

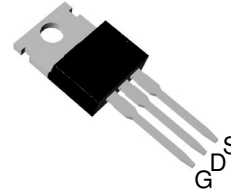
Features

- 150V/20A
 $R_{DS(ON)}=44m\Omega(\text{typ.})@V_{GS}=10V$
- 100% UIS + R_g Tested
- Reliable and Rugged
- Lead Free and Green Devices Available
(RoHS Compliant)

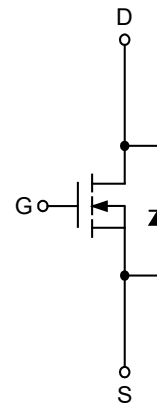
Applications

- Synchronous Rectification.
- Uninterruptible Power Supply.
- DC-DC Converter.

Pin Description



Top View of TO-220



N-Channel MOSFET

Absolute Maximum Ratings ($T_A=25^{\circ}\text{C}$ Unless Otherwise Noted)

Symbol	Parameter		Rating	Unit
Common Ratings				
V _{DSS}	Drain-Source Voltage		150	V
V _{GSS}	Gate-Source Voltage		±20	
T _J	Maximum Junction Temperature		150	°C
T _{STG}	Storage Temperature Range		-55 to 150	
I _S	Diode Continuous Forward Current	T _C =25°C	20	A
I _D	Continuous Drain Current	T _C =25°C	20	A
		T _C =100°C	16	
I _{DM} ^a	Pulsed Drain Current	T _C =25°C	60	
P _D	Maximum Power Dissipation	T _C =25°C	45	W
		T _C =100°C	18	
R _{θJC}	Thermal Resistance-Junction to Case		2.8	°C/W
R _{θJA} ^c	Thermal Resistance-Junction to Ambient		62.5	°C/W
I _{AS} ^b	Avalanche Current, Single pulse	L=0.5mH	19	A
E _{AS} ^b	Avalanche Energy, Single pulse	L=0.5mH	90	mJ

Note a : Pulse width limited by maximum junction temperature.

Note b : UIS tested and pulse width limited by maximum junction temperature (initial temperature $T_J=25^{\circ}\text{C}$).

Note c : Surface Mounted on 1in^2 pad area.

Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted)

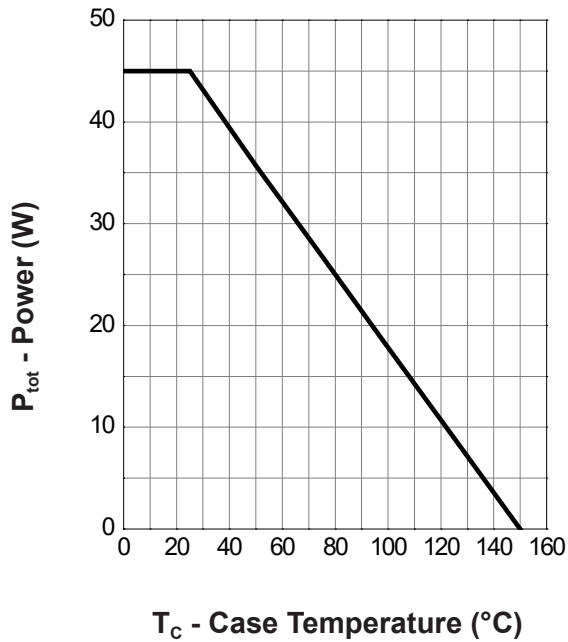
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA	150	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =120V, V _{GS} =0V T _J =85°C	-	-	1 30	μA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	3	4	5	V
I _{GSS}	Gate Leakage Current	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
R _{DS(ON)} ^d	Drain-Source On-state Resistance	V _{GS} =10V, I _{DS} =13A	-	44	50	mΩ
Diode Characteristics						
V _{SD} ^d	Diode Forward Voltage	I _{SD} =6A, V _{GS} =0V	-	0.8	1.1	V
t _{rr}	Reverse Recovery Time	I _{SD} =13A, dI _{SD} /dt=100A/μs	-	61	-	ns
Q _{rr}	Reverse Recovery Charge		-	174	-	nC
Dynamic Characteristics ^e						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz	-	1	-	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =75V, Frequency=1.0MHz	-	1365	1775	pF
C _{oss}	Output Capacitance		-	114	-	
C _{rss}	Reverse Transfer Capacitance		-	14	-	
t _{d(ON)}	Turn-on Delay Time	V _{DD} =30V, R _L =30Ω, I _{DS} =1A, V _{GEN} =10V, R _G =6Ω	-	11	19	ns
t _r	Turn-on Rise Time		-	6	10	
t _{d(OFF)}	Turn-off Delay Time		-	25	45	
t _f	Turn-off Fall Time		-	38	69	
Gate Charge Characteristics ^e						
Q _g	Total Gate Charge	V _{DS} =75V, V _{GS} =10V, I _{DS} =13A	-	22	31	nC
Q _{gs}	Gate-Source Charge		-	5.8	-	
Q _{gd}	Gate-Drain Charge		-	4.9	-	

