General Features

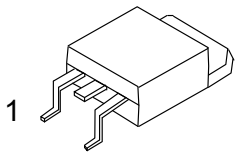
- Low Gate Charge
- Enhancement mode
- Fast Switching
- High Power and Current Handling Capability

Product Summary

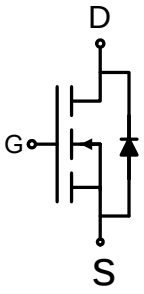
BVDSS	20	V
RDS(on),Typ.@ VGS=4.5 V	5	mΩ
ID	60	A

Applications

- DC-DC primary bridge
- DC-DC Synchronous rectification
- DC FAN



TO-252



N-channel

Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
Common Ratings (T_A=25°C Unless Otherwise Noted)				
V_{DSS}	Drain-Source Voltage		20	V
V_{GSS}	Gate-Source Voltage		±12	
T_J	Maximum Junction Temperature		150	°C
T_{STG}	Storage Temperature Range		-55 to 150	°C
I_S	Diode Continuous Forward Current	T_C=25°C	60	A
Mounted on Large Heat Sink				
I_{DP}	300μs Pulse Drain Current Tested	T_C=25°C	200①	A
I_D	Continuous Drain Current(V_{GS}=8V)	T_C=25°C	60②	A
		T_C=100°C	40	
P_D	Maximum Power Dissipation	T_C=25°C	60	W
		T_C=100°C	25	
$R_{\theta JC}$	Thermal Resistance-Junction to Case		3	°C/W
Drain-Source Avalanche Ratings				
E_{AS}③	Avalanche Energy, Single Pulsed		120	mJ

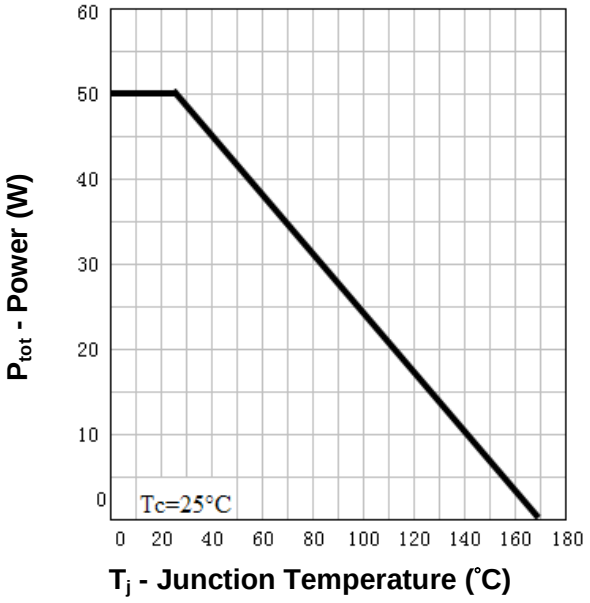
Electrical Characteristics (T_A=25°C Unless Otherwise Noted)

Symbol	Parameter	Test Condition	ASDM20N60			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_{DS}=250μA	20			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}= 20V, V_{GS}=0V			1	μA
		T_J=85°C			30	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250μA	0.4	0.7	1.5	V
I_{GSS}	Gate Leakage Current	V_{GS}=±12V, V_{DS}=0V			±100	nA
$R_{DS(ON)}$ ④	Drain-Source On-state Resistance	V_{GS}= 4.5V, I_{DS}=25A		5	6.5	mΩ
		V_{GS}= 2.5V, I_{DS}=20A		7	10	mΩ
Diode Characteristics						
V_{SD} ④	Diode Forward Voltage	I_{SD}=25A, V_{GS}=0V			1.2	V
t_{rr}	Reverse Recovery Time	I_{SD}=25A, dI_{SD}/dt=100A/μs		14		ns
Q_{rr}	Reverse Recovery Charge			32		nC
Dynamic Characteristics ⑤						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V,F=1MHz		1.2		Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=15V, Frequency=1.0MHz		980		pF
C_{oss}	Output Capacitance			160		
C_{rss}	Reverse Transfer Capacitance			80		
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=15V, R_L=15Ω, I_{DS}=25A, V_{GEN}= 8V, R_G=6Ω		6		ns
t_r	Turn-on Rise Time			10		
$t_{d(OFF)}$	Turn-off Delay Time			24		
t_f	Turn-off Fall Time			5		
Gate Charge Characteristics ⑤						
Q_g	Total Gate Charge	V_{DS}=15V, V_{GS}= 8V, I_{DS}=25A		18	23	nC
Q_{gs}	Gate-Source Charge			2.5		
Q_{gd}	Gate-Drain Charge			5		

