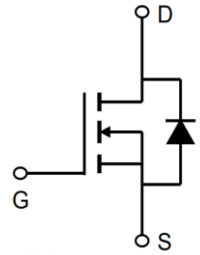


650V N-Channel Enhancement Mode MOSFET

Description

The AP4N65D/Y is silicon N-channel Enhanced VDMOSFETs, is obtained by the self-aligned planar Technology which reduce the conduction loss, improve switching performance and enhance the avalanche energy. The transistor can be used in various power switching circuit for system



General Features

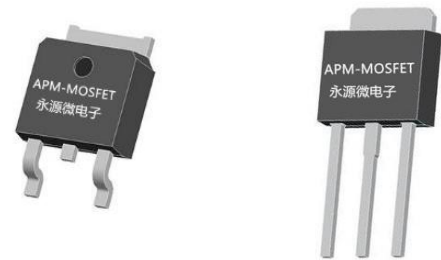
$V_{DS} = 650V, I_D = 4A$

$R_{DS(ON)} < 2.4\Omega @ V_{GS} = 10V$

Application

Uninterruptible Power Supply(UPS)

Power Factor Correction (PFC)



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP4N65D	TO-252-3L	AP4N65D XXX YYYY	2500
AP4N65Y	TO-251-3L	AP4N65Y XXX YYYY	1000

Absolute Maximum Ratings $T_C = 25^\circ C$, unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage ($V_{GS} = 0V$)	V_{DSS}	650	V
Continuous Drain Current	I_D	4	A
Pulsed Drain Current (note1)	I_{DM}	16	A
Gate-Source Voltage	V_{GSS}	± 30	V
Single Pulse Avalanche Energy (note2)	E_{AS}	160	mJ
Avalanche Current (note1)	I_{AR}	4	A
Repetitive Avalanche Energy (note1)	E_{AR}	20	mJ
Power Dissipation ($T_C = 25^\circ C$)	P_D	36	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55~+150	$^\circ C$
Thermal Resistance, Junction-to-Case	R_{thJC}	3.47	K/W
Thermal Resistance, Junction-to-Ambient	R_{thJA}	62.5	

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Electrical Characteristics (T_A=25°C unless otherwise noted)

Parameter	Symbol	Test Conditions	Min.	Type	Max	Unit
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D = 250μA	650	--	--	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 650V, V _{GS} = 0V, T _J = 25°C	--	--	1	μA
Gate-Source Leakage	I _{GSS}	V _{GS} = ±30V	--	--	±100	nA
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	3.0	--	4.0	V
Drain-Source On-Resistance (Note3)	R _{DS(on)}	V _{GS} = 10V, I _D = 2.0A	--	2	2.4	Ω
Input Capacitance	C _{iss}	V _{GS} = 0V, V _{DS} = 25V, f = 1.0MHz	--	580	--	pF
Output Capacitance	C _{oss}		--	69.5	--	
Reverse Transfer Capacitance	C _{rss}		--	10.9	--	
Total Gate Charge	Q _g	V _{DD} = 520V, I _D = 4.0A, V _{GS} = 10V	--	15	--	nC
Gate-Source Charge	Q _{gs}		--	2.5	--	
Gate-Drain Charge	Q _{gd}		--	7.5	--	
Turn-on Delay Time	t _{d(on)}	V _{DD} = 400V, I _D = 4.0A, R _G = 25 Ω	--	12	--	ns
Turn-on Rise Time	t _r		--	22	--	
Turn-off Delay Time	t _{d(off)}		--	50	--	
Turn-off Fall Time	t _f		--	48	--	
Continuous Body Diode Current	I _S	T _C = 25 °C	--	--	4	A
Pulsed Diode Forward Current	I _{SM}		--	--	16	
Body Diode Voltage	V _{SD}	T _J = 25°C, I _{SD} = 4.0A, V _{GS} = 0V	--	--	1.4	V
Reverse Recovery Time	t _{rr}	V _{GS} = 0V, I _S = 4.0A, di _F /dt = 100A/μs	--	250	--	ns
Reverse Recovery Charge	Q _{rr}		--	3.5	--	μC

