

SIA450DJ-T1-GE3-VB Datasheet

N-Channel 200 V (D-S) MOSFET

PRODUCT SUMMARY

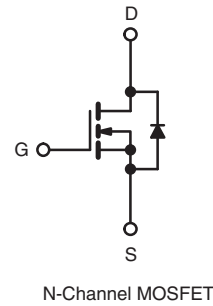
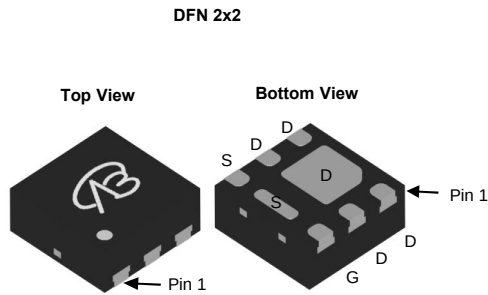
V_{DS} (V)	200	
$R_{DS(on)}$ (Ω)	$V_{GS} = 10\text{ V}$	1.2
Q_g (Max.) (nC)	8.2	
Q_{gs} (nC)	1.8	
Q_{gd} (nC)	4.5	
Configuration	Single	

FEATURES

- Available in tape and reel
- Dynamic dV/dt rating
- Repetitive avalanche rated
- Fast switching
- Ease of paralleling
- Simple drive requirements



RoHS
COMPLIANT
HALOGEN
FREE
Available



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

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	V_{DS}	200	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current	V_{GS} at 10 V	$T_C = 25\text{ }^{\circ}\text{C}$	A
		$T_C = 100\text{ }^{\circ}\text{C}$	
Pulsed Drain Current ^a	I_{DM}	8.4	
Linear Derating Factor		0.025	W/ $^{\circ}\text{C}$
Linear Derating Factor (PCB Mount) ^e		0.017	
Single Pulse Avalanche Energy ^b	E_{AS}	50	mJ
Repetitive Avalanche Current ^a	I_{AR}	0.96	A
Repetitive Avalanche Energy ^a	E_{AR}	0.31	mJ
Maximum Power Dissipation	P_D	$T_C = 25\text{ }^{\circ}\text{C}$	W
Maximum Power Dissipation (PCB Mount) ^e		$T_A = 25\text{ }^{\circ}\text{C}$	
Peak Diode Recovery dV/dt ^c	dV/dt	5.0	V/ns
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to +150	$^{\circ}\text{C}$
Soldering Recommendations (Peak Temperature) ^d	for 10 s	300	

Notes

- Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11).
- $V_{DD} = 50\text{ V}$, starting $T_J = 25\text{ }^{\circ}\text{C}$, $L = 81\text{ mH}$, $R_G = 25\text{ }\Omega$, $I_{AS} = 0.96\text{ A}$ (see fig. 12).
- $I_{SD} \leq 3.3\text{ A}$, $dI/dt \leq 70\text{ A}/\mu\text{s}$, $V_{DD} \leq V_{DS}$, $T_J \leq 150\text{ }^{\circ}\text{C}$.
- 1.6 mm from case.
- When mounted on 1" square PCB (FR-4 or G-10 material).

THERMAL RESISTANCE RATINGS

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Maximum Junction-to-Ambient (PCB Mount) ^a	R_{thJA}	-	-	40	°C/W
Maximum Junction-to-Case (Drain)	R_{thJC}	-	-	60	

Note

a. When mounted on 1" square PCB (FR-4 or G-10 material).