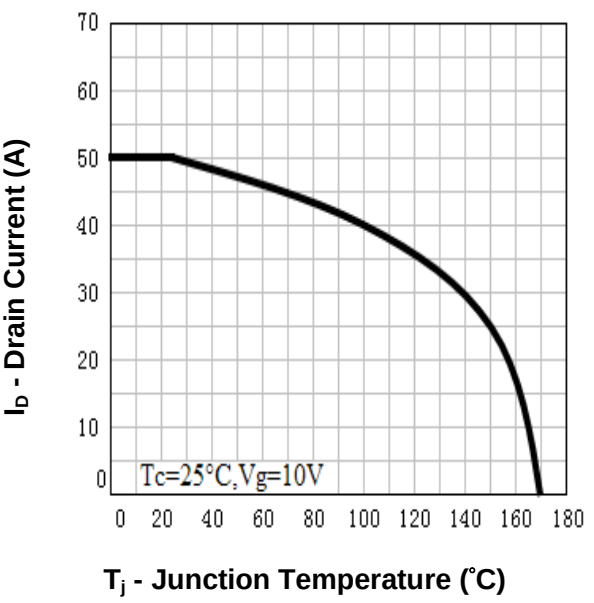
Notes: ①Pulse width limited by safe operating area.
②Calculated continuous current based on maximum allowable junction temperature. Current limited by bond wire.
③Limited by T_{Jmax}, I_{AS} =20A, V_{DD} = 15V, R_G = 50Ω , Starting T_J = 25°C.
④Pulse test ; Pulse width≤300μs, duty cycle≤2%.
⑤Guaranteed by design, not subject to production testing.

