SiHFBF20L-E3-VB Datasheet
Power MOSFET

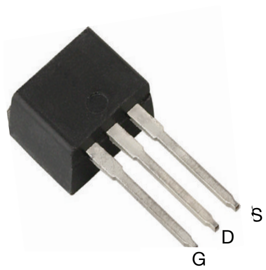
PRODUCT SUMMARY		
V_{DS} (V)	950	
$R_{DS(on)}$ (Ω)	V_{GS} = 10 V	5.4
Q_g (Max.) (nC)	78	
Q_{gs} (nC)	10	
Q_{gd} (nC)	42	
Configuration	Single	

FEATURES

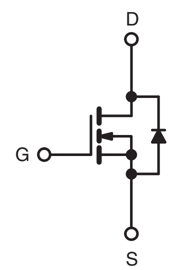
- Dynamic dV/dt Rating
- Repetitive Avalanche Rated
- Fast Switching
- Ease of Paralleling
- Simple Drive Requirements
- Compliant to RoHS Directive 2002/95/EC

Pb Available
RoHS* COMPLIANT

TO-262



Top View



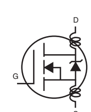
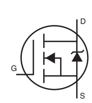
N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T_C = 25 °C, unless otherwise noted)					
PARAMETER			**SYMBOL**	**LIMITE**	**UNIT**
Drain-Source Voltage			V_{DS}	950	V
Gate-Source Voltage			V_{GS}	± 20	
Continuous Drain Current	V_{GS} at 10 V	T_C = 25 °C	I_D	3.6	A
		T_C = 100 °C		2.3	
Pulsed Drain Current[a]			I_{DM}	14	
Linear Derating Factor				1.0	W/°C
Single Pulse Avalanche Energy[b]			E_{AS}	250	mJ
Repetitive Avalanche Current[a]			I_{AR}	3.6	A
Repetitive Avalanche Energy[a]			E_{AR}	13	mJ
Maximum Power Dissipation	T_C = 25 °C		P_D	125	W
Peak Diode Recovery dV/dt[c]			dV/dt	1.5	V/ns
Operating Junction and Storage Temperature Range			T_J, T_{stg}	- 55 to + 150	°C
Soldering Recommendations (Peak Temperature)	for 10 s			300[d]	
Mounting Torque	6-32 or M3 screw			10	lbf · in
				1.1	N · m

Notes

a. Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11).
b. V_{DD} = 50 V, starting T_J = 25 °C, L = 36 mH, R_g = 25 Ω, I_{AS} = 3.6 A (see fig. 12).
c. $I_{SD} \le 3.6$ A, dI/dt ≤ 70 A/μs, $V_{DD} \le 600$, $T_J \le 150$ °C.
d. 1.6 mm from case.

THERMAL RESISTANCE RATINGS				
PARAMETER	**SYMBOL**	**TYP.**	**MAX.**	**UNIT**
Maximum Junction-to-Ambient	R_{thJA}	-	62	°C/W
Case-to-Sink, Flat, Greased Surface	R_{thCS}	0.50	-	
Maximum Junction-to-Case (Drain)	R_{thJC}	-	1.0	

