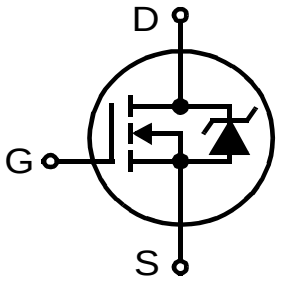
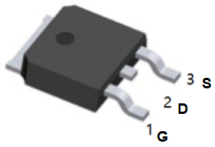
Description

This N-Channel MOSFET has been designed specifically to improve the overall efficiency of DC/DC converters using either synchronous or conventional switching PWM controllers. It has been optimized for low gate charge, low $r_{DS(ON)}$ and fast switching speed.



Features

V_{DS} (V) = 30V
I_D = 35A (V_{GS} = 10V)
$R_{DS(ON)}$ =5.7mΩ (V_{GS} = 10V)
$R_{DS(ON)}$ =6.8mΩ (V_{GS} = 4.5V)



TO-252(DPAK) top view

MOSFET Maximum Ratings T_C = 25°C unless otherwise noted

Symbol	Parameter	Ratings	Units
V_{DSS}	Drain to Source Voltage	30	V
V_{GS}	Gate to Source Voltage	±20	V
I_D	Drain Current Continuous (T_C = 25°C, V_{GS} = 10V) (Note 1)	94	A
	Continuous (T_C = 25°C, V_{GS} = 4.5V) (Note 1)	85	A
	Continuous (T_{amb} = 25°C, V_{GS} = 10V, with $R_{\theta JA}$ = 52°C/W)	17	A
	Pulsed	Figure 4	A
E_{AS}	Single Pulse Avalanche Energy (Note 2)	168	mJ
P_D	Power dissipation	80	W
	Derate above 25°C	0.53	W/°C
T_J, T_{STG}	Operating and Storage Temperature	-55 to 175	°C

Thermal Characteristics

$R_{\theta JC}$	Thermal Resistance Junction to Case TO-252	1.88	°C/W
$R_{\theta JA}$	Thermal Resistance Junction to Ambient TO-252	100	°C/W
$R_{\theta JA}$	Thermal Resistance Junction to Ambient TO-252, 1in^2 copper pad area	52	°C/W

Electrical Characteristics T_C = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
B_{VDSS}	Drain to Source Breakdown Voltage	I_D = 250μA, V_{GS} = 0V	30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 24V, V_{GS} = 0V	-	-	1	μA
		V_{DS} = 24V, V_{GS} = 0V, T_C = 150°C	-	-	250	
I_{GSS}	Gate to Source Leakage Current	V_{GS} = ±20V	-	-	±100	nA
On Characteristics						
$V_{GS(TH)}$	Gate to Source Threshold Voltage	V_{GS} = V_{DS}, I_D = 250μA	1.2	-	2.5	V
$r_{DS(ON)}$	Drain to Source On Resistance	I_D = 35A, V_{GS} = 10V	-	47	57	mΩ
		I_D = 35A, V_{GS} = 4.5V	-	57	68	
		I_D = 35A, V_{GS} = 10V, T_J = 175°C	-	75	92	
Dynamic Characteristics						
C_{ISS}	Input Capacitance	V_{DS} = 15V, V_{GS} = 0V, f = 1MHz	-	2525	-	pF
C_{OSS}	Output Capacitance		-	490	-	pF
C_{RSS}	Reverse Transfer Capacitance		-	300	-	pF
R_G	Gate Resistance	V_{GS} = 0.5V, f = 1MHz	-	2.1	-	Ω
$Q_{g(TOT)}$	Total Gate Charge at 10V	V_{GS} = 0V to 10V; V_{DD} = 15V, I_D = 35A, I_g = 1.0mA	-	46	60	nC
$Q_{g(5)}$	Total Gate Charge at 5V	V_{GS} = 0V to 5V	-	24	32	nC
$Q_{g(TH)}$	Threshold Gate Charge	V_{GS} = 0V to 1V	-	2.3	3.0	nC
Q_{gs}	Gate to Source Gate Charge		-	6.9	-	nC
Q_{gs2}	Gate Charge Threshold to Plateau		-	4.6	-	nC
Q_{gd}	Gate to Drain “Miller” Charge		-	9.8	-	nC
Switching Characteristics (V_{GS} = 10V)						
t_{ON}	Turn-On Time	V_{DD} = 15V, I_D = 35A, V_{GS} = 10V, R_{GS} = 6.2Ω	-	-	171	ns
$t_{d(ON)}$	Turn-On Delay Time		-	9	-	ns
t_r	Rise Time		-	106	-	ns
$t_{d(OFF)}$	Turn-Off Delay Time		-	53	-	ns
t_f	Fall Time		-	41	-	ns
t_{OFF}	Turn-Off Time		-	-	143	ns
Drain-Source Diode Characteristics						
V_{SD}	Source to Drain Diode Voltage	I_{SD} = 35A	-	-	1.25	V
		I_{SD} = 15A	-	-	1.0	V
t_{rr}	Reverse Recovery Time	I_{SD} = 35A, dI_{SD}/dt = 100A/μs	-	-	27	ns
Q_{RR}	Reverse Recovered Charge	I_{SD} = 35A, dI_{SD}/dt = 100A/μs	-	-	12	nC