Typical Characteristics

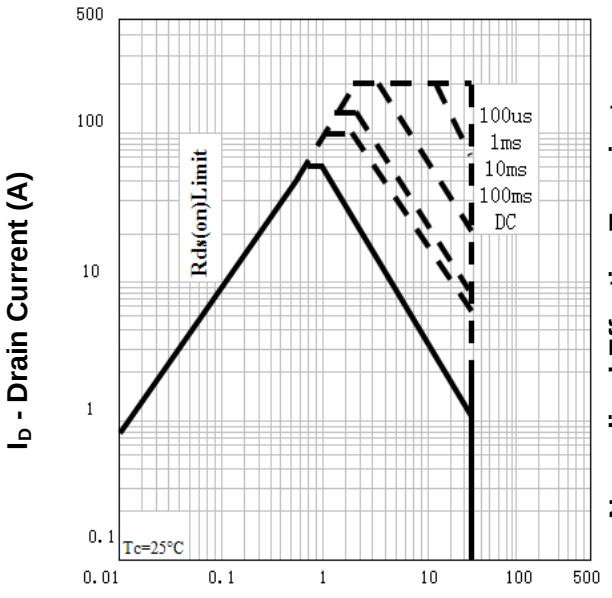
Power Dissipation



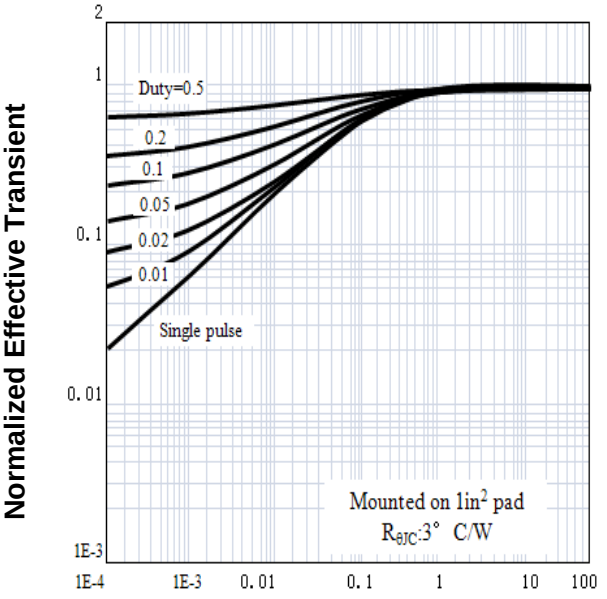
Drain Current



Safe Operation Area

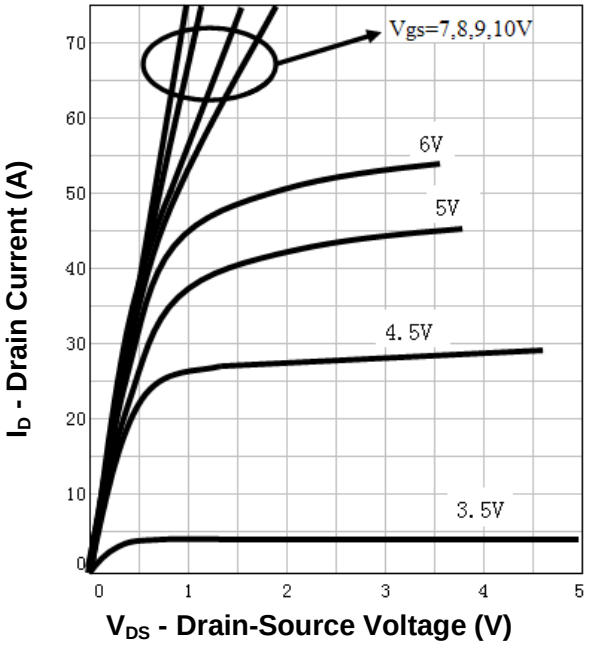


Thermal Transient Impedance

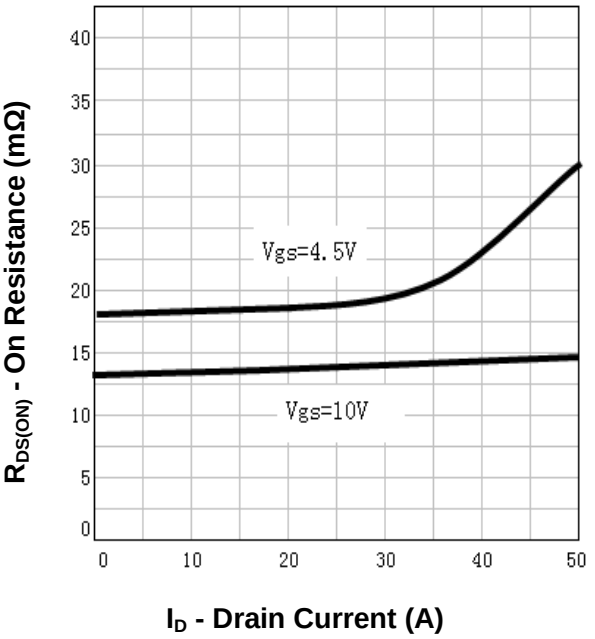


Typical Characteristics

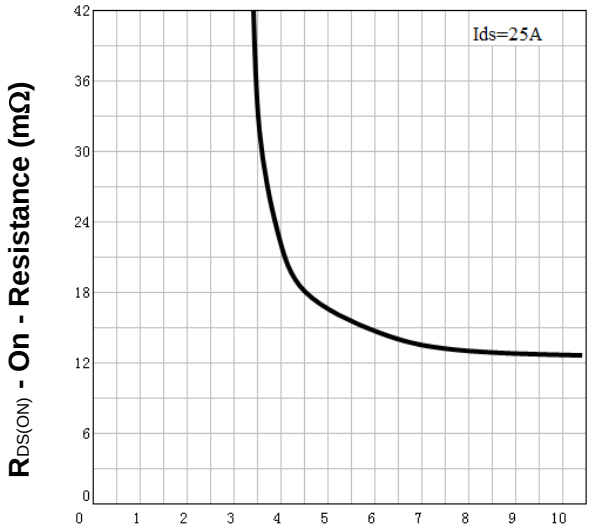
