



### Features

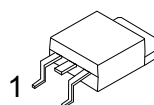
- High density cell design for ultra low  $R_{DS(on)}$
- Fully characterized Avalanche voltage and current
- Good stability and uniformity with high EAS
- Excellent package for good heat dissipation
- Special process technology for high ESD capability

### Product Summary

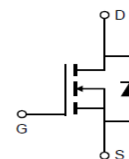
$V_{DS}$	30	V
$R_{DS(on),TYP} @ V_{GS}=10\text{ V}$	9	m $\Omega$
$R_{DS(on),TYP} @ V_{GS}=4.5\text{ V}$	11.3	m $\Omega$
$I_D$	50	A

### Application

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible Power Supply



TO-252



### Absolute Maximum Ratings ( $T_C=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous	$I_D$	50	A
Drain Current-Continuous( $T_C=100^\circ\text{C}$ )	$I_D(100^\circ\text{C})$	35	A
Pulsed Drain Current	$I_{DM}$	140	A
Maximum Power Dissipation	$P_D$	60	W
Derating factor		0.4	W/ $^\circ\text{C}$
Single pulse avalanche energy <sup>(Note 5)</sup>	$E_{AS}$	70	mJ
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 To 175	$^\circ\text{C}$

### Thermal Characteristic

Thermal Resistance, Junction-to-Case <sup>(Note 2)</sup>	$R_{\theta JC}$	2.5	$^\circ\text{C}/\text{W}$
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**Electrical Characteristics (T<sub>C</sub>=25°C unless otherwise noted)**

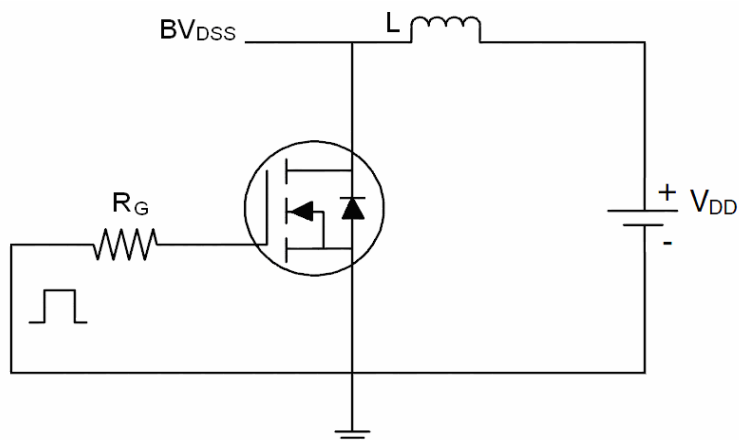
Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	30	33	-	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V	-	-	1	μA
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±100	nA
<b>On Characteristics</b> <sup>(Note 3)</sup>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1	1.4	2	V
Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =25A	-	9	11	mΩ
		V <sub>GS</sub> =5V, I <sub>D</sub> =20A	-	11.3	14	
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =5V, I <sub>D</sub> =20A	15	-	-	S
<b>Dynamic Characteristics</b> <sup>(Note 4)</sup>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, F=1.0MHz	-	2000	-	PF
Output Capacitance	C <sub>oss</sub>		-	280	-	PF
Reverse Transfer Capacitance	C <sub>rss</sub>		-	160	-	PF
<b>Switching Characteristics</b> <sup>(Note 4)</sup>						
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =15V, I <sub>D</sub> =20A V <sub>GS</sub> =10V, R <sub>GEN</sub> =1.8Ω	-	10	-	nS
Turn-on Rise Time	t <sub>r</sub>		-	8	-	nS
Turn-Off Delay Time	t <sub>d(off)</sub>		-	30	-	nS
Turn-Off Fall Time	t <sub>f</sub>		-	5	-	nS
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =10V, I <sub>D</sub> =25A, V <sub>GS</sub> =10V	-	23	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	7	-	nC
Gate-Drain Charge	Q <sub>gd</sub>		-	4.5	-	nC
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage <sup>(Note 3)</sup>	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =25A	-	0.85	1.2	V
Diode Forward Current <sup>(Note 2)</sup>	I <sub>S</sub>		-	-	50	A
Reverse Recovery Time	t <sub>rr</sub>	T <sub>J</sub> = 25°C, I <sub>F</sub> = 50A di/dt = 100A/μs <sup>(Note 3)</sup>	-	22	35	nS
Reverse Recovery Charge	Q <sub>rr</sub>		-	11	18	nC
Forward Turn-On Time	t <sub>on</sub>	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

