

VBE2670 Datasheet

P-Channel 60 V (D-S) MOSFET

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A) ^d	Q_g (Typ)
- 60	0.070 at $V_{GS} = - 10$ V	- 25	30
	0.082 at $V_{GS} = - 4.5$ V	- 30	

FEATURES

- Halogen-free According to IEC 61249-2-21
- Definition
- TrenchFET® Power MOSFET
- 100 % UIS Tested
- Compliant to RoHS Directive 2002/95/EC

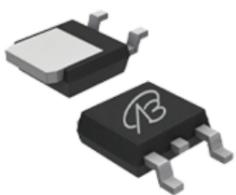


RoHS
COMPLIANT
HALOGEN
FREE
Available

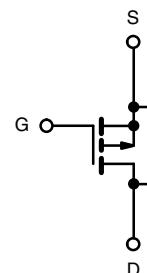
APPLICATIONS

- High Side Switch for Full Bridge Converter
- DC/DC Converter for LCD Display

TO-252



Top View



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS ($T_A = 25$ °C, unless otherwise note)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	- 60	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current ($T_J = 150$ °C)	I_D	- 25	A
		- 20	
Pulsed Drain Current	I_{DM}	- 75	A
Avalanche Current, Single Pulse	I_{AS}	- 22	
Repetitive Avalanche Energy, Single Pulse ^a	E_{AS}	24.2	mJ
Power Dissipation	P_D	38.5 ^c	W
		2.3 ^{b, c}	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to 150	°C

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^b	R_{thJA}	17	21	°C/W
		45	55	
Maximum Junction-to-Case	R_{thJC}	2.7	3.25	

Notes:

a. Duty cycle ≤ 1 %.

b. When mounted on 1" square PCB (FR-4 material).

c. See SOA curve for voltage derating.

d. Based up on $T_C = 25$ °C.