Output Characteristics



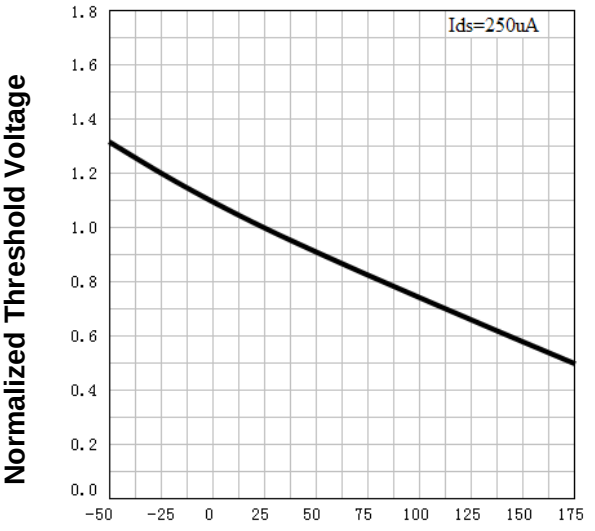
Drain-Source On Resistance



Drain-Source On Resistance

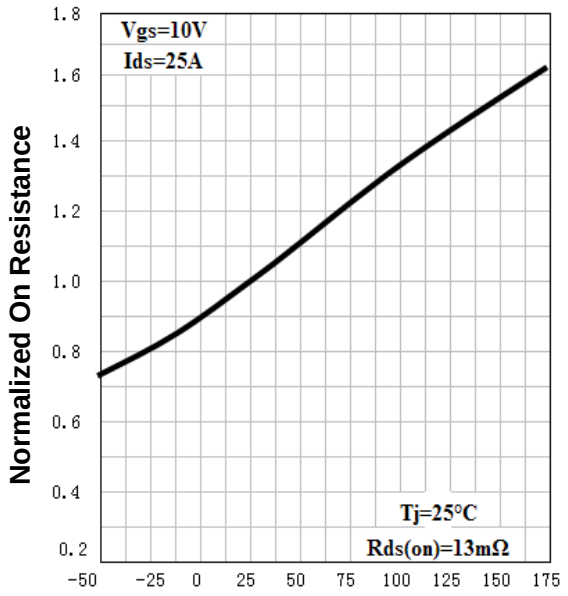


Gate Threshold Voltage



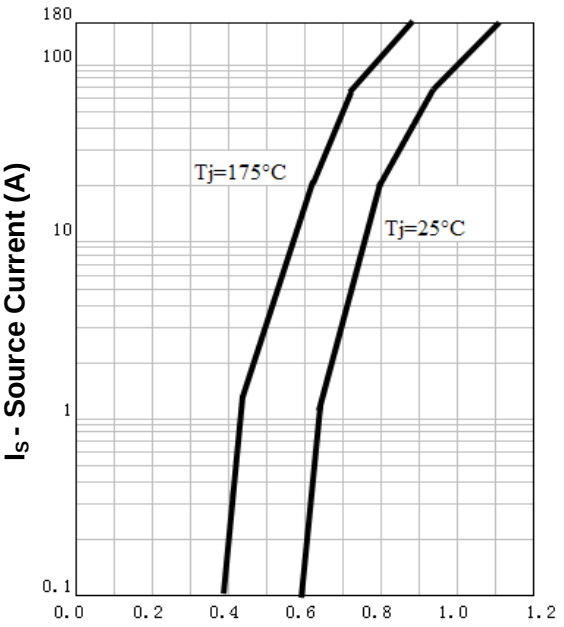
Typical Characteristics

Drain-Source On Resistance



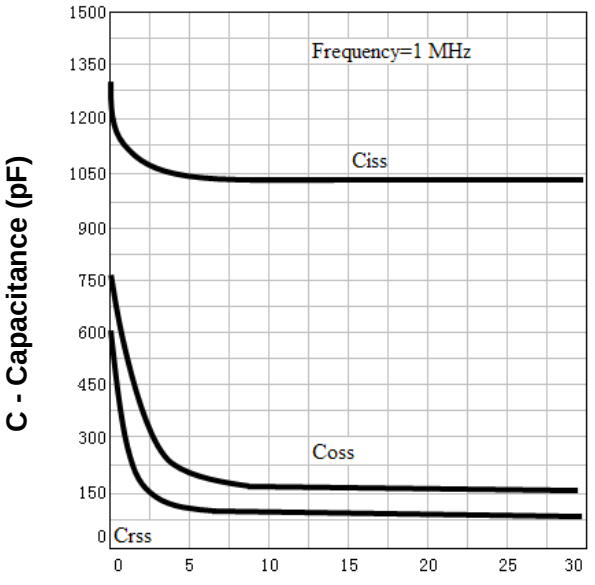
T_j - Junction Temperature (°C)