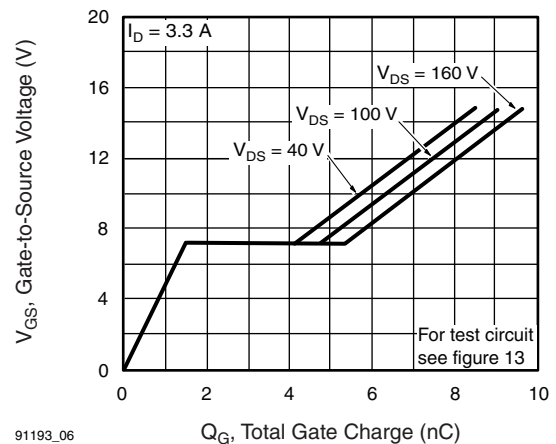
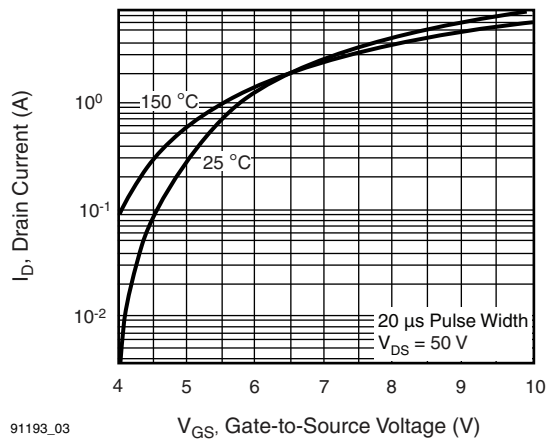
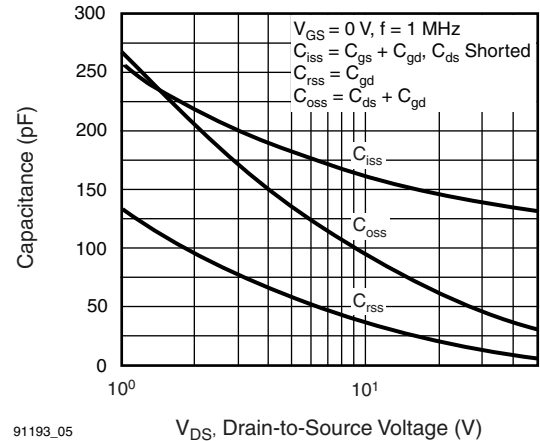
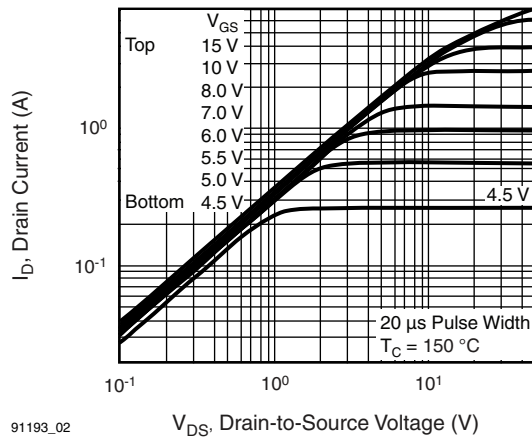
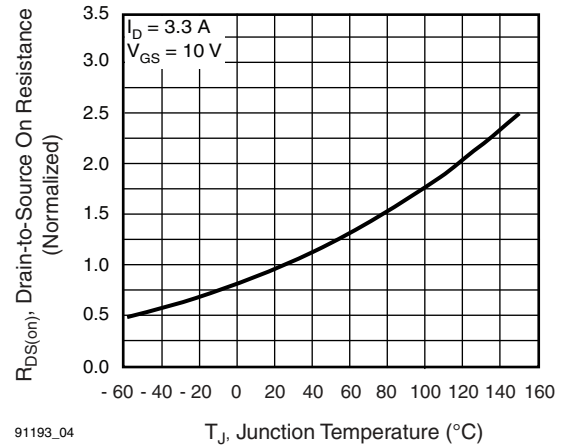
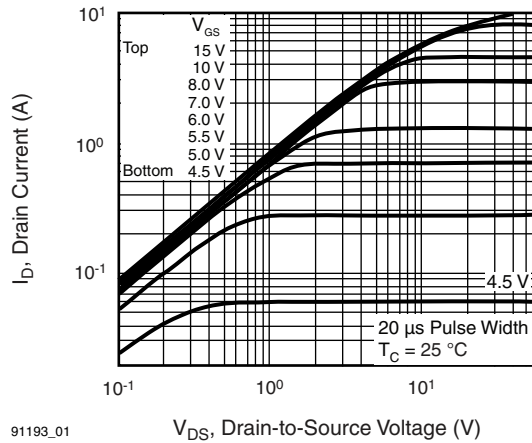
SPECIFICATIONS ($T_J = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
Static							
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0\text{ V}$, $I_D = 250\text{ }\mu\text{A}$		200	-	-	V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	Reference to $25\text{ }^{\circ}\text{C}$, $I_D = 1\text{ mA}$		-	0.30	-	$\text{V}/^{\circ}\text{C}$
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\text{ }\mu\text{A}$		2.0	-	4.0	V
Gate-Source Leakage	I_{GSS}	$V_{GS} = \pm 20\text{ V}$		-	-	± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 200\text{ V}$, $V_{GS} = 0\text{ V}$		-	-	25	μA
		$V_{DS} = 160\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 125\text{ }^{\circ}\text{C}$		-	-	250	
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS} = 10\text{ V}$	$I_D = 0.58\text{ A}^b$	-	1.2	-	Ω
Forward Transconductance	g_{fs}	$V_{DS} = 50\text{ V}$, $I_D = 0.58\text{ A}$		0.51	-	-	S
Dynamic							
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}$, $V_{DS} = 25\text{ V}$, $f = 1.0\text{ MHz}$, see fig. 5		-	140	-	pF
Output Capacitance	C_{oss}			-	53	-	