SPECIFICATIONS (T_J = 25 °C, unless otherwise noted)							
PARAMETER	**SYMBOL**	**TEST CONDITIONS**		**MIN.**	**TYP.**	**MAX.**	**UNIT**
Static							
Drain-Source Breakdown Voltage	V_{DS}	V_{GS} = 0 V, I_D = 250 μA		950	-	-	V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	Reference to 25 °C, I_D = 1 mA		-	1.1	-	V/°C
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 250 μA		2.0	-	4.0	V
Gate-Source Leakage	I_{GSS}	V_{GS} = ± 20 V		-	-	± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 900 V, V_{GS} = 0 V		-	-	100	μA
		V_{DS} = 720 V, V_{GS} = 0 V, T_J = 125 °C		-	-	500	
Drain-Source On-State Resistance	$R_{DS(on)}$	V_{GS} = 10 V	I_D = 2.2 A[b]	--	5.4	-	Ω
Forward Transconductance	g_{fs}	V_{DS} = 100 V, I_D = 2.2 A[b]		2.3	-	-	S
Dynamic							
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1.0 MHz, see fig. 5		-	1200	-	pF
Output Capacitance	C_{oss}			-	320	-	
Reverse Transfer Capacitance	C_{rss}			-	200	-	
Total Gate Charge	Q_g	V_{GS} = 10 V	I_D = 3.6 A, V_{DS} = 360 V, see fig. 6 and 13[b]	-	-	78	nC
Gate-Source Charge	Q_{gs}			-	-	10	
Gate-Drain Charge	Q_{gd}			-	-	42	
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 450 V, I_D = 3.6 A, R_g = 12 Ω, R_D = 120 Ω, see fig. 10[b]		-	14	-	ns
Rise Time	t_r			-	25	-	
Turn-Off Delay Time	$t_{d(off)}$			-	90	-	
Fall Time	t_f			-	30	-	
Internal Drain Inductance	L_D	Between lead, 6 mm (0.25") from package and center of die contact		-	4.5	-	nH
Internal Source Inductance	L_S			-	7.5	-	
Drain-Source Body Diode Characteristics							
Continuous Source-Drain Diode Current	I_S	MOSFET symbol showing the integral reverse p - n junction diode		-	-	3.6	A
Pulsed Diode Forward Current[a]	I_{SM}			-	-	14	
Body Diode Voltage	V_{SD}	T_J = 25 °C, I_S = 3.6 A, V_{GS} = 0 V[b]		-	-	1.8	V
Body Diode Reverse Recovery Time	t_{rr}	T_J = 25 °C, I_F = 3.6 A, dI/dt = 100 A/μs[b]		-	430	650	ns
Body Diode Reverse Recovery Charge	Q_{rr}			-	1.4	2.1	μC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by L_S and L_D)					

Notes
a. Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11).
b. Pulse width ≤ 300 μs; duty cycle ≤ 2 %.