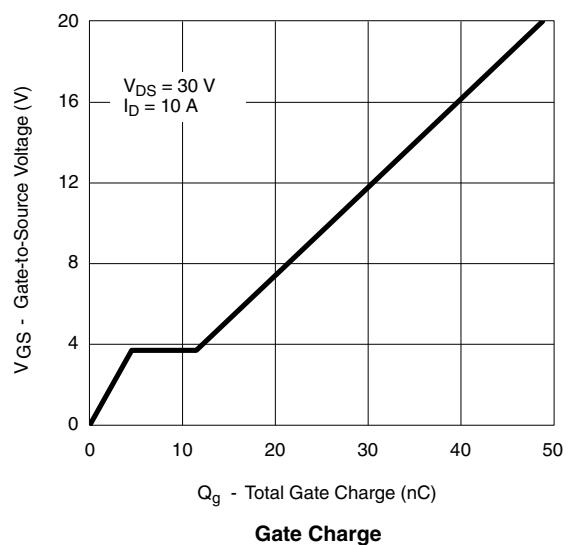
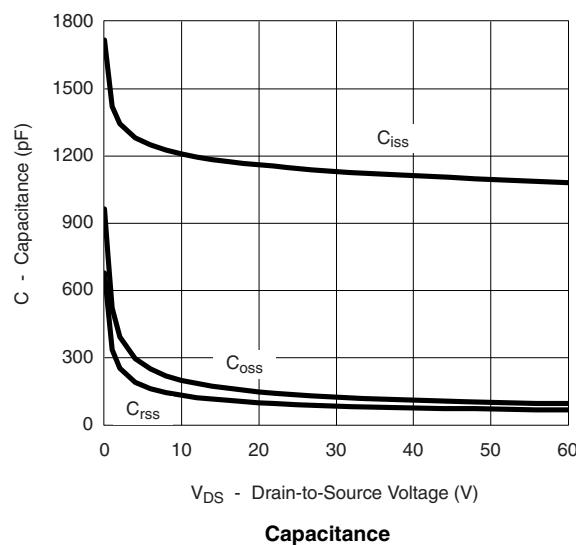
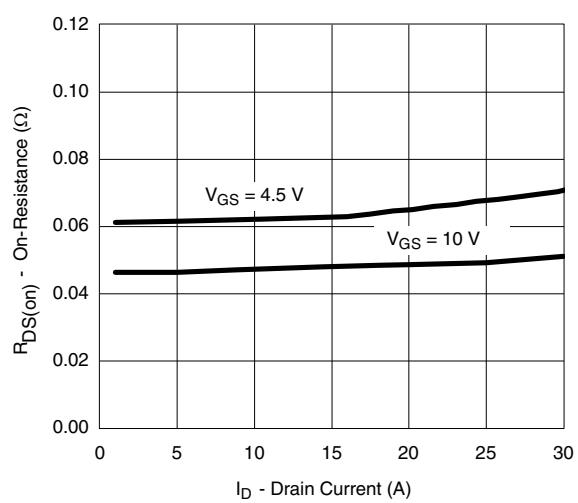
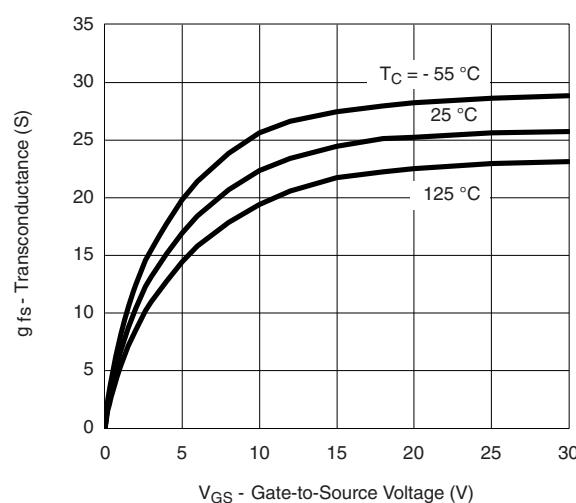
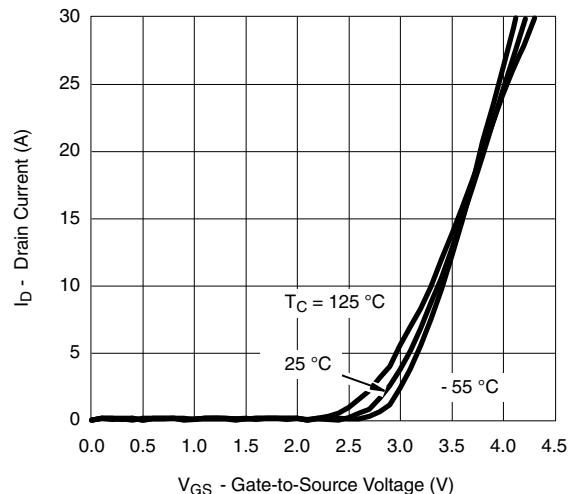
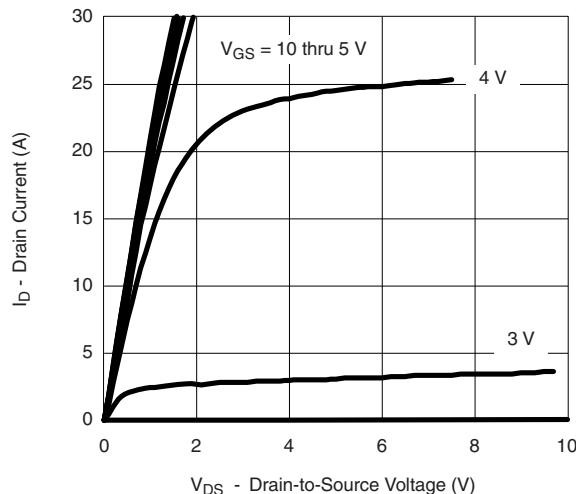
SPECIFICATIONS ($T_J = 25^\circ\text{C}$, unless otherwise note)