Notes:
1: Package current limitation is 35A.
2: Starting T_J = 25°C, L = 0.43mH, I_{AS} = 28A, V_{DD} = 27V, V_{GS} = 10V.

Typical Characteristics T_C = 25°C unless otherwise noted

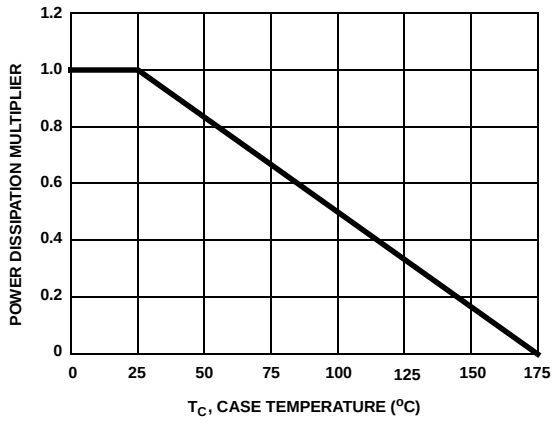


Figure 1. Normalized Power Dissipation vs Case Temperature

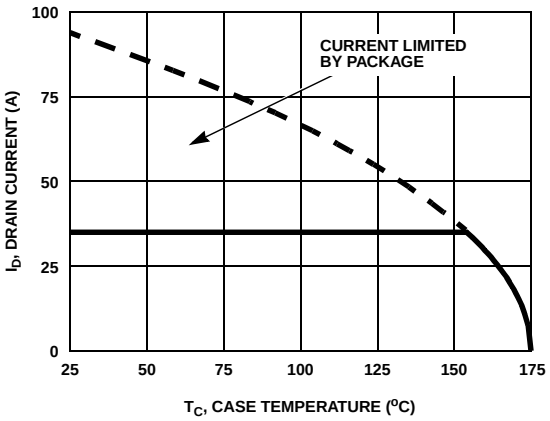