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

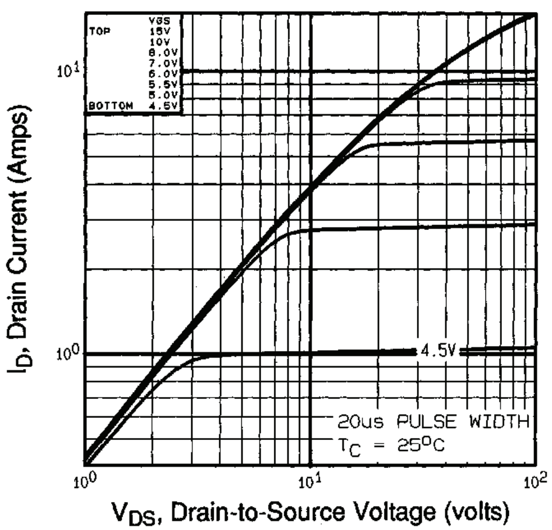


Fig. 1 - Typical Output Characteristics, T_C = 25 °C

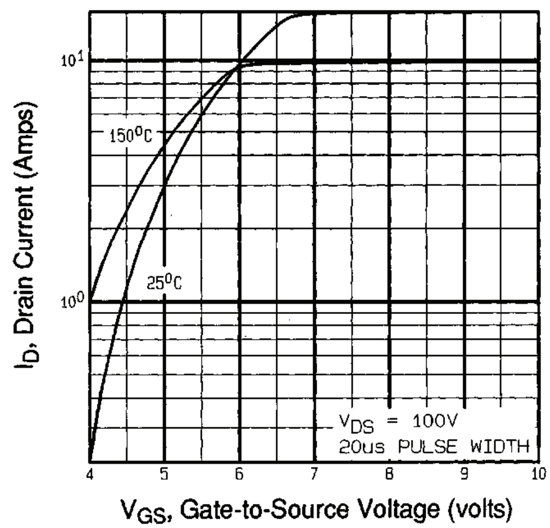


Fig. 3 - Typical Transfer Characteristics

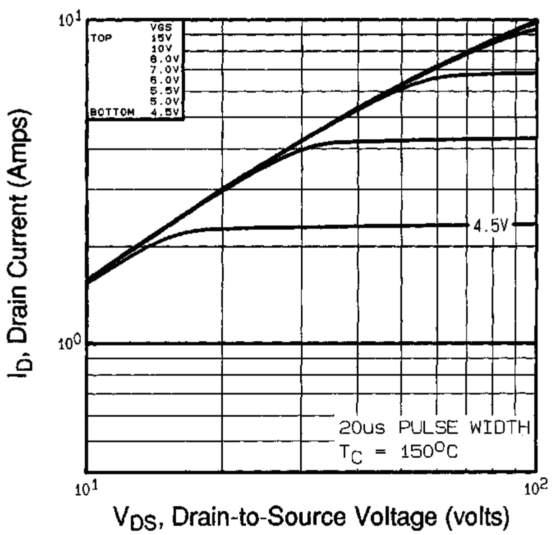


Fig. 2 -Typical Output Characteristics, T_C = 150 °C

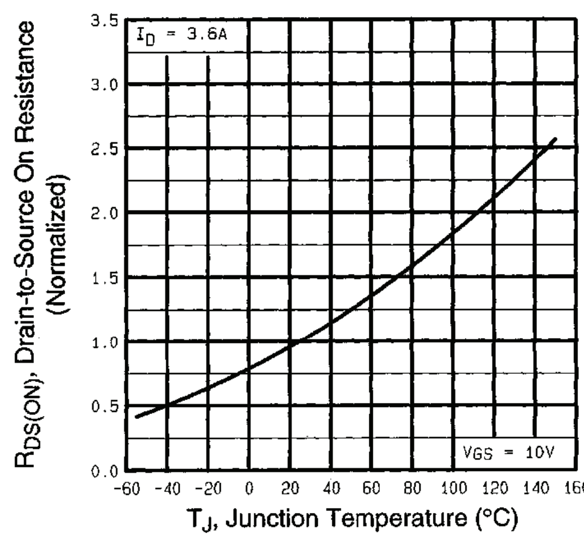


Fig. 4 - Normalized On-Resistance vs. Temperature