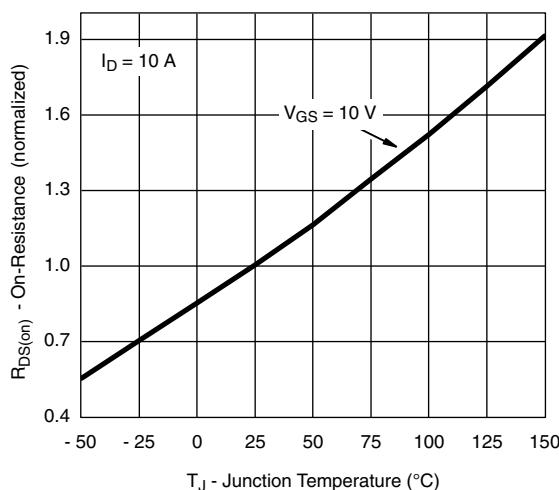
Parameter	Symbol	Test Conditions	Min .	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0 \text{ V}, I_D = - 250 \mu\text{A}$	- 60			V
Gate Threshold Voltage	$V_{GS(\text{th})}$	$V_{DS} = V_{GS}, I_D = - 250 \mu\text{A}$	- 1		- 3	V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 20 \text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = - 60 \text{ V}, V_{GS} = 0 \text{ V}$			- 1	μA
		$V_{DS} = - 60 \text{ V}, V_{GS} = 0 \text{ V}, T_J = 125^\circ\text{C}$			- 50	
		$V_{DS} = - 60 \text{ V}, V_{GS} = 0 \text{ V}, T_J = 150^\circ\text{C}$			- 125	
On-State Drain Current ^a	$I_{D(\text{on})}$	$V_{DS} = - 5 \text{ V}, V_{GS} = - 10 \text{ V}$	- 20			A
Drain-Source On-State Resistance ^a	$R_{DS(\text{on})}$	$V_{GS} = - 10 \text{ V}, I_D = - 10 \text{ A}$		0.070		Ω
		$V_{GS} = - 10 \text{ V}, I_D = - 10 \text{ A}, T_J = 125^\circ\text{C}$		0.095		
		$V_{GS} = - 10 \text{ V}, I_D = - 10 \text{ A}, T_J = 150^\circ\text{C}$		0.115		
		$V_{GS} = - 4.5 \text{ V}, I_D = - 5 \text{ A}$		0.082		
Forward Transconductance ^a	g_{fs}	$V_{DS} = - 15 \text{ V}, I_D = - 10 \text{ A}$		22		S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{GS} = 0 \text{ V}, V_{DS} = - 25 \text{ V}, f = 1 \text{ MHz}$		1000		pF
Output Capacitance	C_{oss}			130		
Reverse Transfer Capacitance	C_{rss}			90		
Total Gate Charge ^c	Q_g	$V_{DS} = - 30 \text{ V}, V_{GS} = - 10 \text{ V}, I_D = - 10 \text{ A}$		30	45	nC
Gate-Source Charge ^c	Q_{gs}			4.5		
Gate-Drain Charge ^c	Q_{gd}			7		
Gate Resistance	R_g	$f = 1 \text{ MHz}$		7		Ω
Turn-On Delay Time ^c	$t_{d(\text{on})}$	$V_{DD} = - 30 \text{ V}, R_L = 3 \Omega$ $I_D \equiv - 19 \text{ A}, V_{GEN} = - 10 \text{ V}, R_g = 2.5 \Omega$		8	15	ns
Rise Time ^c	t_r			9	15	
Turn-Off Delay Time ^c	$t_{d(\text{off})}$			80		
Fall Time ^c	t_f			30	45	
Drain-Source Body Diode and Characteristics ($T_C = 25^\circ\text{C}$)^b						
Continuous Current	I_S				- 25	A
Pulsed Current	I_{SM}				- 75	
Forward Voltage ^a	V_{SD}	$I_F = - 19 \text{ A}, V_{GS} = 0 \text{ V}$		- 1	- 1.5	V
Reverse Recovery Time	t_{rr}	$I_F = - 19 \text{ A}, \text{di/dt} = 100 \text{ A}/\mu\text{s}$		41	61	ns

Notes:

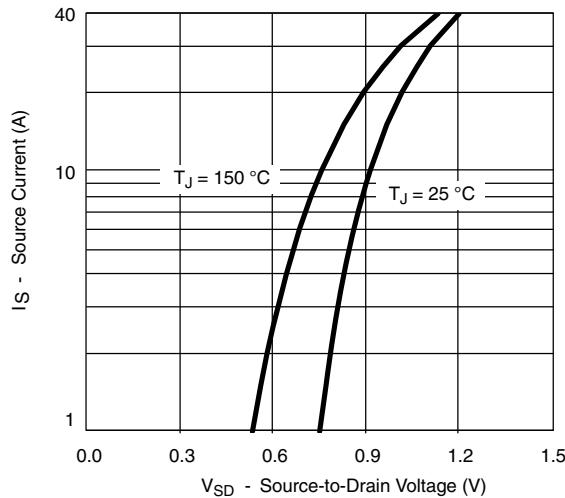
- a. Pulse test; pulse width $\leq 300 \mu\text{s}$, duty cycle $\leq 2\%$.
- b. Guaranteed by design, not subject to production testing.
- c. Independent of operating temperature.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

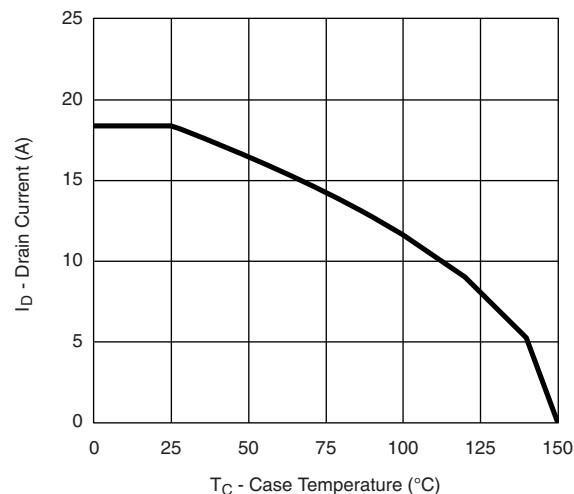
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)


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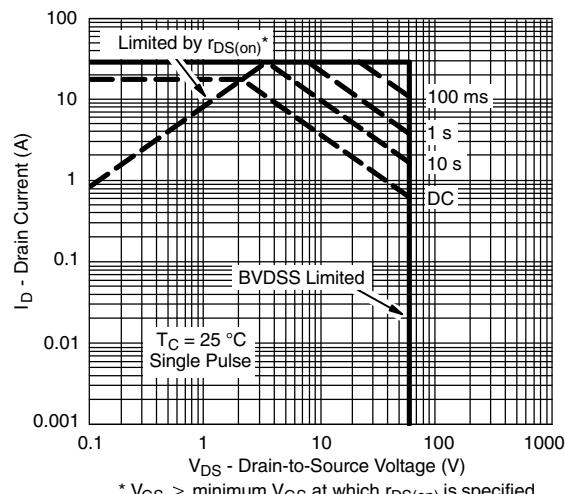
On-Resistance vs. Junction Temperature