Reverse Transfer Capacitance	C_{rss}			-	15	-	
Total Gate Charge	Q_g	$V_{GS} = 10\text{ V}$	$I_D = 3.3\text{ A}$, $V_{DS} = 160\text{ V}$, see fig. 6 and 13 ^b	-	-	8.2	nC
Gate-Source Charge	Q_{gs}			-	-	1.8	
Gate-Drain Charge	Q_{gd}			-	-	4.5	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 100\text{ V}$, $I_D = 3.3\text{ A}$, $R_g = 24\text{ }\Omega$, $R_D = 30\text{ }\Omega$, see fig. 10 ^b		-	8.2	-	ns
Rise Time	t_r			-	17	-	
Turn-Off Delay Time	$t_{d(off)}$			-	14	-	
Fall Time	t_f			-	8.9	-	
Internal Drain Inductance	L_D	Between lead, 6 mm (0.25") from package and center of die contact		-	4.0	-	nH
Internal Source Inductance	L_S			-	6.0	-	
Drain-Source Body Diode Characteristics							
Continuous Source-Drain Diode Current	I_S	MOSFET symbol showing the integral reverse p - n junction diode		-	-	2.8	A
Pulsed Diode Forward Current ^a	I_{SM}			-	-	8.4	
Body Diode Voltage	V_{SD}	$T_J = 25\text{ }^{\circ}\text{C}$, $I_S = 0.96\text{ A}$, $V_{GS} = 0\text{ V}^b$		-	-	2.0	V
Body Diode Reverse Recovery Time	t_{rr}	$T_J = 25\text{ }^{\circ}\text{C}$, $I_F = 3.3\text{ A}$, $dI/dt = 100\text{ A}/\mu\text{s}^b$		-	150	310	ns
Body Diode Reverse Recovery Charge	Q_{rr}			-	0.60	1.4	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 $\leq 300\text{ }\mu\text{s}$; duty cycle $\leq 2\%$.