Note d : Pulse test ; pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

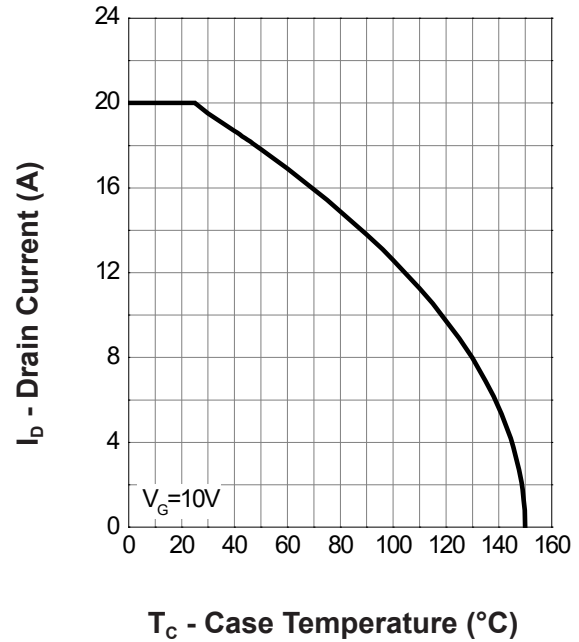
Note e : Guaranteed by design, not subject to production testing.