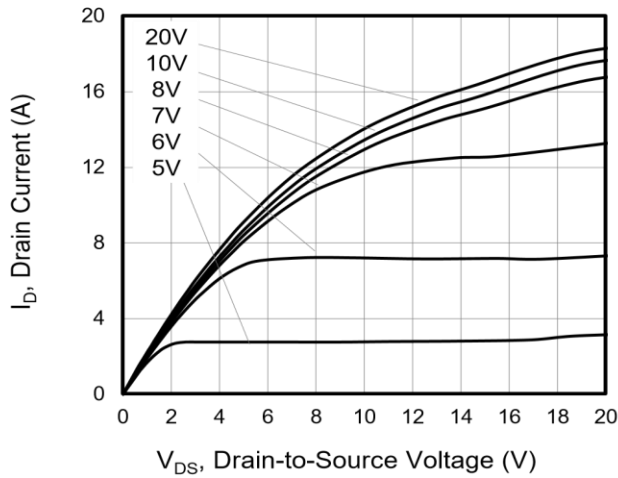
Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. I_{AS} = 4A, V_{DD} = 50V, R_G = 25 Ω, Starting T_J = 25 °C
3. Pulse Test: Pulse width ≤ 300μs, Duty Cycle ≤ 1%

650V N-Channel Enhancement Mode MOSFET

Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 1. Output Characteristics ($T_J = 25^\circ\text{C}$)