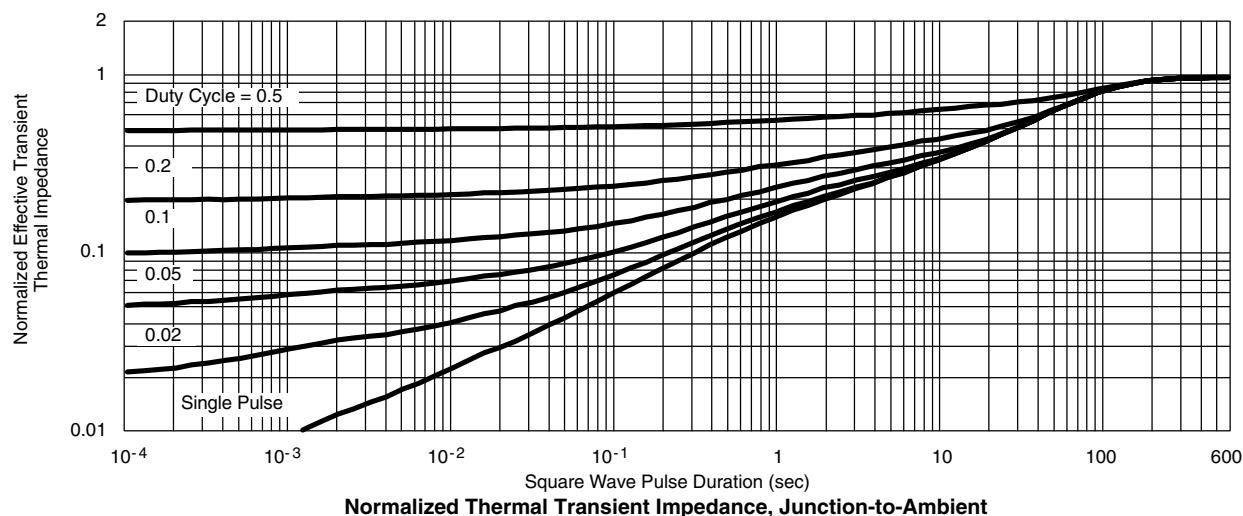
Source-Drain Diode Forward Voltage

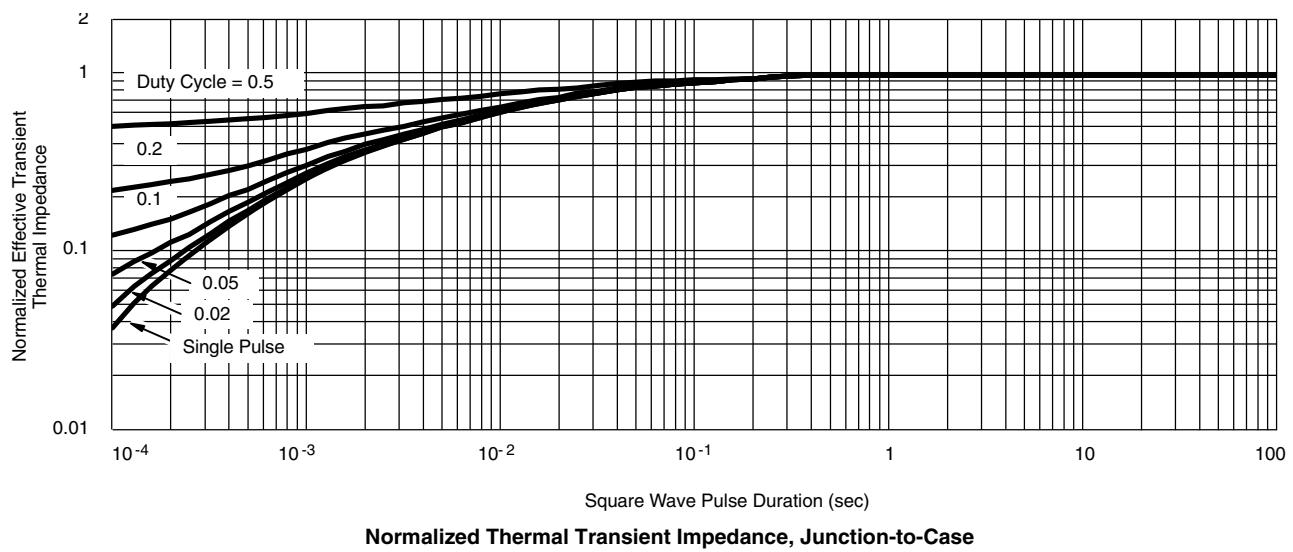
THERMAL RATINGS


Maximum Drain Current vs. Case Temperature

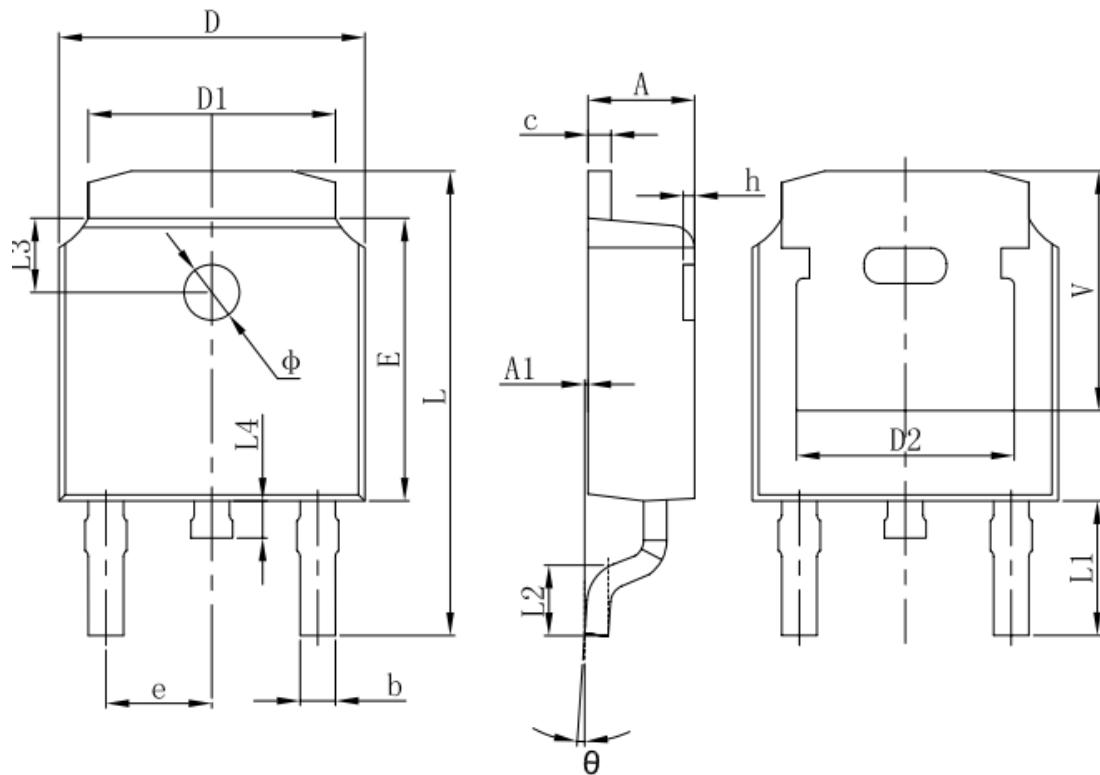


Safe Operating Area

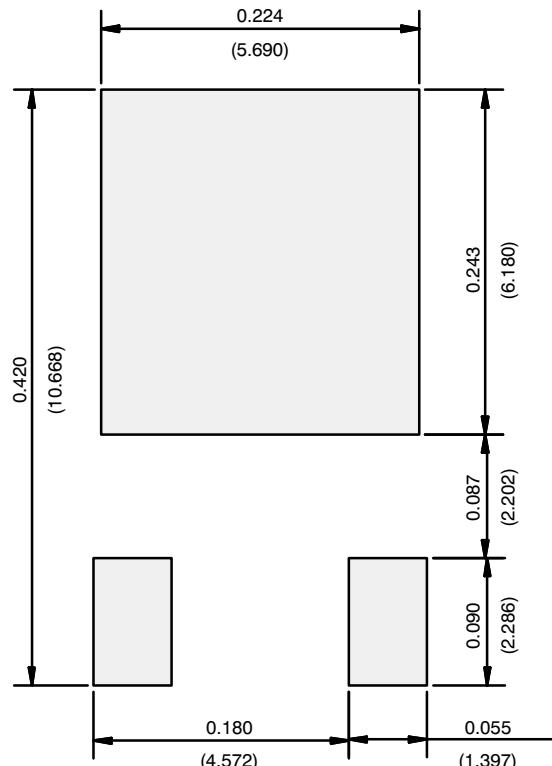


THERMAL RATINGS

TO252 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.635	0.770	0.025	0.030
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.712	10.312	0.382	0.406
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.250 REF.		0.207 REF.	

RECOMMENDED MINIMUM PADS FOR DPAK (TO-252)

Recommended Minimum Pads
Dimensions in Inches/(mm)

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