Typical Operating Characteristics

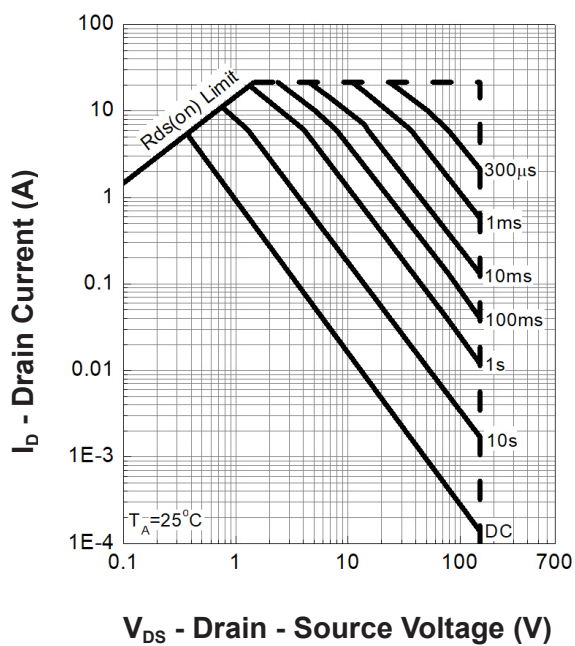
Power Dissipation



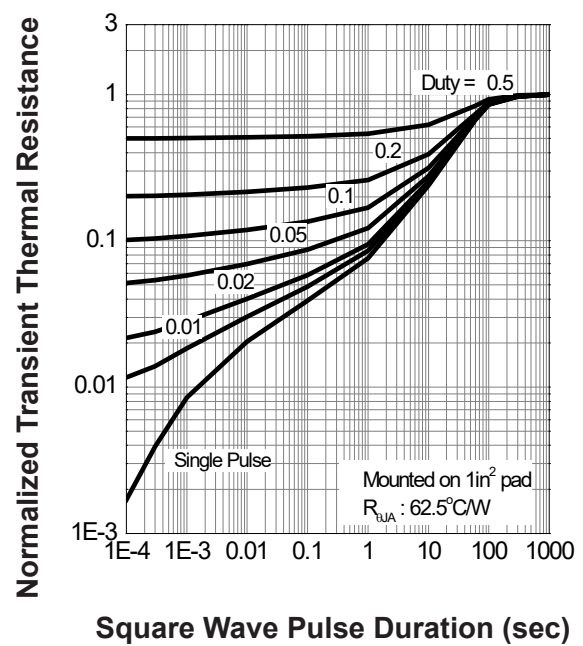
Drain Current



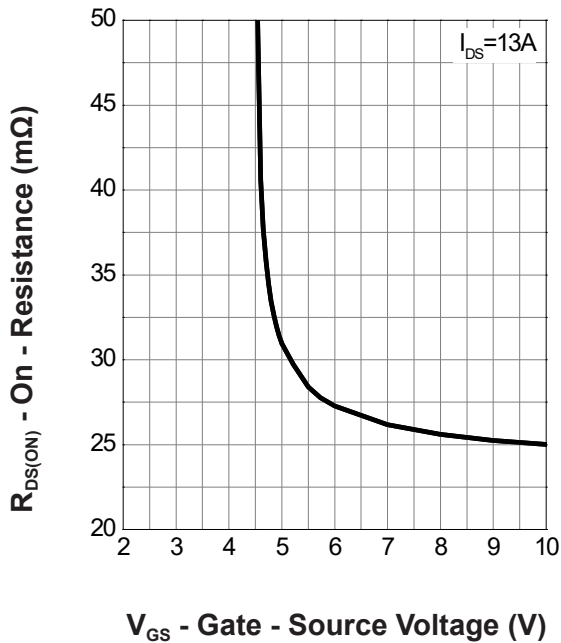
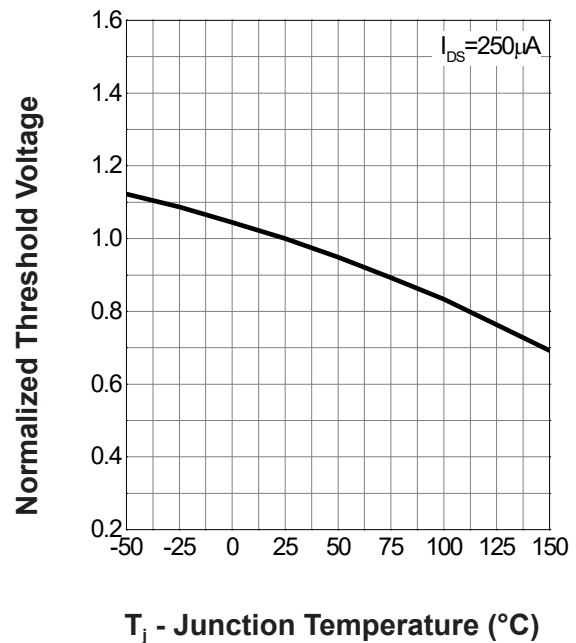
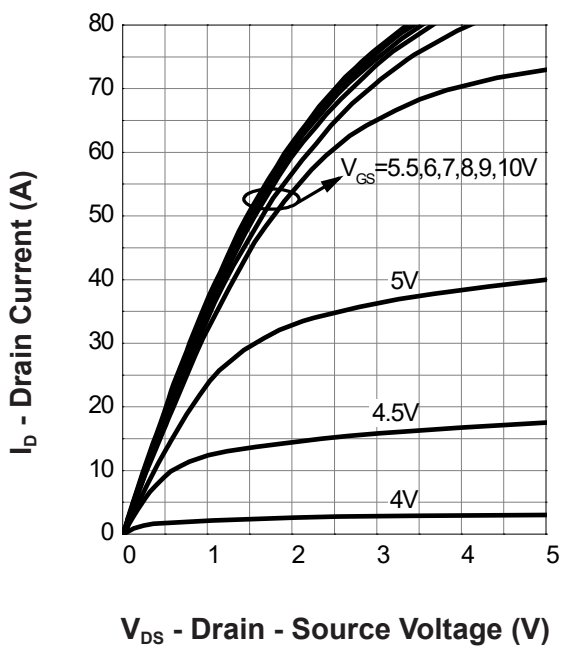
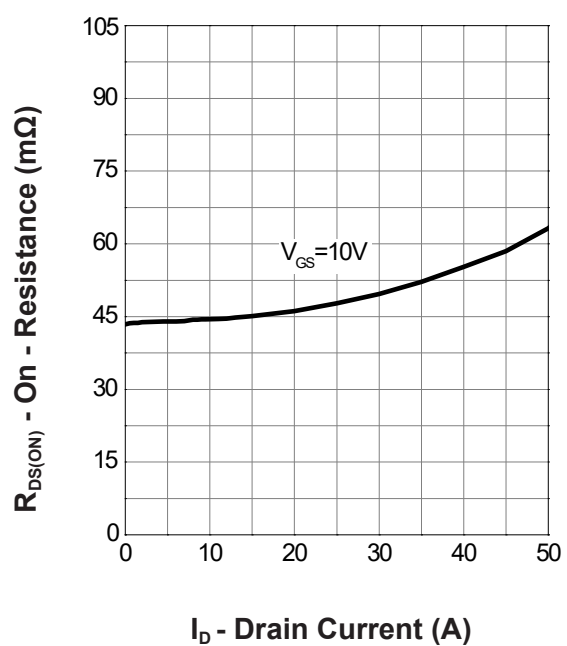
Safe Operation Area