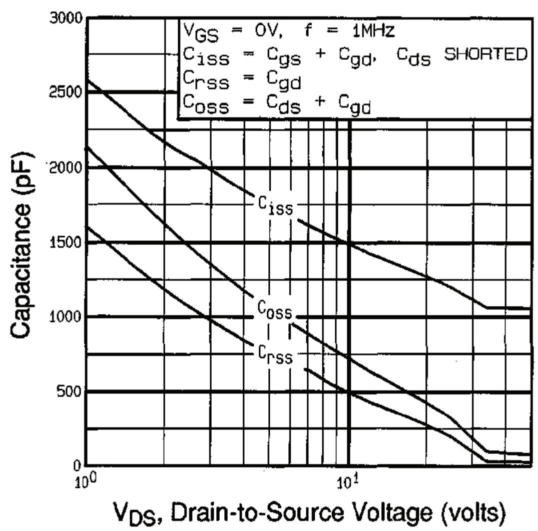


Fig. 5 - Typical Capacitance vs. Drain-to-Source Voltage

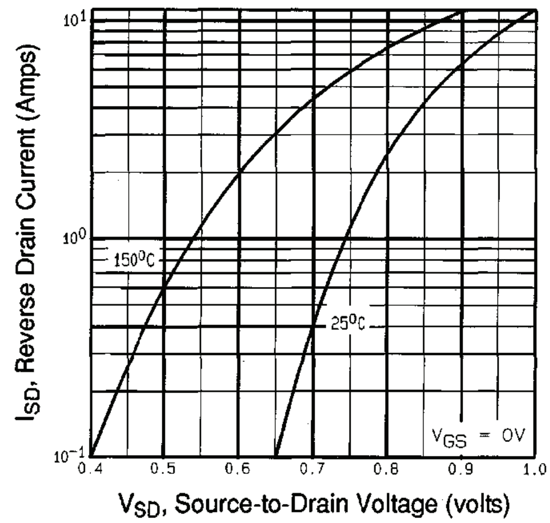


Fig. 7 - Typical Source-Drain Diode Forward Voltage

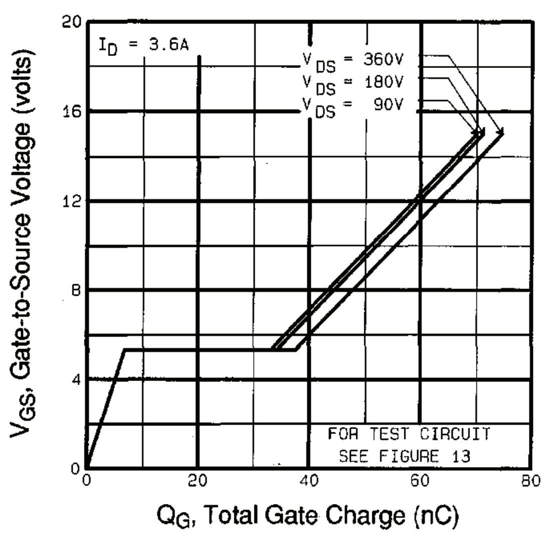


Fig. 6 - Typical Gate Charge vs. Gate-to-Source Voltage

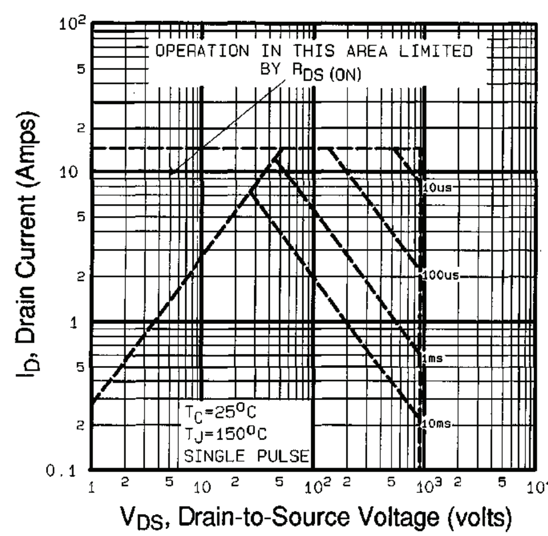


Fig. 8 - Maximum Safe Operating Area

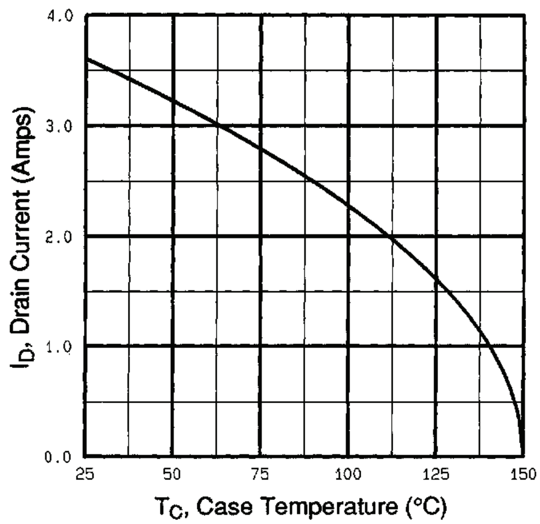