**Notes:**

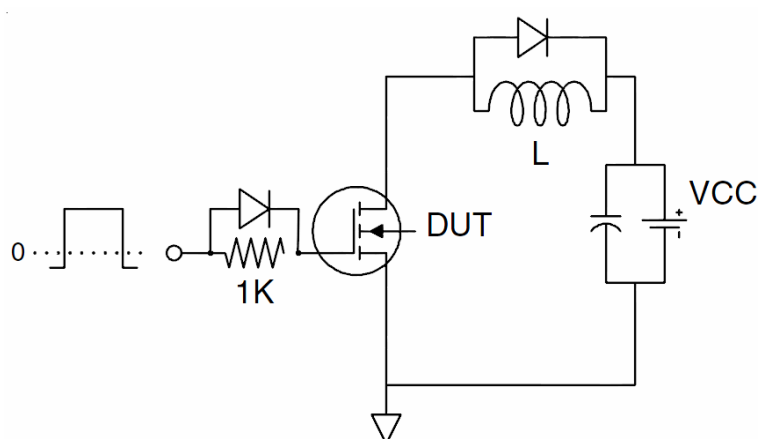
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production
5. EAS condition: T<sub>J</sub>=25°C, V<sub>DD</sub>=15V, V<sub>G</sub>=10V, L=1mH, R<sub>g</sub>=25Ω

## Test circuit

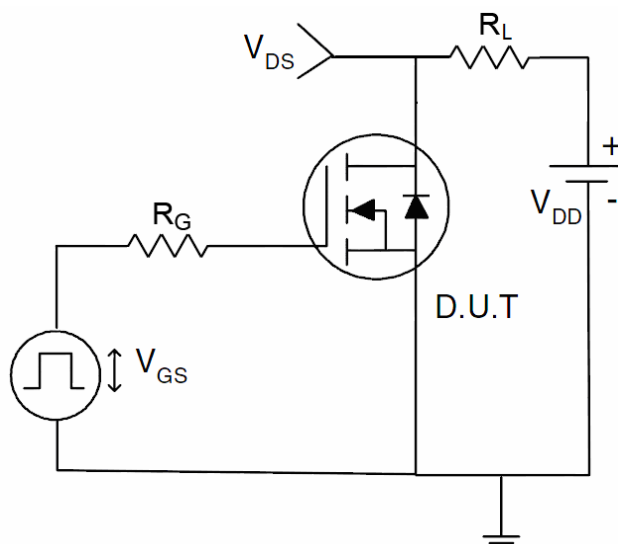
### 1) $E_{AS}$ test Circuits



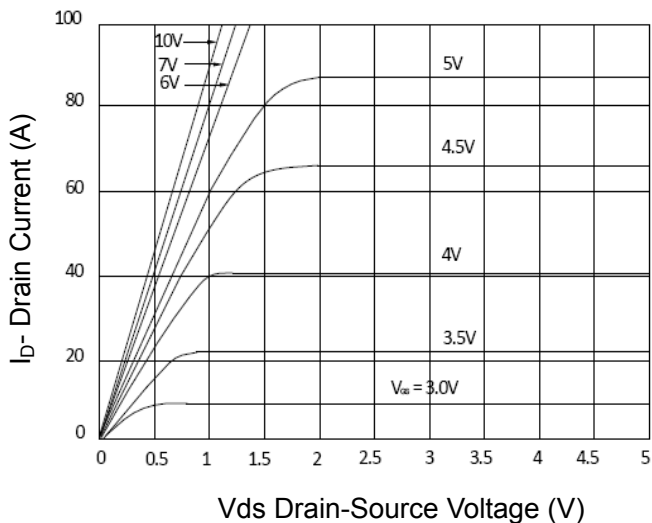
### 2) Gate charge test Circuit:



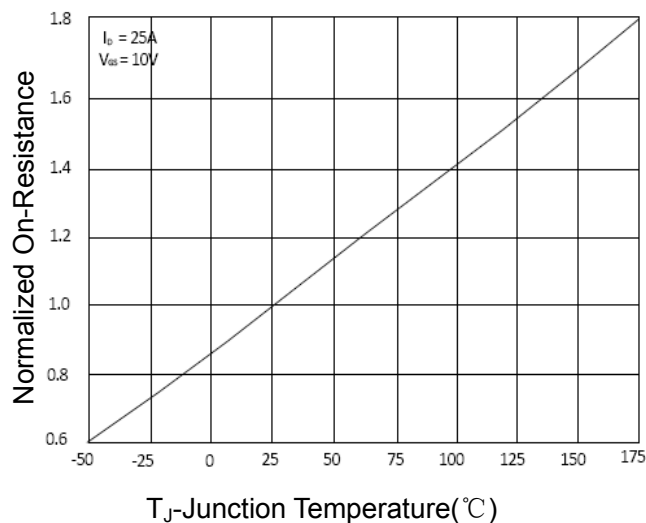
### 3) Switch Time Test Circuit:



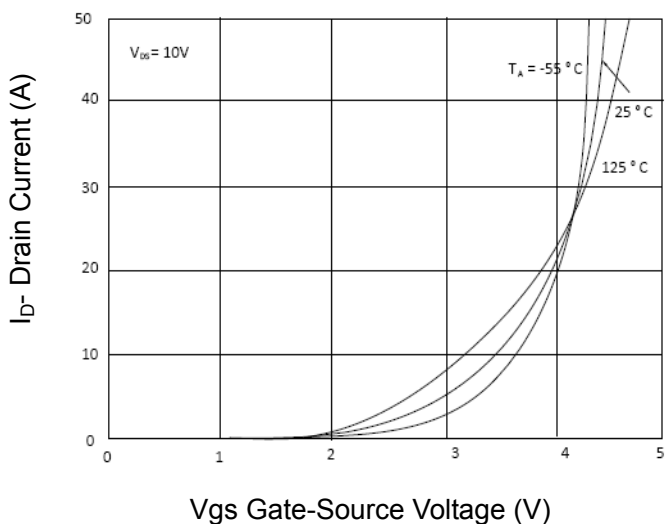
**Typical Electrical and Thermal Characteristics (Curves)**