1.2

Figure 2. Body Diode Forward Voltage

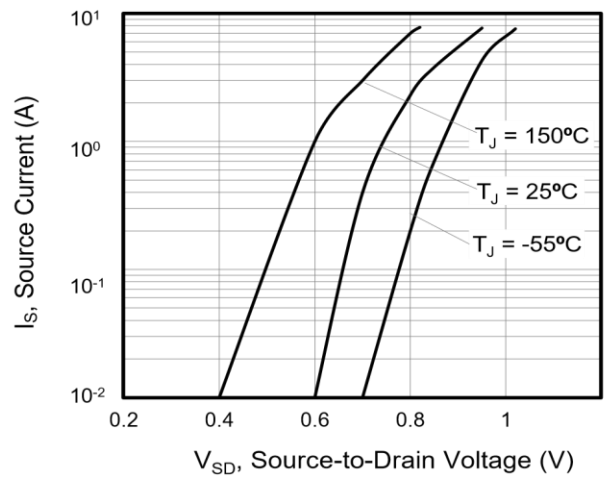


Figure 3. Drain Current vs. Temperature

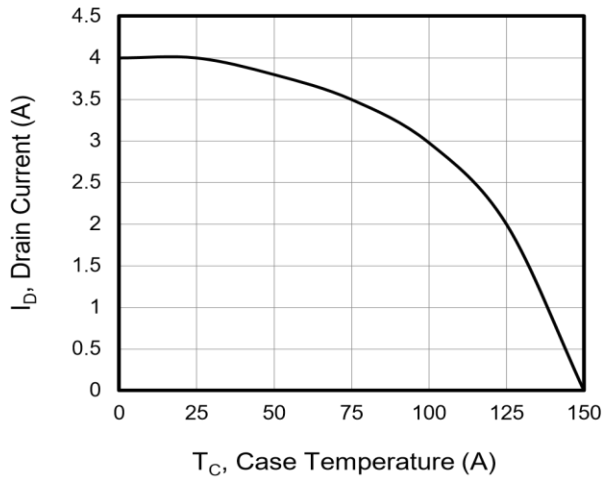


Figure 4. Power Dissipation vs. Temperature

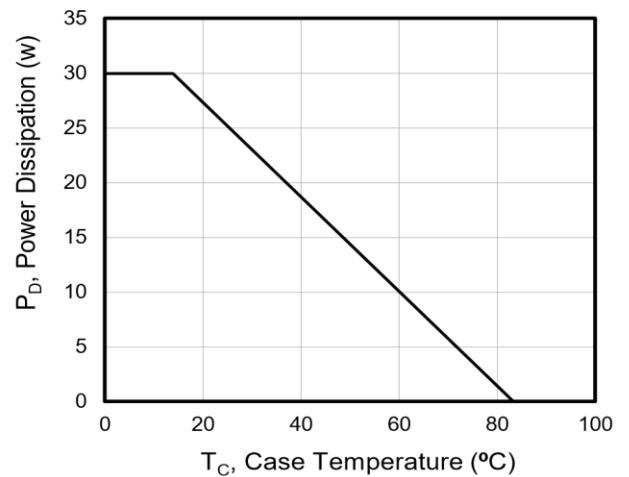


Figure 5. Transfer Characteristics

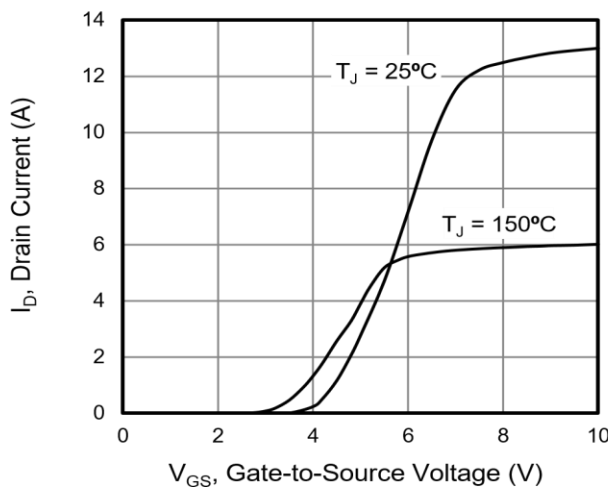
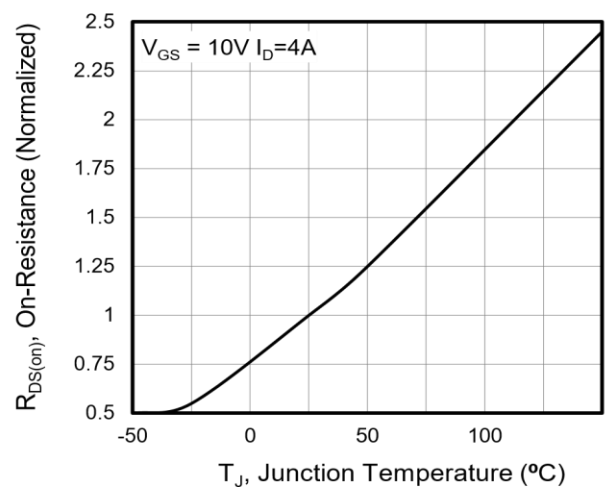