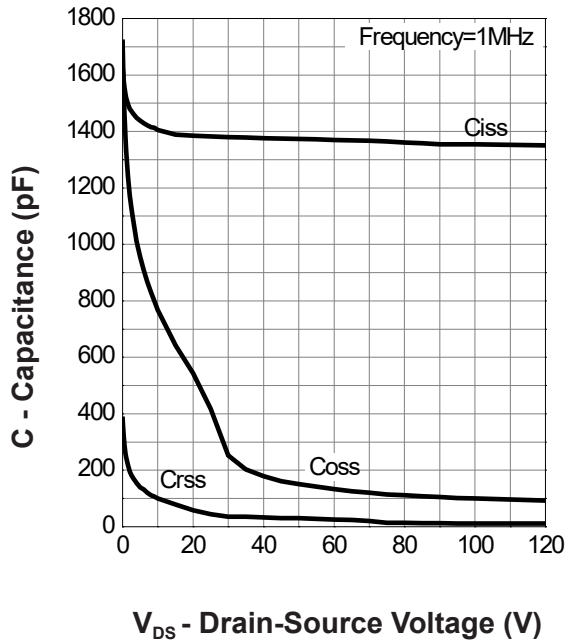
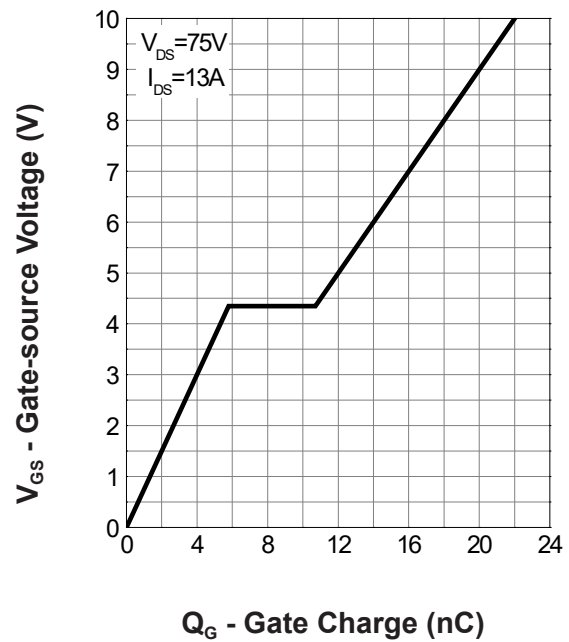
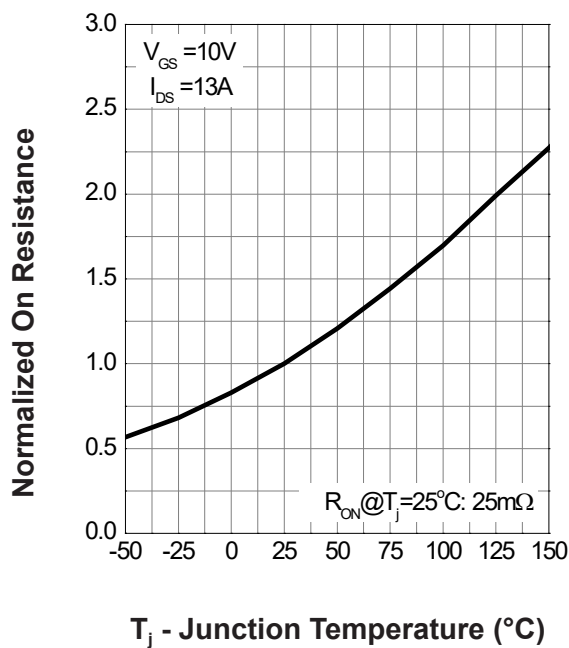
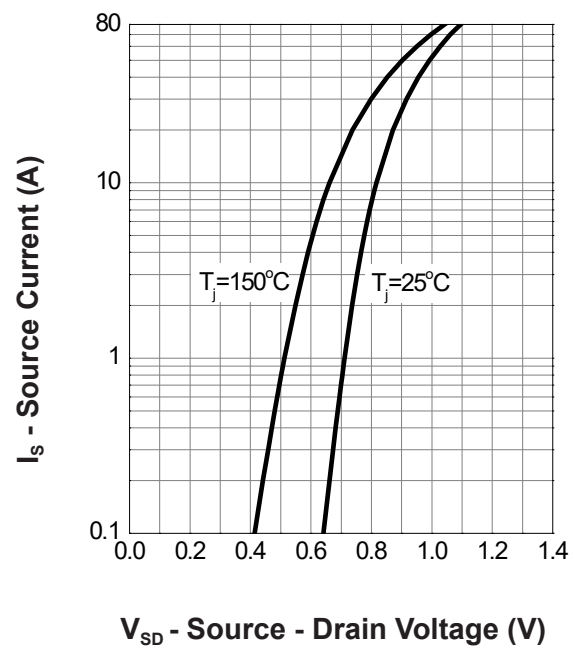
Thermal Transient Impedance