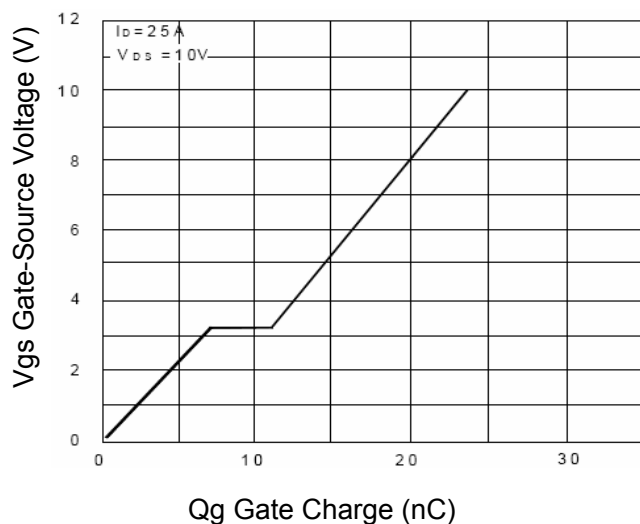
**Figure 1 Output Characteristics**



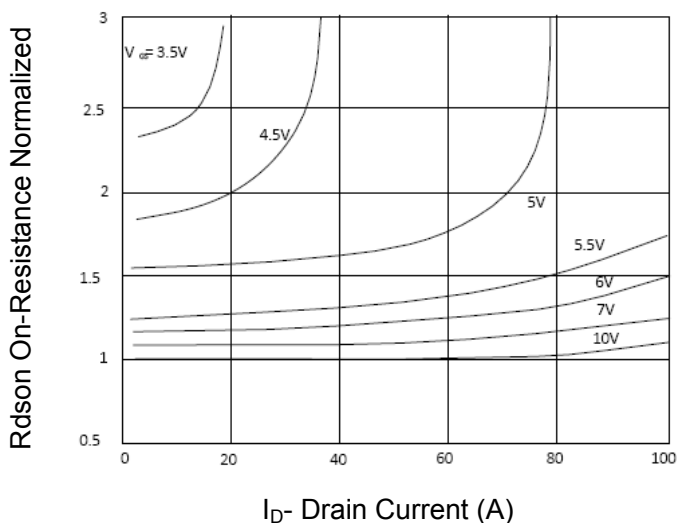
**Figure 4 Rdson-Junction Temperature**



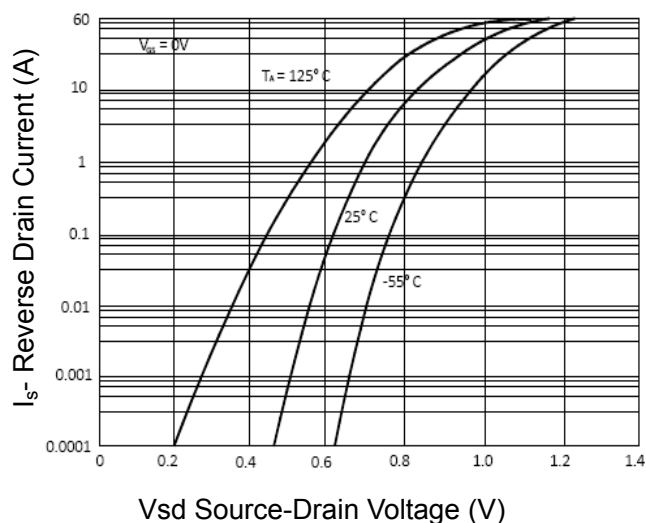
**Figure 2 Transfer Characteristics**



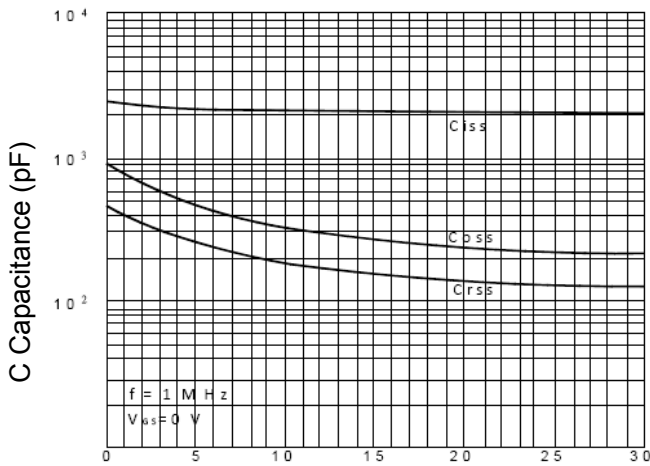
**Figure 5 Gate Charge**



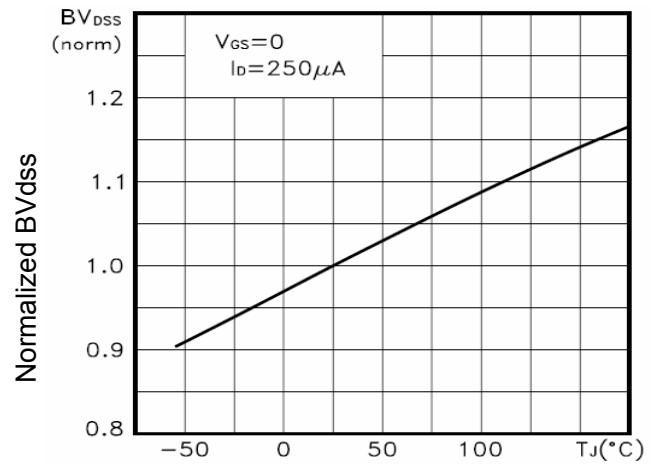
**Figure 3 Rdson- Drain Current**



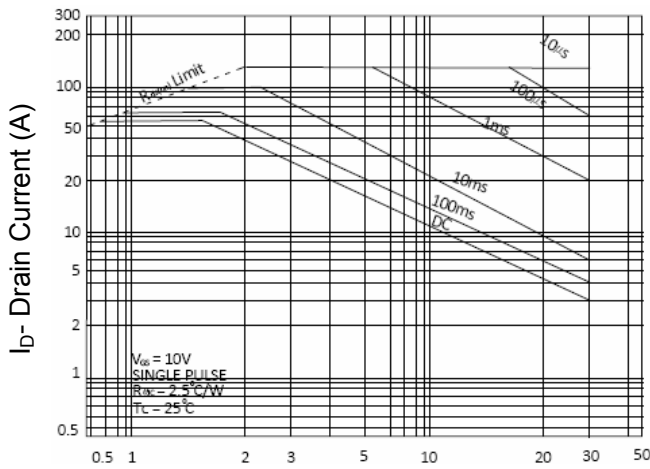
**Figure 6 Source- Drain Diode Forward**



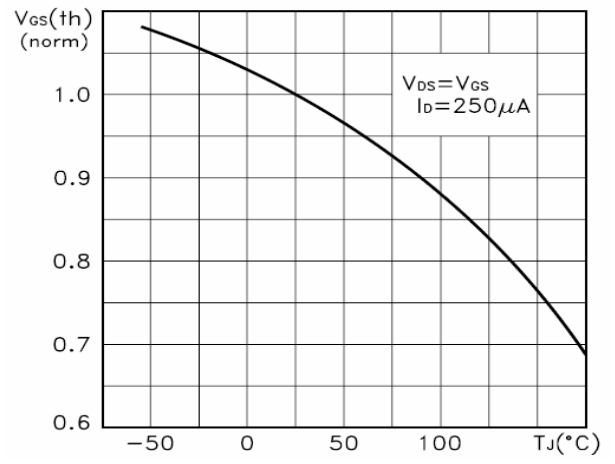