Fig. 9 - Maximum Drain Current vs. Case Temperature

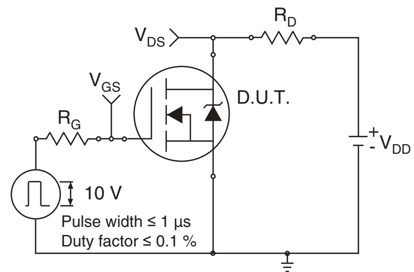


Fig. 10a - Switching Time Test Circuit

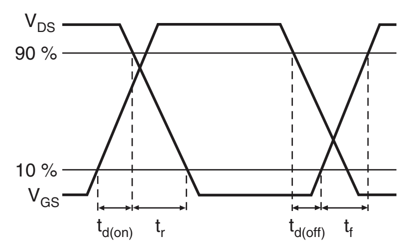


Fig. 10b - Switching Time Waveforms

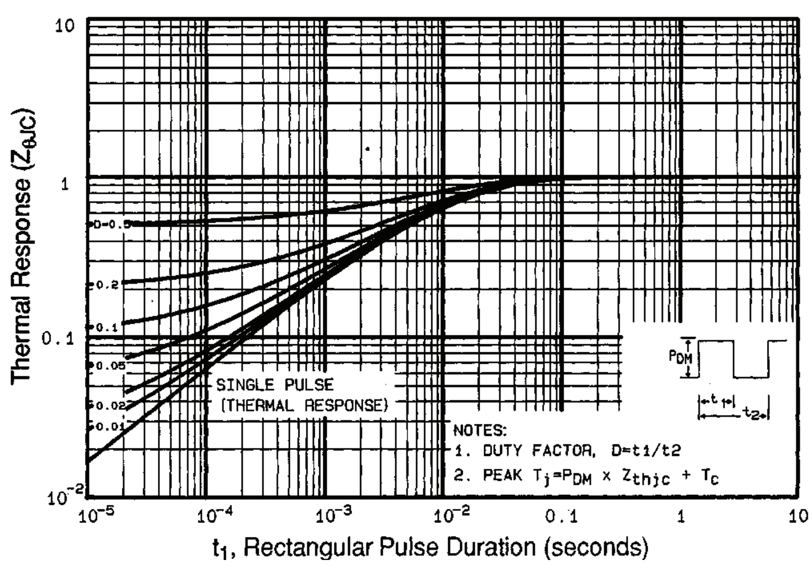


Fig. 11 - Maximum Effective Transient Thermal Impedance, Junction-to-Case

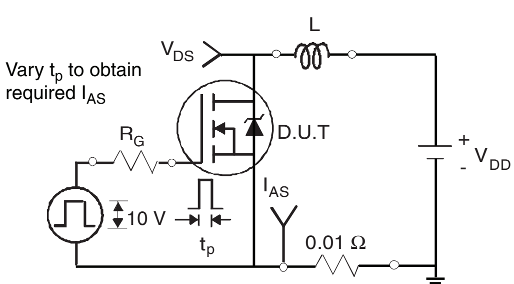


