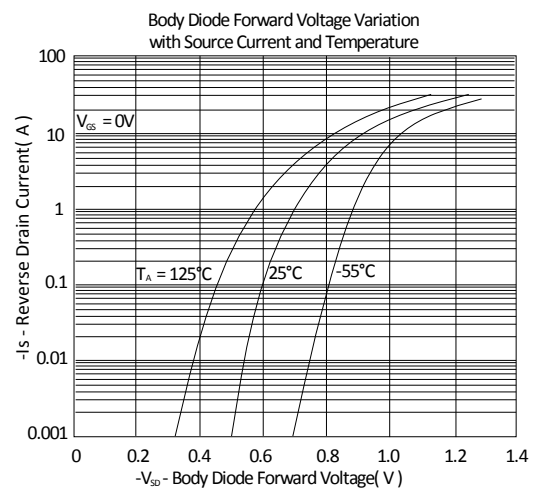
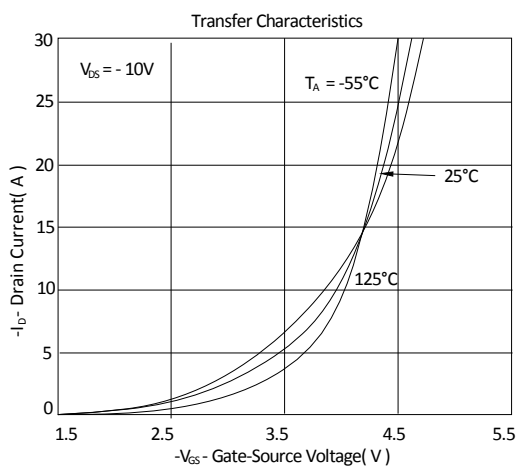
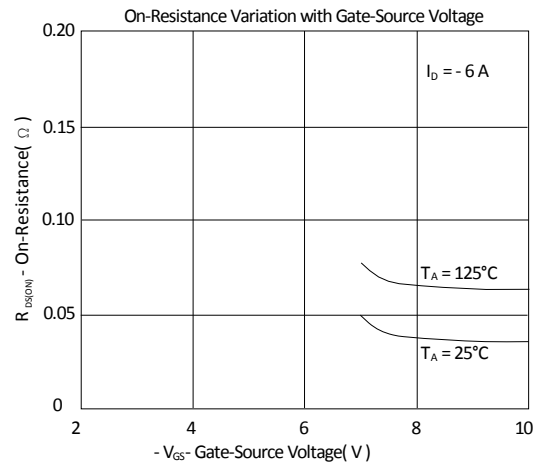
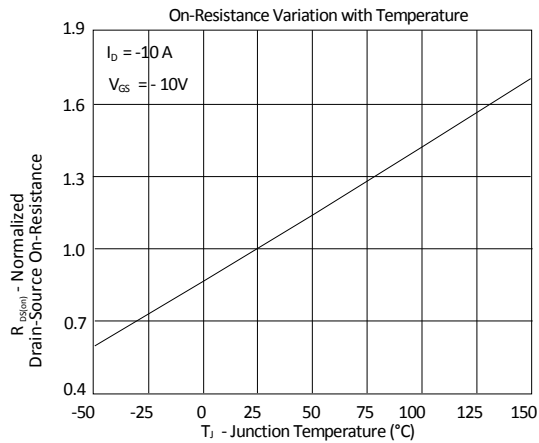
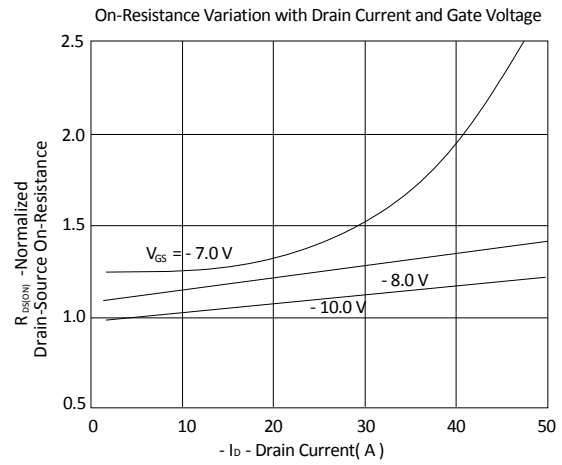
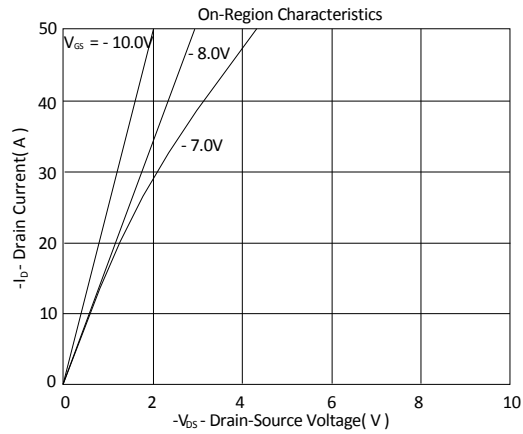
Ordering & Marking Information:

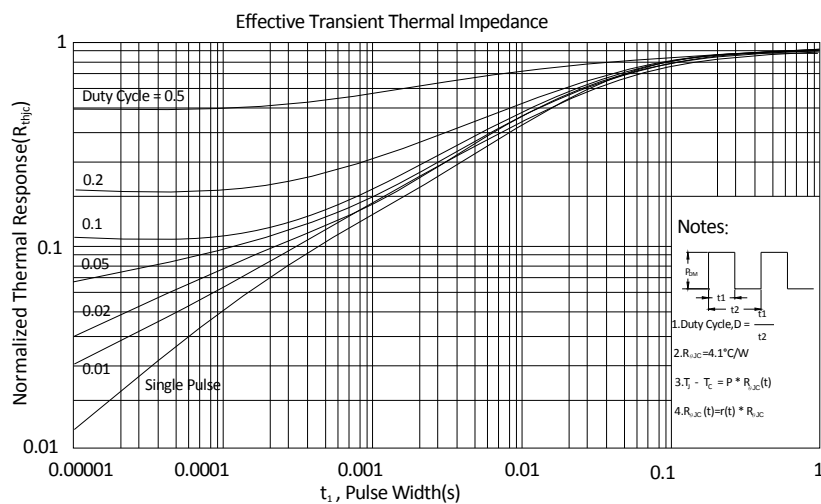
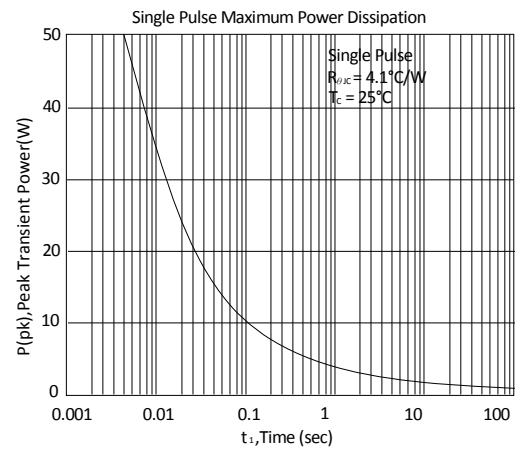
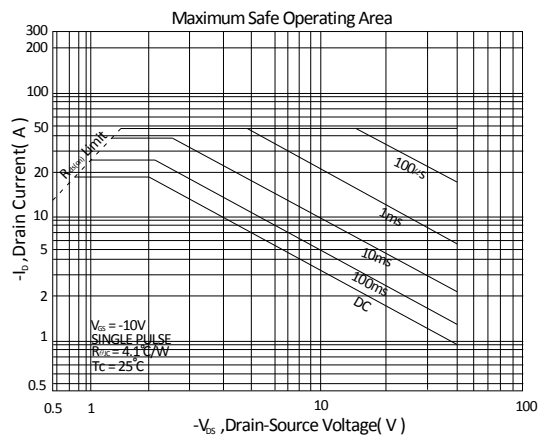
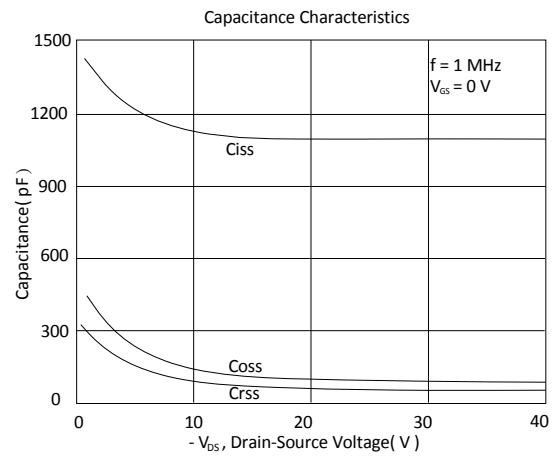
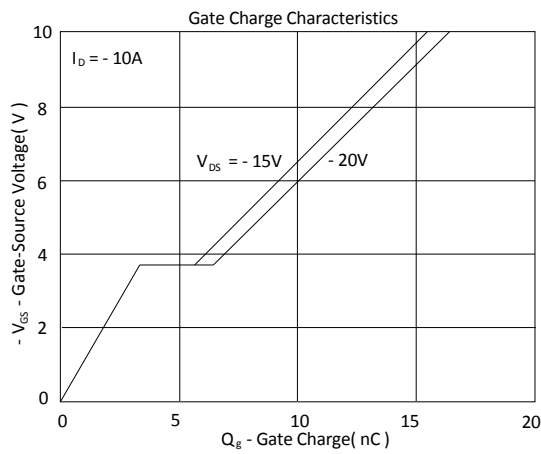
Device Name: EMB39P04A for DPAK (TO-252)