Figure 6. On-Resistance vs. Temperature



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Figure 7. Capacitance

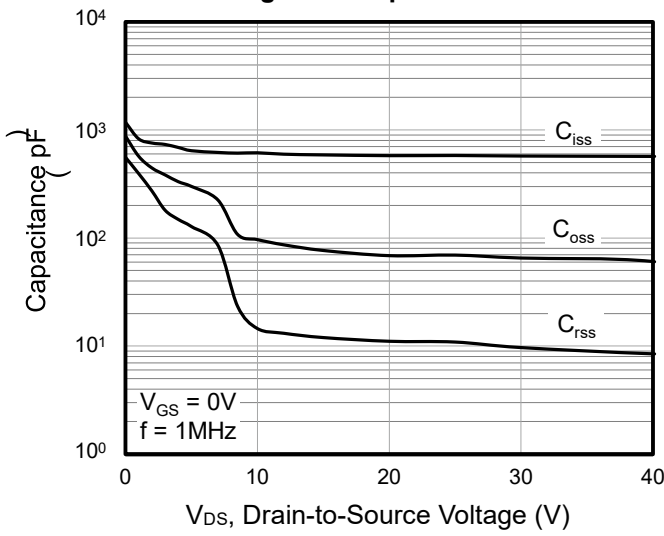


Figure 8. Gate Charge

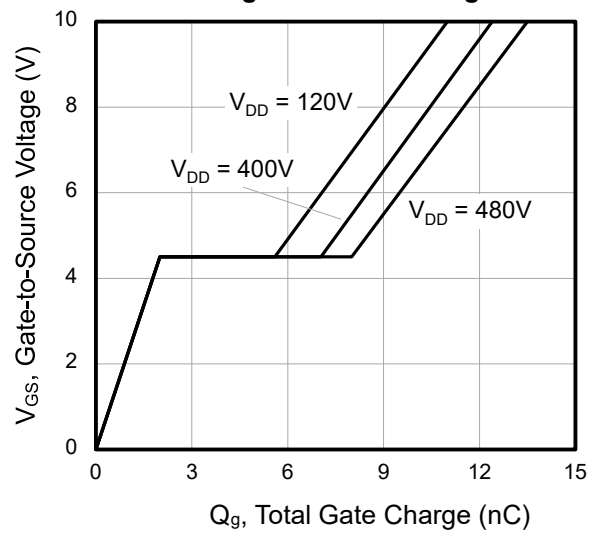


Figure 9. Transient Thermal Impedance TO-220F

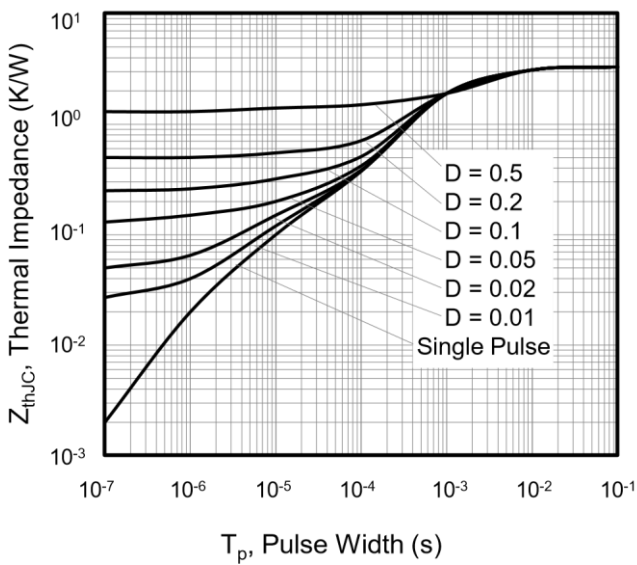
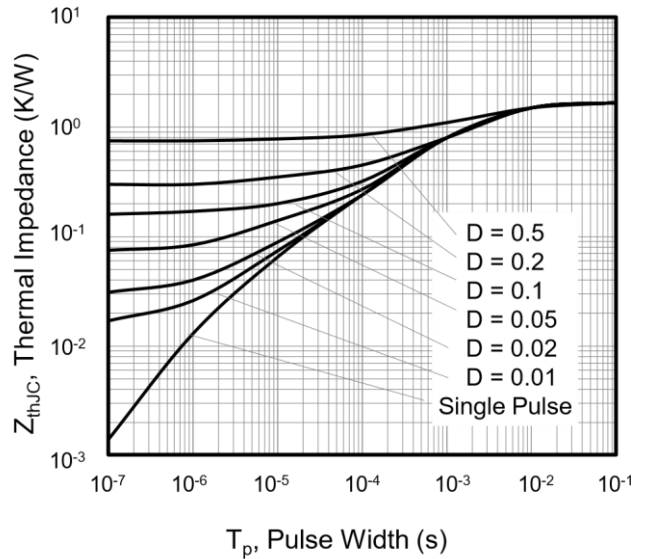