Vds Drain-Source Voltage (V)  
**Figure 7 Capacitance vs Vds**



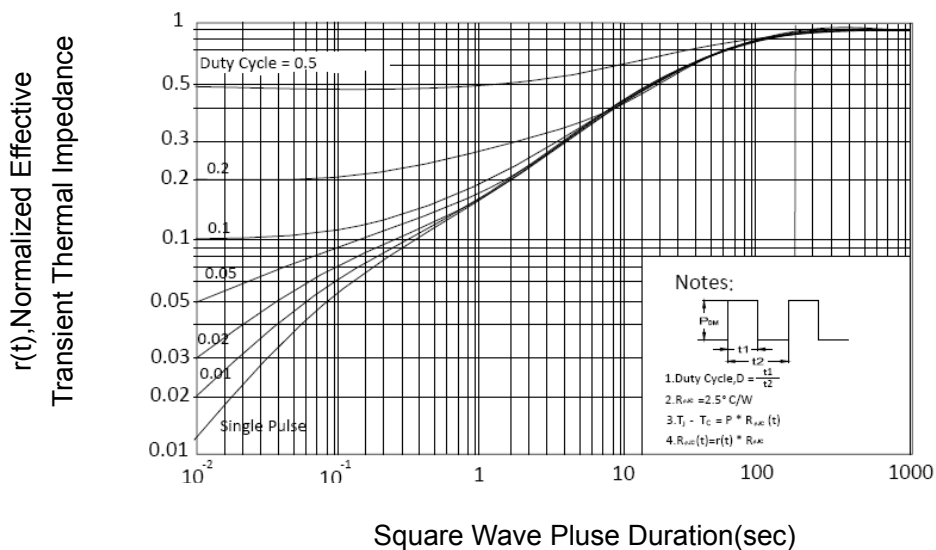
T<sub>J</sub>-Junction Temperature(°C)  
**Figure 9 BV<sub>DSS</sub> vs Junction Temperature**



Vds Drain-Source Voltage (V)  
**Figure 8 Safe Operation Area**



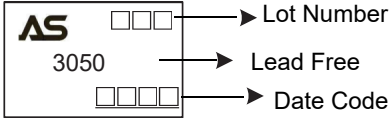
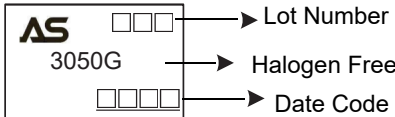
T<sub>J</sub>-Junction Temperature(°C)  
**Figure 10 V<sub>GS(th)</sub> vs Junction Temperature**