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)


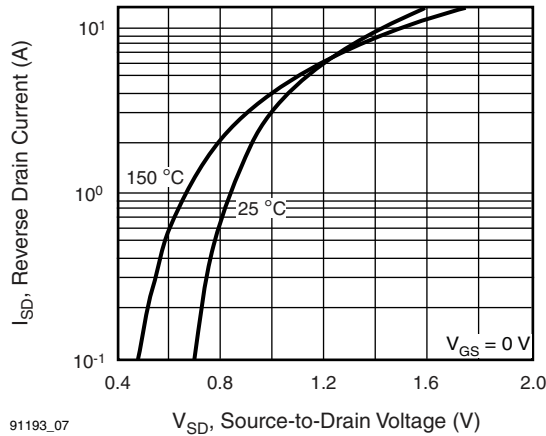


Fig. 7 - Typical Source-Drain Diode Forward Voltage

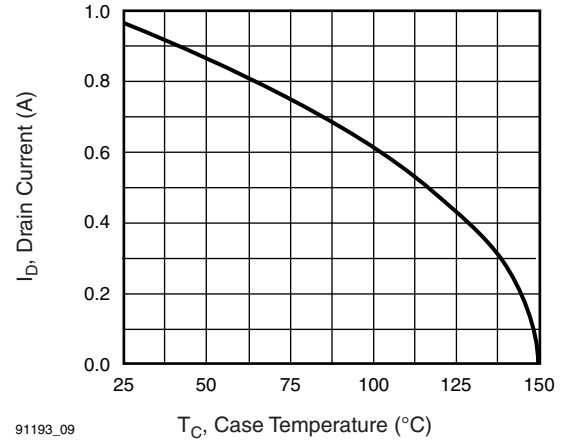


Fig. 9 - Maximum Drain Current vs. Case Temperature

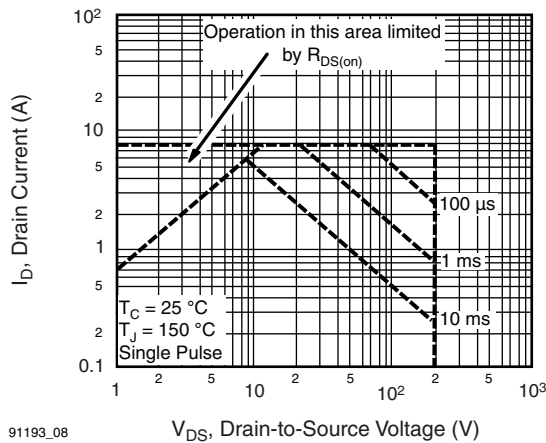


Fig. 8 - Maximum Safe Operating Area

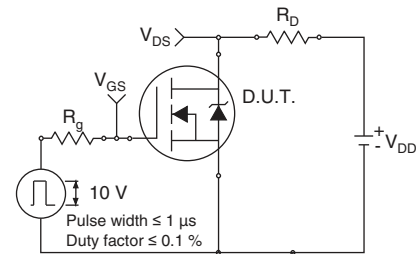


Fig. 10a - Switching Time Test Circuit

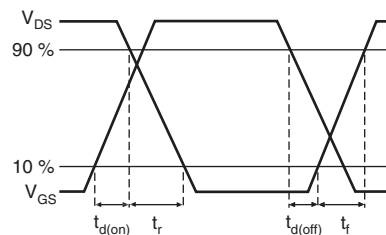


Fig. 10b - Switching Time Waveforms

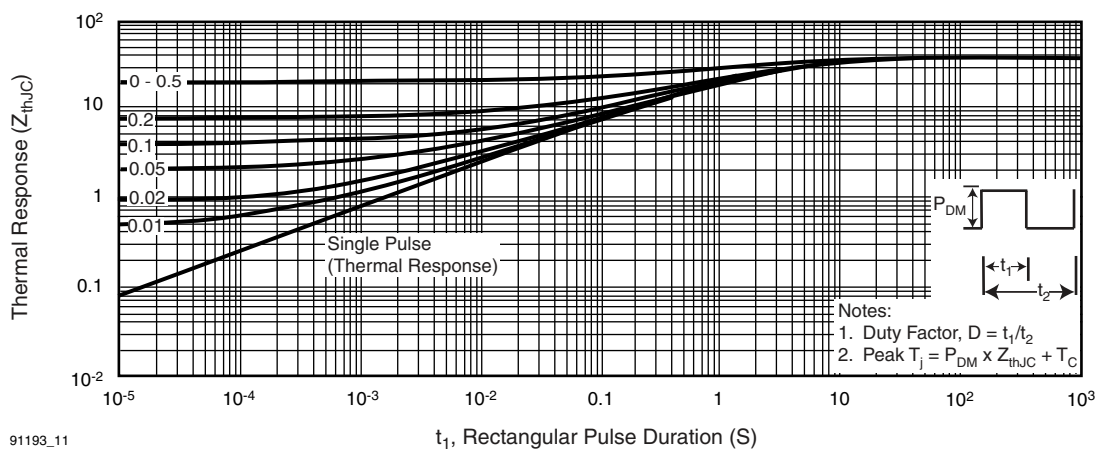