Figure 10. Transient Thermal Impedance TO-220



650V N-Channel Enhancement Mode MOSFET

Figure A: Gate Charge Test Circuit and Waveform

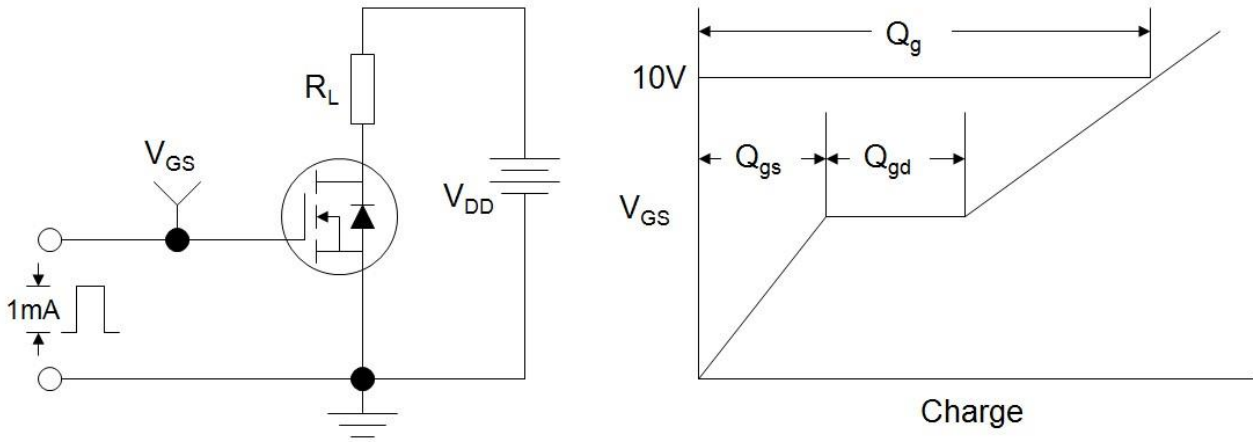


Figure B: Resistive Switching Test Circuit and Waveform

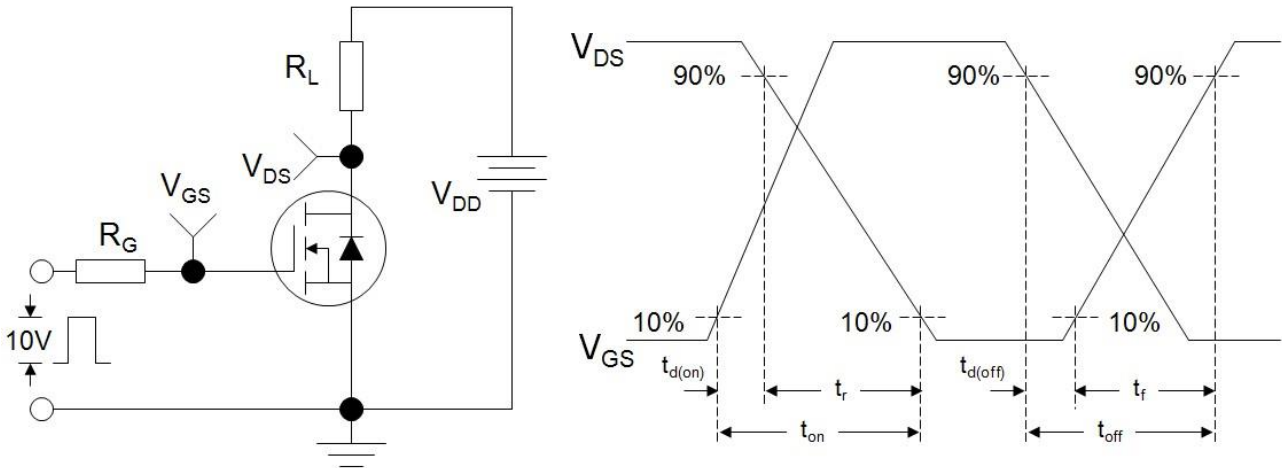
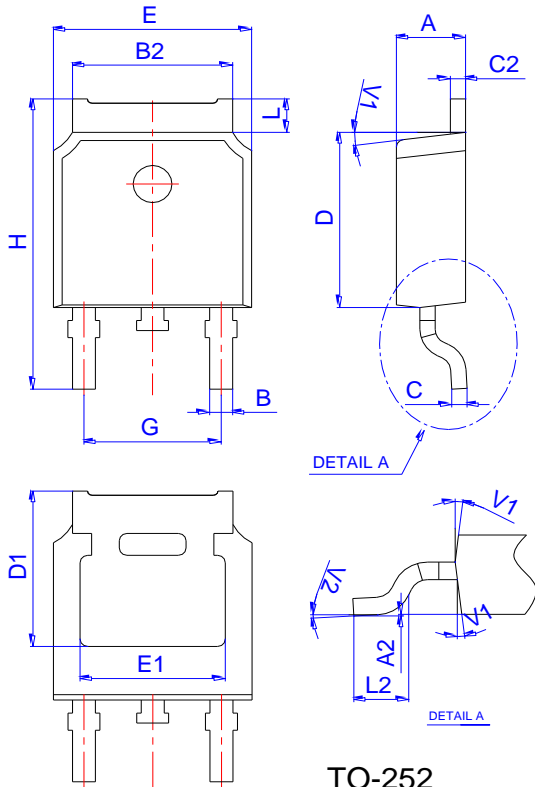