Figure 2. Maximum Continuous Drain Current vs Case Temperature

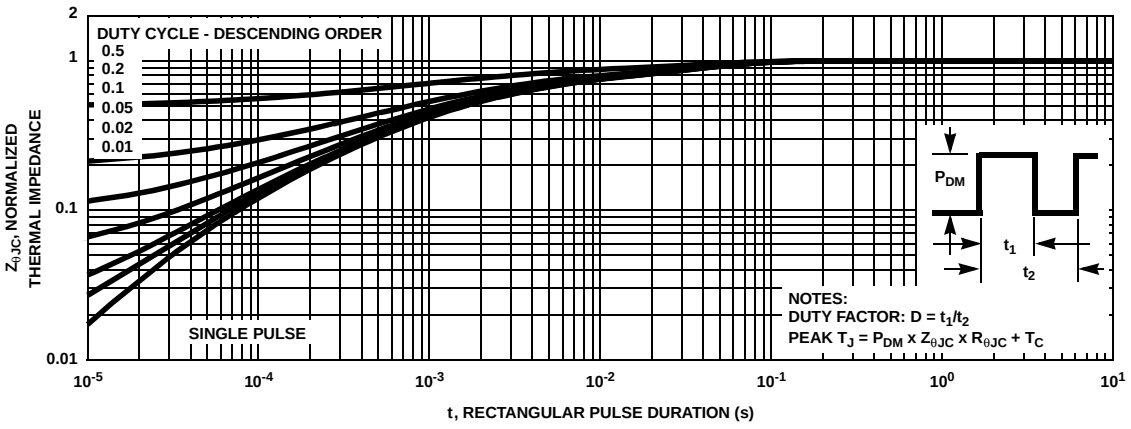


Figure 3. Normalized Maximum Transient Thermal Impedance

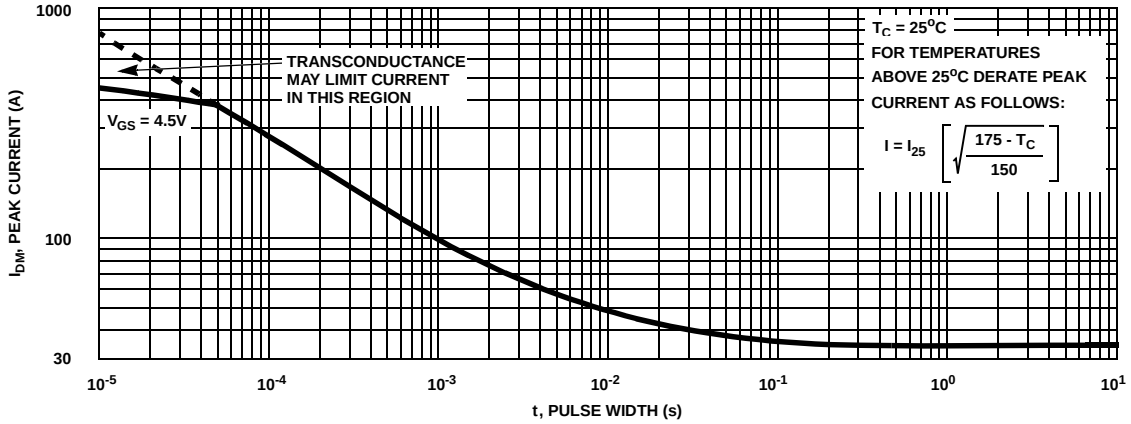


Figure 4. Peak Current Capability

Typical Characteristics T_C = 25°C unless otherwise noted

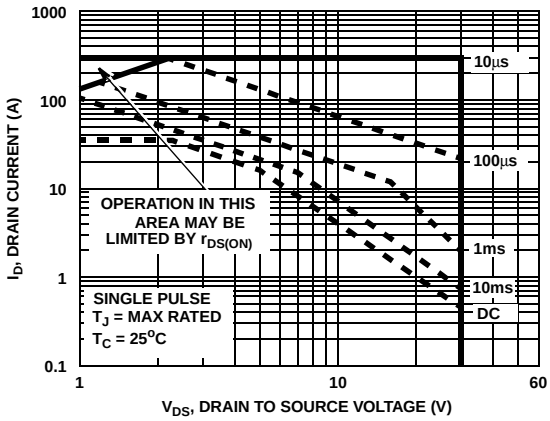
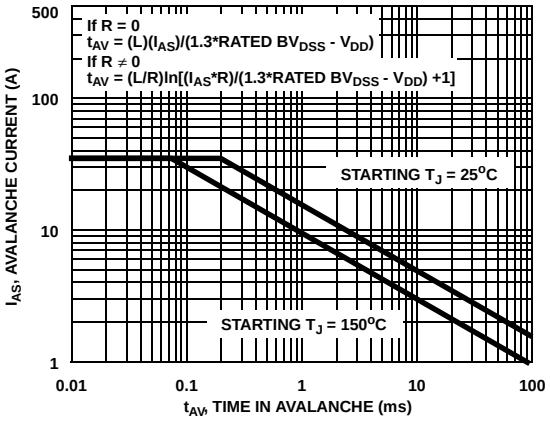