Fig. 12a - Unclamped Inductive Test Circuit

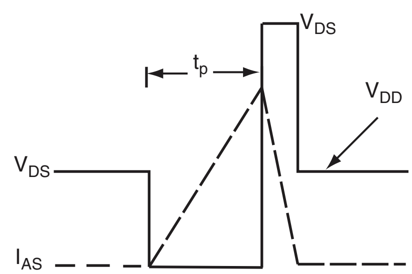


Fig. 12b - Unclamped Inductive Waveforms

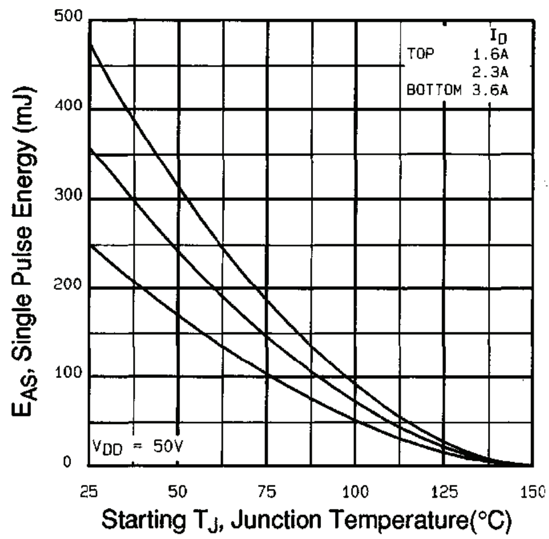


Fig. 12c - Maximum Avalanche Energy vs. Drain Current

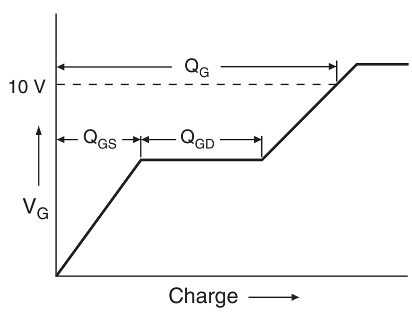


Fig. 13a - Basic Gate Charge Waveform

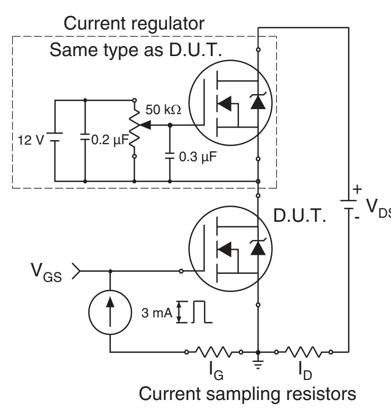
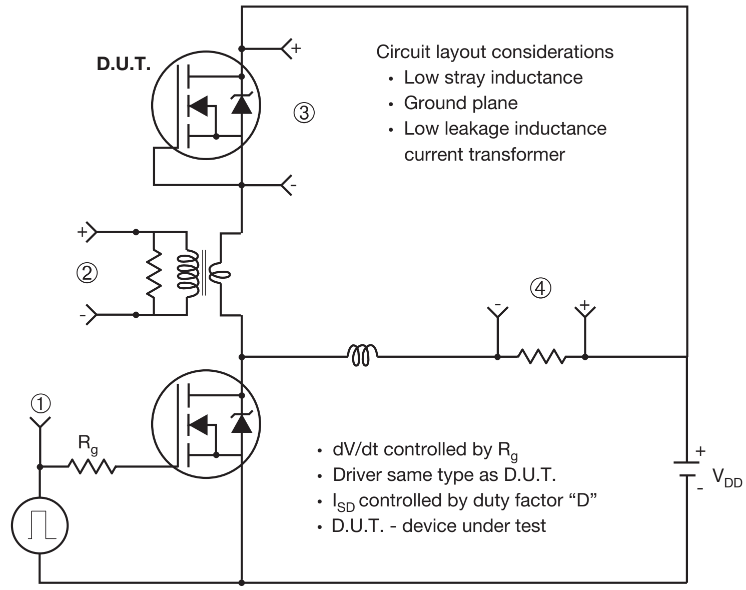
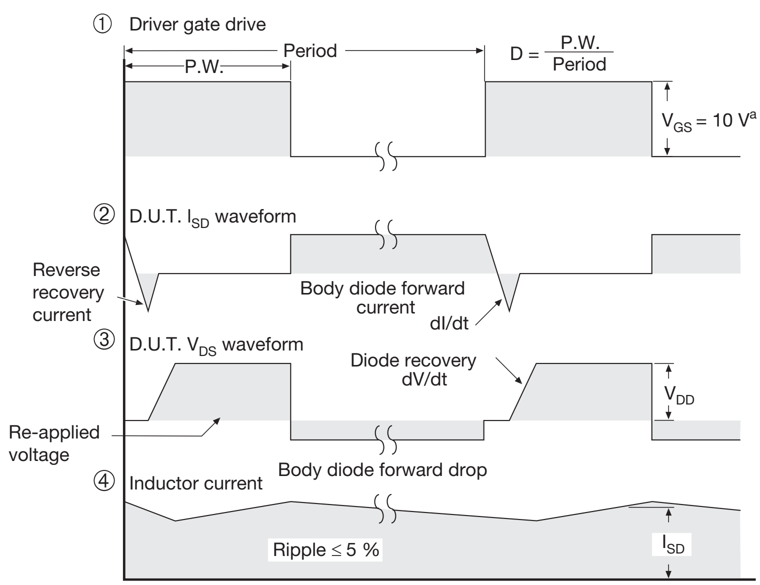