Fig. 11 - Maximum Effective Transient Thermal Impedance, Junction-to-Case

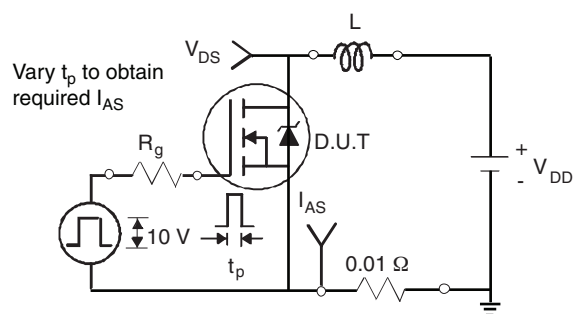


Fig. 12a - Unclamped Inductive Test Circuit

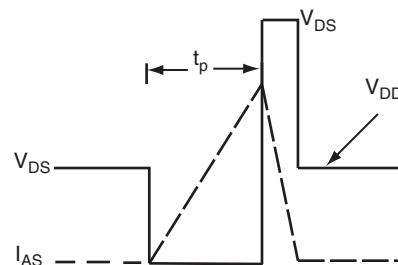


Fig. 12b - Unclamped Inductive Waveforms

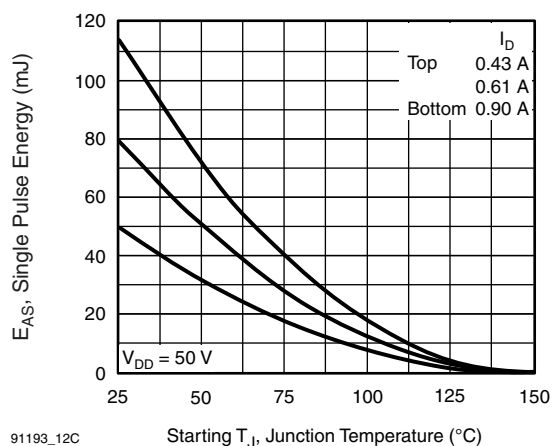


Fig. 12c - Maximum Avalanche Energy vs. Drain Current

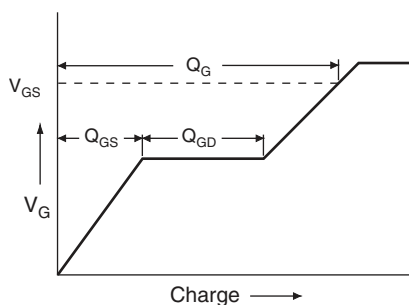


Fig. 13a - Basic Gate Charge Waveform

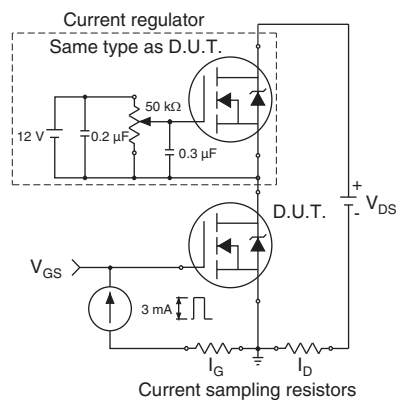
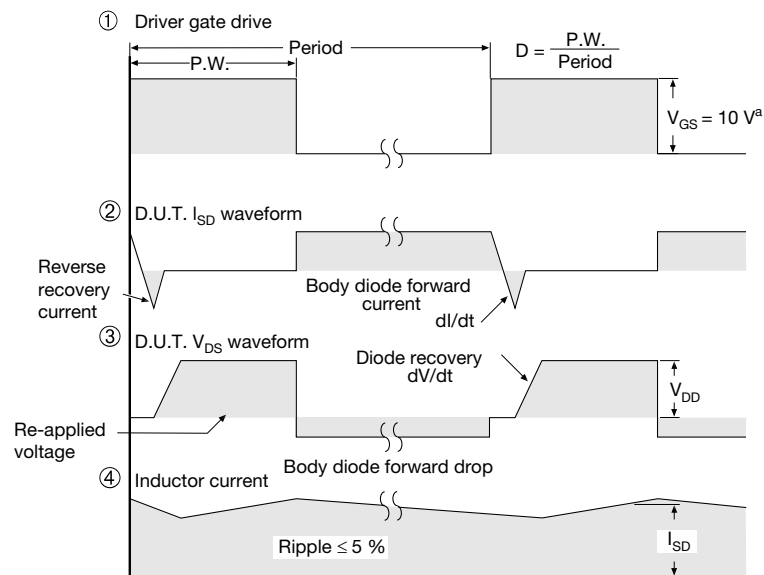
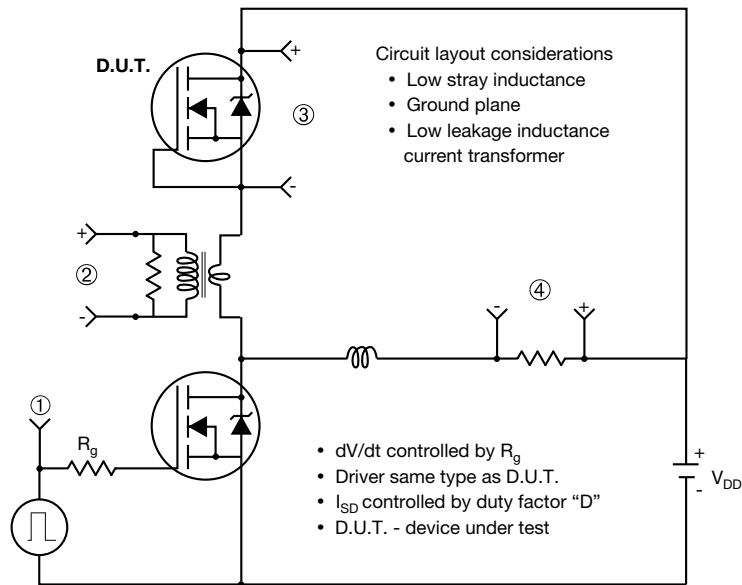