Figure 5. Forward Bias Safe Operating Area



NOTE: Refer to Fairchild Application Notes AN7514 and AN7515

Figure 6. Unclamped Inductive Switching Capability

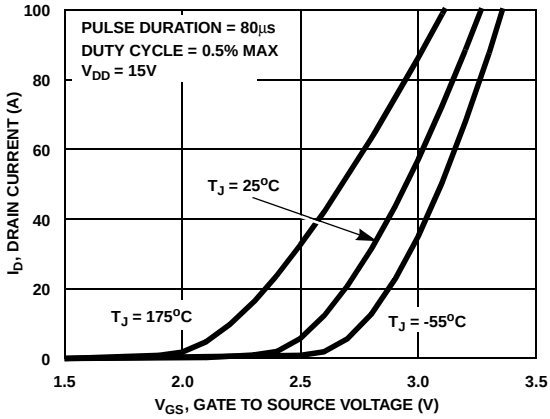


Figure 7. Transfer Characteristics

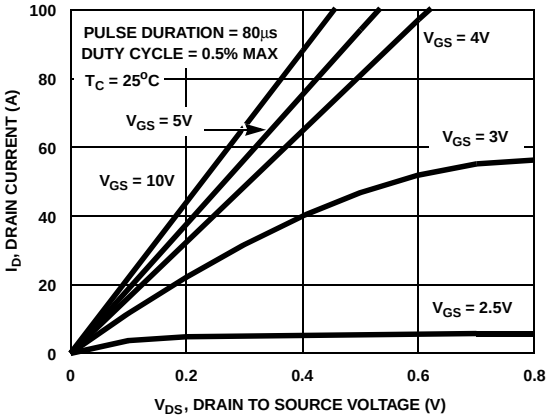


Figure 8. Saturation Characteristics

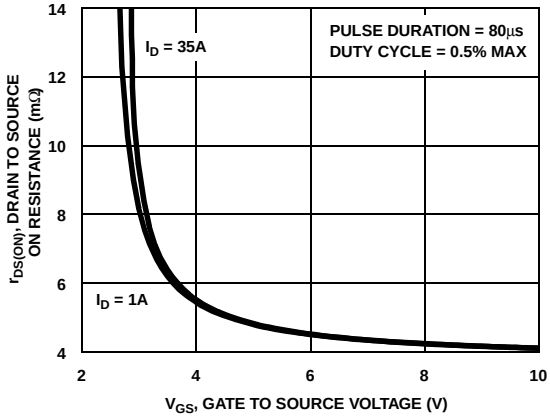


Figure 9. Drain to Source On Resistance vs Gate Voltage and Drain Current

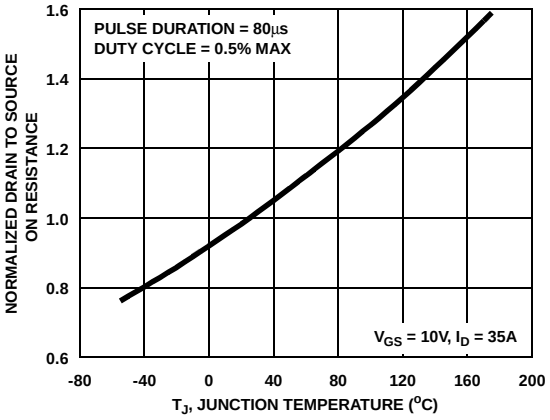


Figure 10. Normalized Drain to Source On Resistance vs Junction Temperature

Typical Characteristics T_C = 25°C unless otherwise noted