Fig. 13b - Gate Charge Test Circuit

Peak Diode Recovery dV/dt Test Circuit



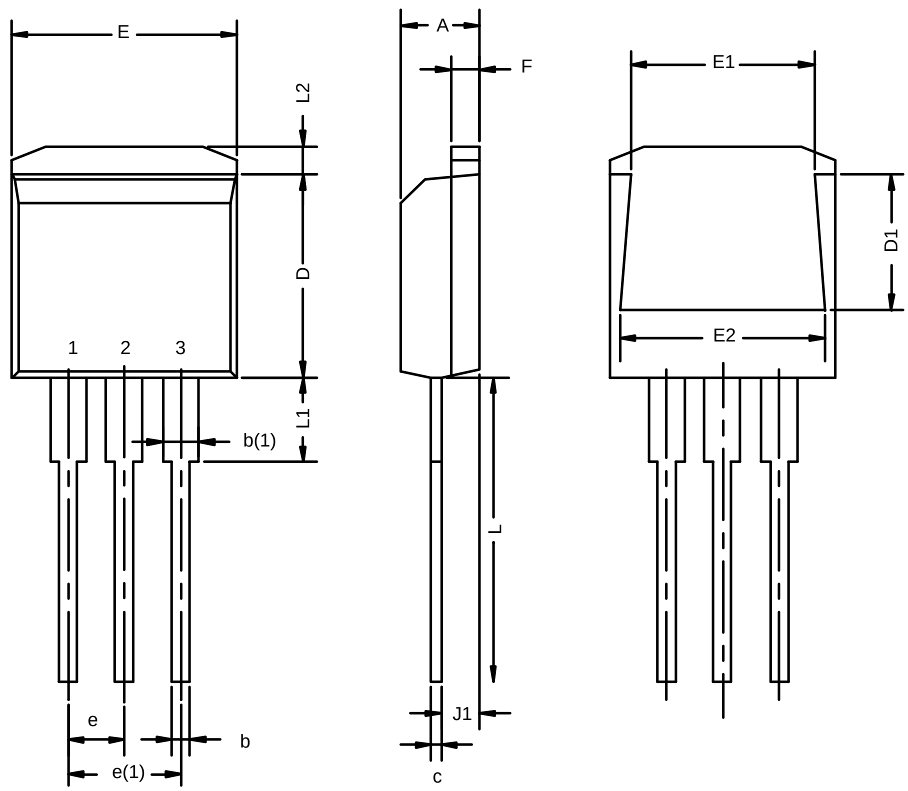


Note

a. V_{GS} = 5 V for logic level devices

Fig. 14 - For N-Channel

TO-262: 3-LEAD



Dim	MILLIMETERS*		INCHES	
	Min	Max	Min	Max
A	4.32	4.70	0.170	0.185
b	0.64	1.00	0.025	0.039
b(1)	1.14	1.40	0.045	0.055
c	0.36	0.50	0.014	0.020
D	8.64	9.65	0.340	0.380
D1	5.59	6.10	0.220	0.240
e	2.41	2.67	0.095	0.105
e(1)	4.95	5.33	0.195	0.210
E	10.03	10.41	0.395	0.410
E1	7.87	8.64	0.310	0.340
E2	9.02	9.53	0.355	0.375
F	1.14	1.40	0.045	0.055
J1	2.41	2.79	0.095	0.110
L	13.08	14.22	0.515	0.560
L1	-	3.81	-	0.150
L2	1.02	1.40	0.040	0.055
ECN: T-02234—Rev. C, 14-Oct-02 DWG: 5855				

*Use millimeters as the primary measurement

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