Fig. 13b - Gate Charge Test Circuit

Peak Diode Recovery dV/dt Test Circuit

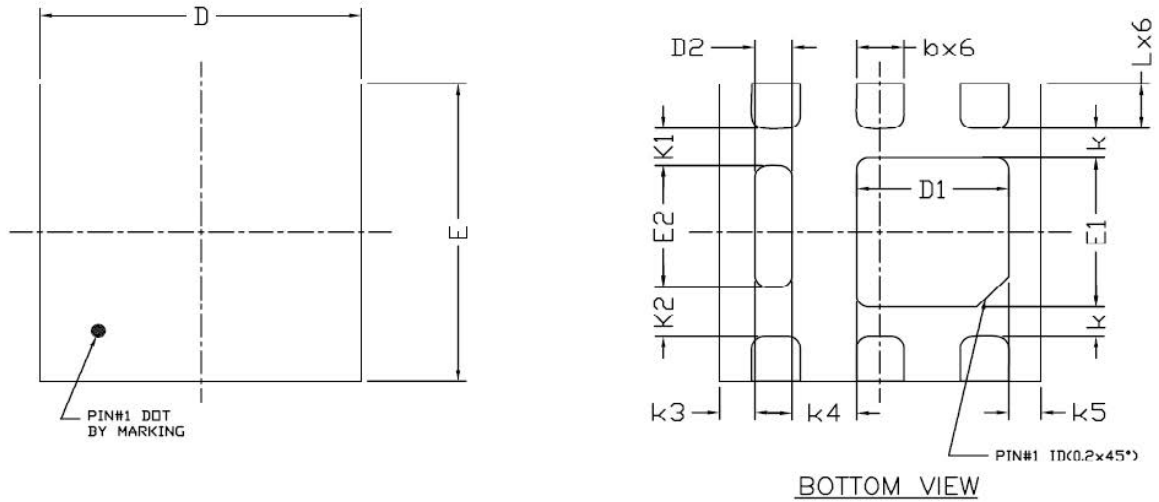


Note

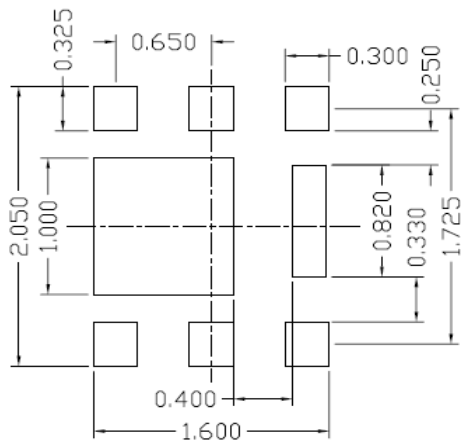
a. $V_{GS} = 5\text{ V}$ for logic level devices

Fig. 14 - For N-Channel

DFN2x2 _6L_EP1_S PACKAGE OUTLINE



RECOMMENDED LAND PATTERN



NOTE

1. CONTROLLING DIMENSION IS MILLIMETER.
CONVERTED INCH DIMENSIONS ARE NOT NECESSARILY EXACT.

SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.50	0.55	0.60	0.020	0.022	0.024
A1	0.00	—	0.05	0.000	—	0.002
b	0.25	0.30	0.35	0.010	0.012	0.014
c	0.152 REF			0.006 REF		
D	1.90	2.00	2.10	0.075	0.079	0.083
D1	0.85	0.95	1.05	0.033	0.037	0.041
D2	0.13	0.23	0.33	0.005	0.009	0.013
E	1.90	2.00	2.10	0.075	0.079	0.083
E1	0.90	1.00	1.10	0.035	0.039	0.043
E2	0.72	0.82	0.92	0.028	0.032	0.036
e	0.65 BSC			0.026 BSC		
K	0.20 BSC			0.008 BSC		
K1	0.25 BSC			0.010 BSC		
K2	0.33 BSC			0.013 BSC		
K3	0.22 BSC			0.009 BSC		
K4	0.40 BSC			0.016 BSC		
K5	0.20 BSC			0.008 BSC		
L	0.25	0.30	0.35	0.010	0.012	0.014

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