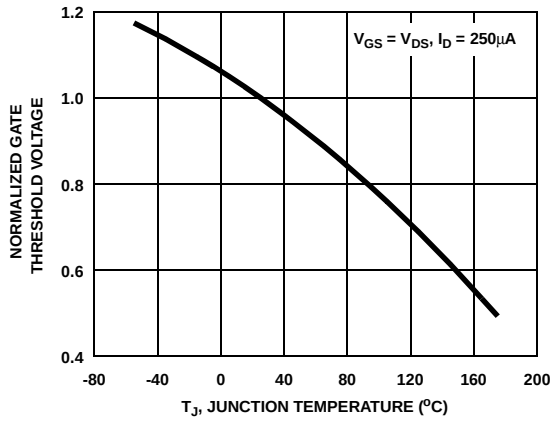


Figure 11. Normalized Gate Threshold Voltage vs Junction Temperature

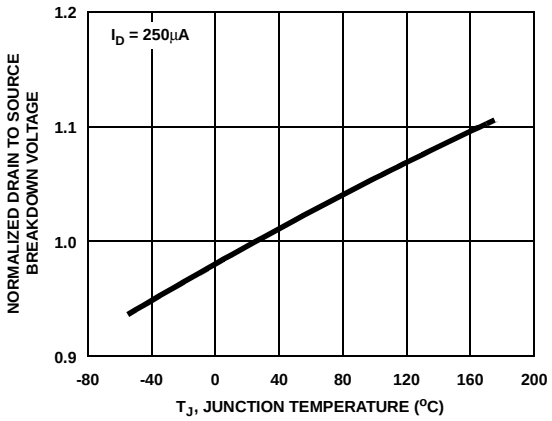


Figure 12. Normalized Drain to Source Breakdown Voltage vs Junction Temperature

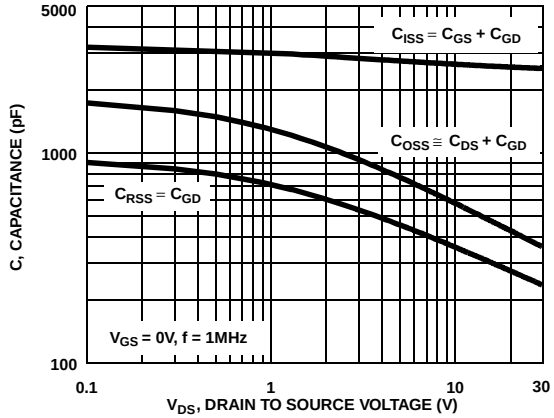


Figure 13. Capacitance vs Drain to Source Voltage

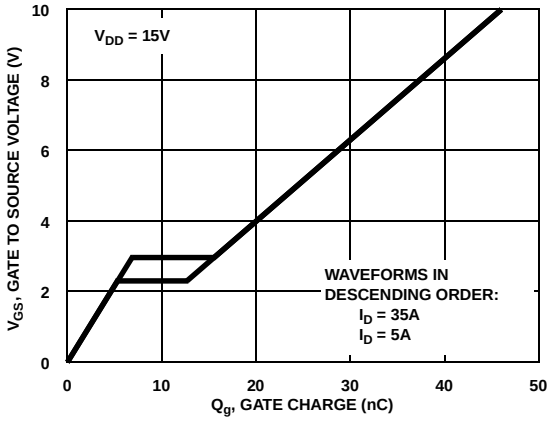


Figure 14. Gate Charge Waveforms for Constant Gate Current

Test Circuits and Waveforms

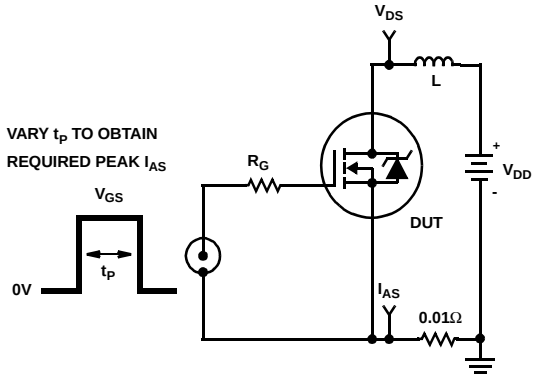


Figure 15. Unclamped Energy Test Circuit

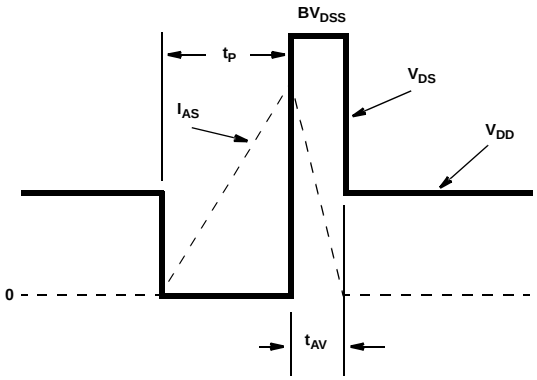


Figure 16. Unclamped Energy Waveforms