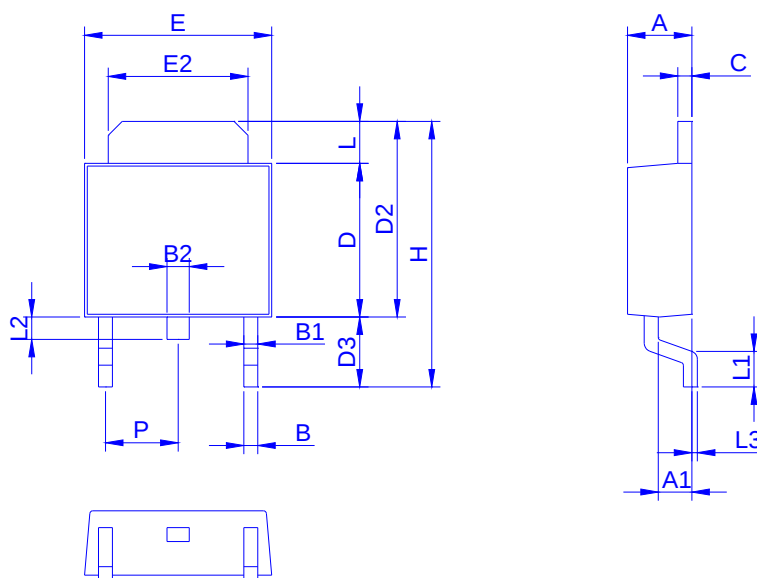


TYPICAL CHARACTERISTICS





Outline Drawing



Dimension	A	A1	B	B1	B2	C	D	D2	D3	E	E2	H	L	L1	L2	L3	P
Min.	2.10	0.95	0.30	0.40	0.60	0.40	5.30	6.70	2.20	6.40	4.80	9.20	0.89	0.90	0.50	0.00	2.10
Max.	2.50	1.30	0.85	0.94	1.00	0.60	6.20	7.30	3.00	6.70	5.45	10.15	1.70	1.65	1.10	0.30	2.50

Footprint