Source-Drain Diode Forward



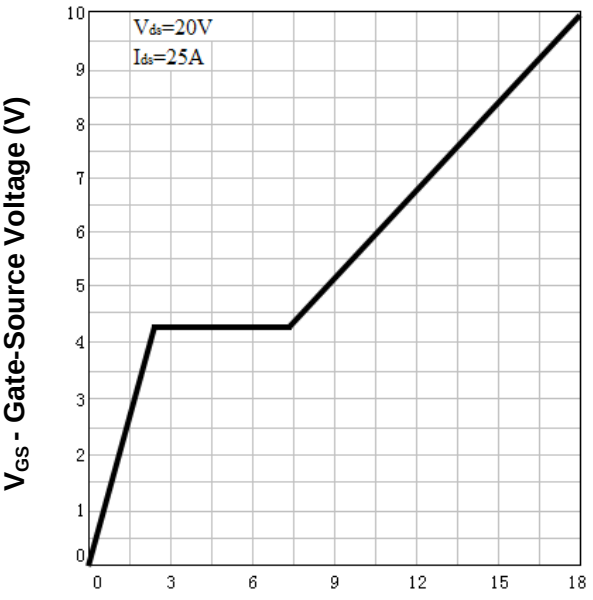
V_{SD} - Source-Drain Voltage (V)

Capacitance



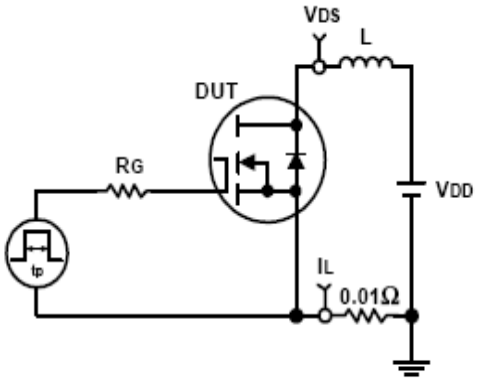
V_{DS} - Drain-Source Voltage (V)

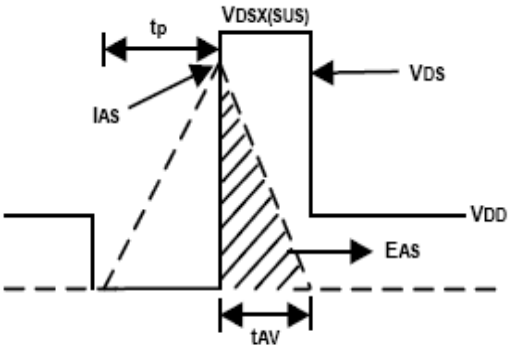
Gate Charge



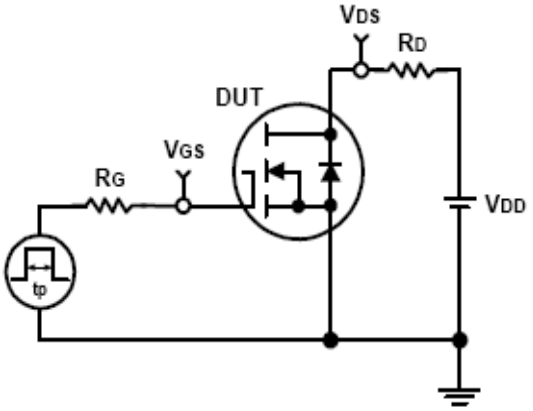
Q_G - Gate Charge (nC)

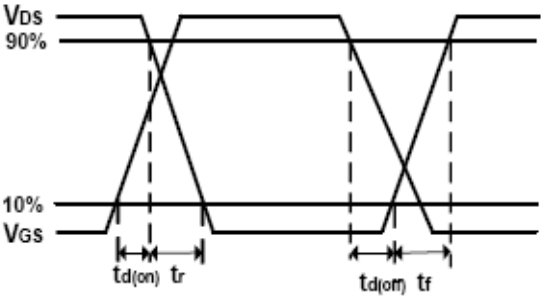
Avalanche Test Circuit and Waveforms





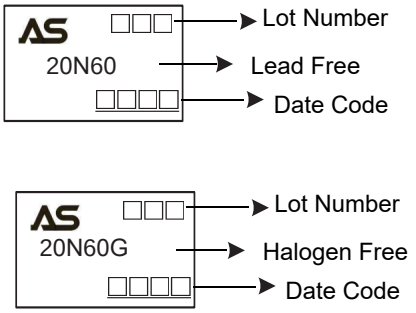
Switching Time Test Circuit and Waveforms