Figure C: Unclamped Inductive Switching Test Circuit and Waveform

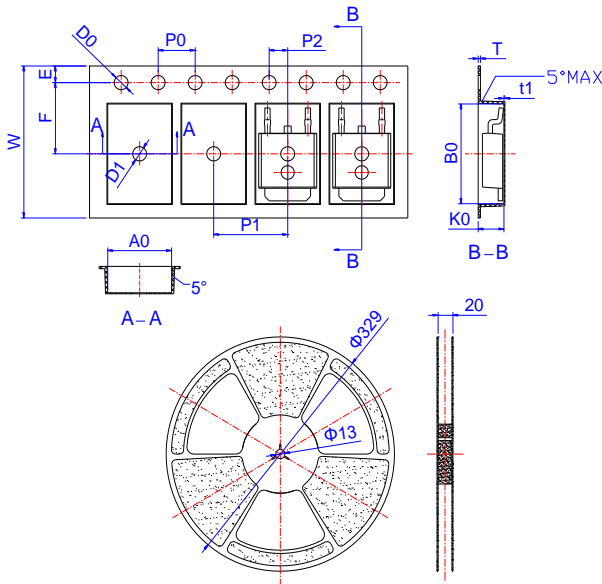
650V N-Channel Enhancement Mode MOSFET

Package Mechanical Data



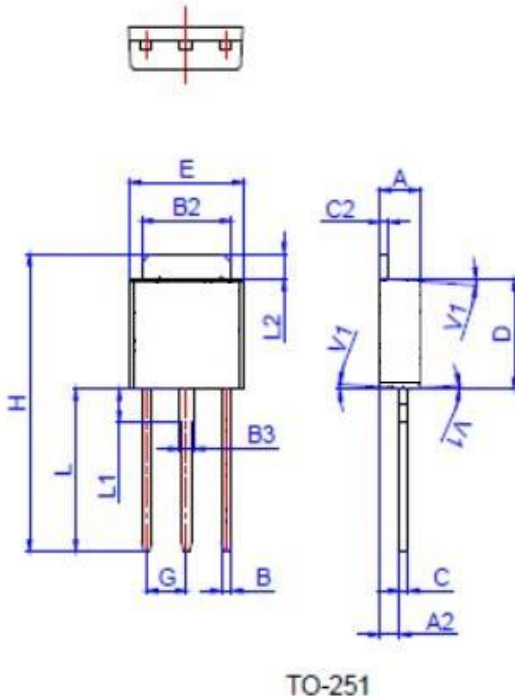
Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

Reel Specification-TO-252



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
W	15.90	16.00	16.10	0.626	0.630	0.634
E	1.65	1.75	1.85	0.065	0.069	0.073
F	7.40	7.50	7.60	0.291	0.295	0.299
D0	1.40	1.50	1.60	0.055	0.059	0.063
D1	1.40	1.50	1.60	0.055	0.059	0.063
P0	3.90	4.00	4.10	0.154	0.157	0.161
P1	7.90	8.00	8.10	0.311	0.315	0.319
P2	1.90	2.00	2.10	0.075	0.079	0.083
A0	6.85	6.90	7.00	0.270	0.271	0.276
B0	10.45	10.50	10.60	0.411	0.413	0.417
K0	2.68	2.78	2.88	0.105	0.109	0.113
T	0.24		0.27	0.009		0.011
t1	0.10			0.004		
10P0	39.80	40.00	40.20	1.567	1.575	1.583

Package Mechanical Data



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.20		2.40	0.086		0.095
A2	0.90		1.20	0.035		0.047
B	0.55		0.65	0.022		0.026
B2	5.10		5.40	0.200		0.213
B3	0.76		0.85	0.030		0.033
C	0.45		0.62	0.018		0.024
C2	0.48		0.62	0.019		0.024
D	6.00		6.20	0.236		0.244
E	6.40		6.70	0.252		0.264
G		2.30			0.091	
H	16.0		17.0	0.630		0.669
L	8.90		9.40	0.350		0.370
L1	1.80		1.90	0.071		0.075
L2	1.37		1.50	0.054		0.059
V1		4°			4°	

Package Information -TO-251

OUTLINE	TUBE (PCS)	INNER BOX (PCS)	PER CARTON (PCS)
TUBE	80	4,000	32,000

650V N-Channel Enhancement Mode MOSFET**Attention**

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