**Figure 11 Normalized Maximum Transient Thermal Impedance**

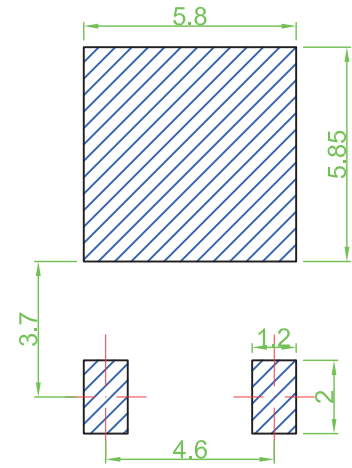
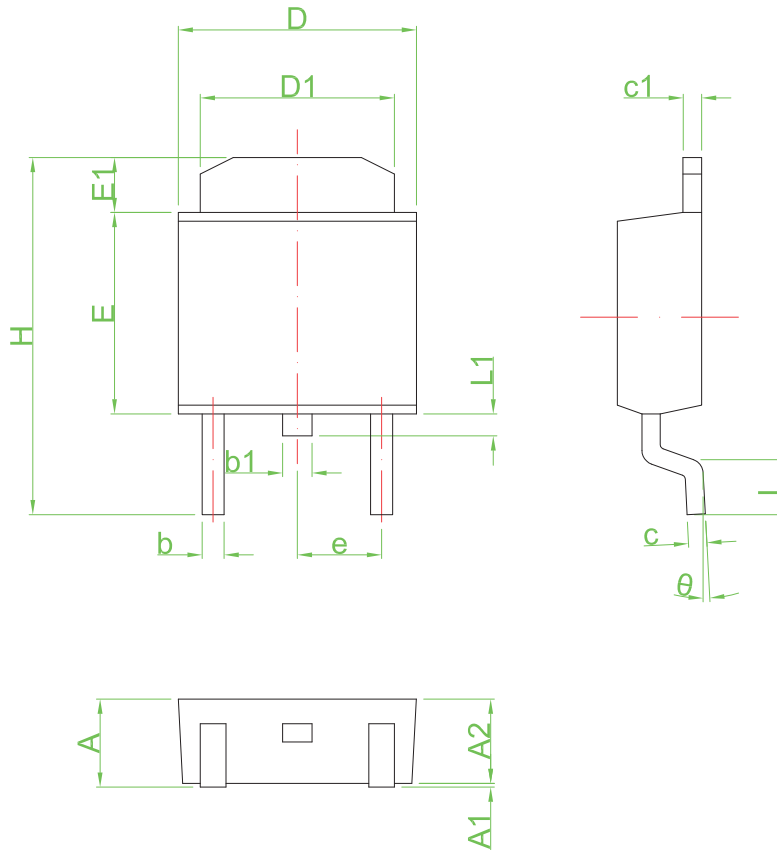
## Ordering and Marking Information

Device	Marking	Package	Packaging	Quantity
ASDM3050KQ	3050	TO-252	Tape Reel	2500

PACKAGE	MARKING
TO-252	 

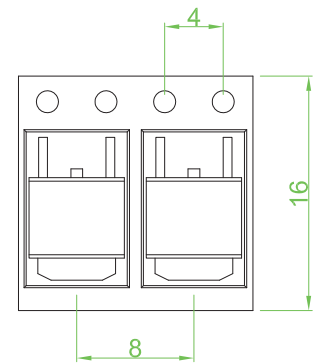
Ordering Information		Package
Lead Free	Halogen Free	
ASDM3050-KQ-R	ASDM3050G-KQ-R	TO-252

<p>ASDM3050G-KQ-R</p> <p>1 Packing Type</p> <p>2 Package Type</p> <p>3 Green Package</p>	<p>1 R:Tape Reel</p> <p>2 KQ:TO-252</p> <p>3 blank: Lead Free</p> <p>G:Halogen Free</p>
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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
theta	0°	8°	0°	8°



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