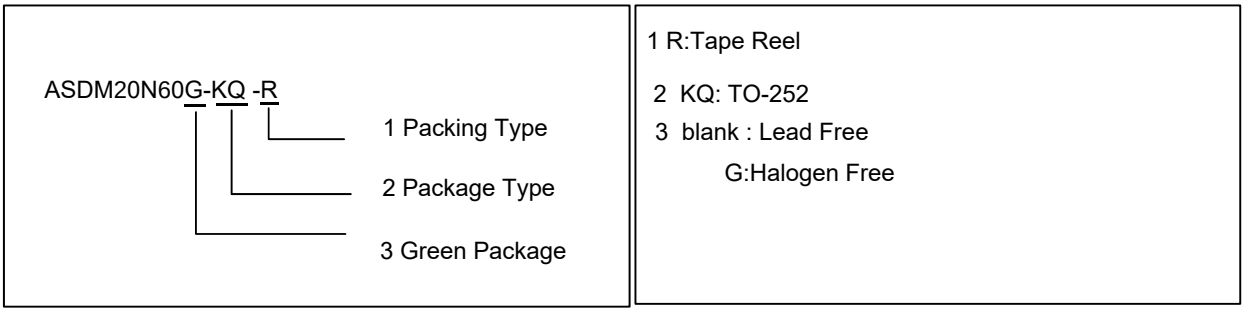


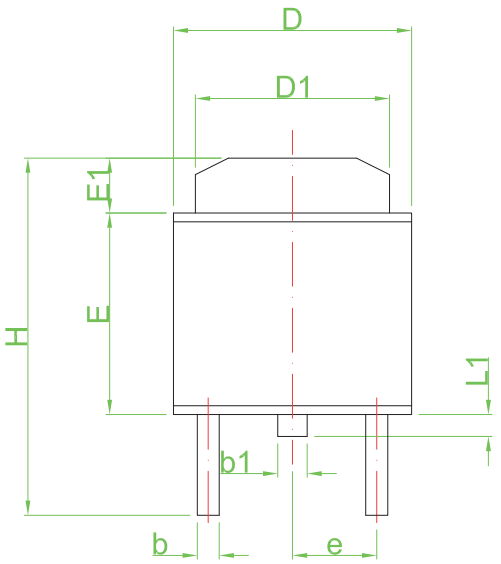
Ordering and Marking Information

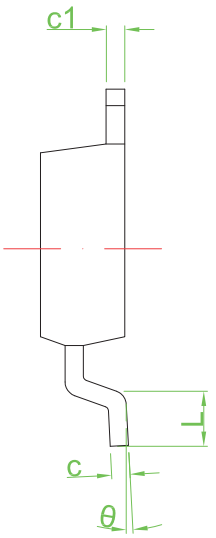
Device	Marking	Package	Packaging	Quantity
ASDM20N60	20N60	TO-252	Tape&Reel	2500/Reel

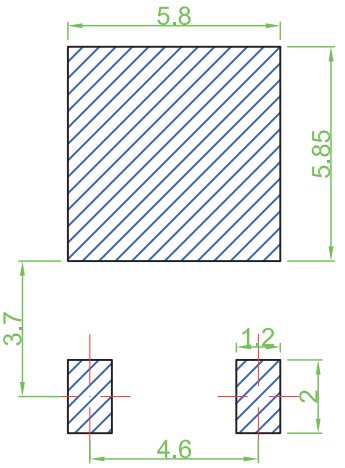
PACKAGE	MARKING
TO-252	

Ordering Number		Package
Lead Free	Halogen Free	
ASDM20N60-KQ-R	ASDM20N60G-KQ-R	TO-252

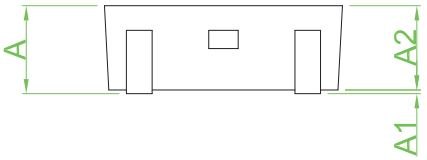








Recommended Land Pattern



Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	2.25	2.65	0.089	0.104
A1	0.00	0.15	0.000	0.006
A2	2.20	2.40	0.087	0.094
b	0.50	0.70	0.020	0.028
b1	0.70	0.90	0.028	0.035
c	0.46	0.66	0.018	0.026
c1	0.46	0.66	0.018	0.026
D	6.30	6.70	0.248	0.264
D1	5.20	5.40	0.205	0.213
E	5.30	5.70	0.209	0.224
E1	1.40	1.60	0.055	0.063
H	9.40	9.90	0.370	0.390
e	2.30 TYP		0.09 TYP	
L	1.40	1.77	0.055	0.070
L1	0.50	0.70	0.020	0.028
θ	0°	8°	0°	8°

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