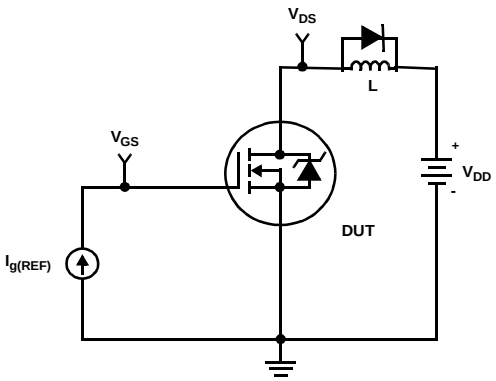


Figure 17. Gate Charge Test Circuit

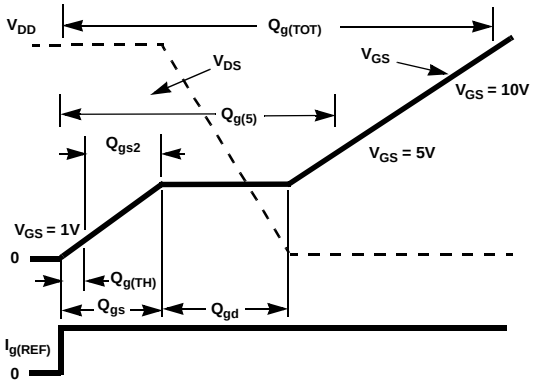


Figure 18. Gate Charge Waveforms

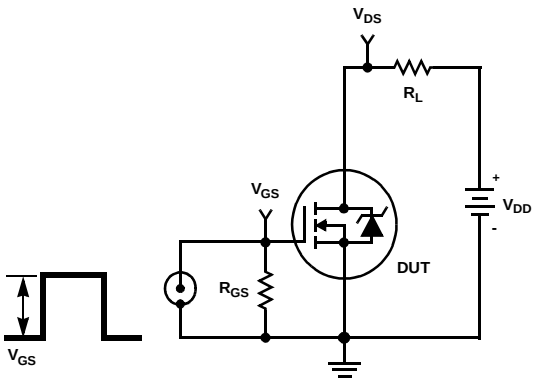


Figure 19. Switching Time Test Circuit

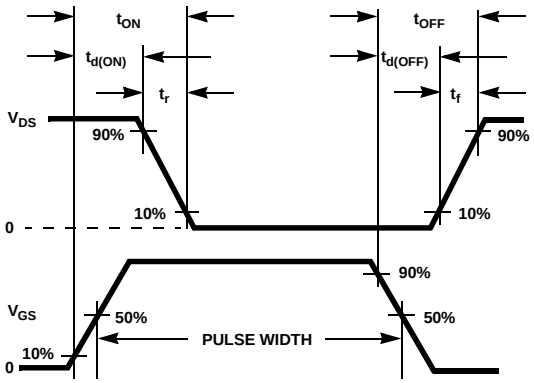
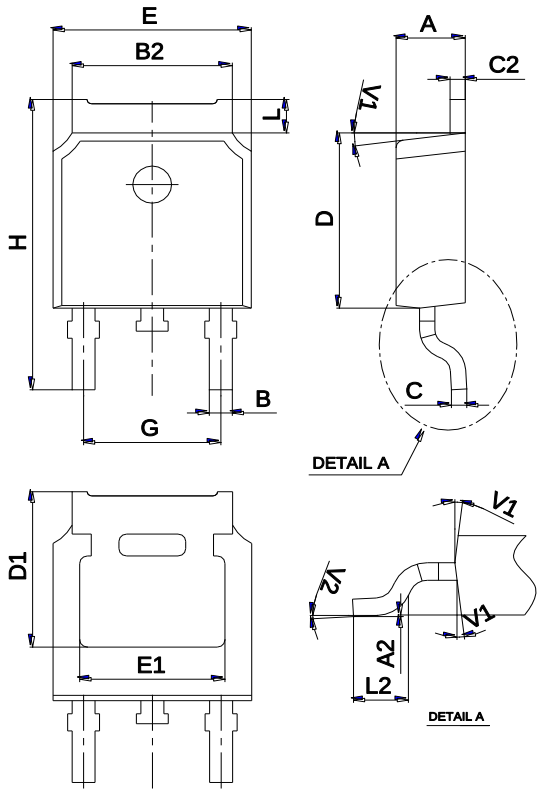


Figure 20. Switching Time Waveforms

Package Mechanical Data TO-252



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°

Ordering information

Order code	Package	Baseqty	Delivery mode
UMW FDD8896	TO-252	2500	Tape and reel

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