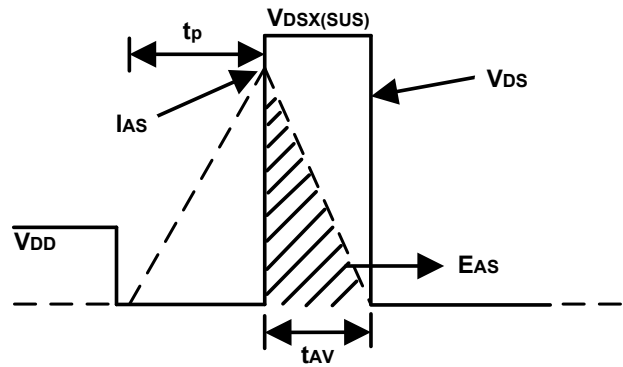
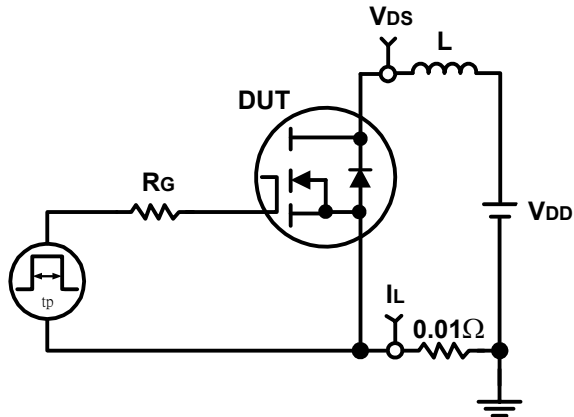
Typical Operating Characteristics(Cont.)

Gate-Source On Resistance

Gate Threshold Voltage

Output Characteristics

Drain-Source On Resistance


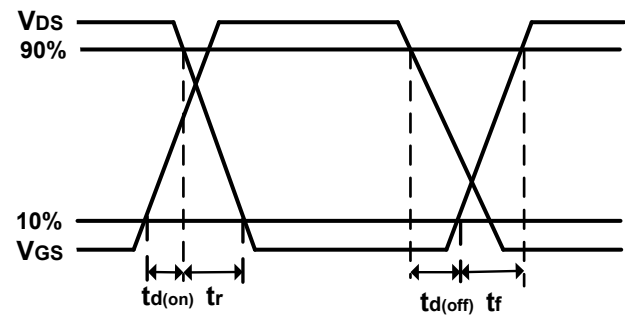
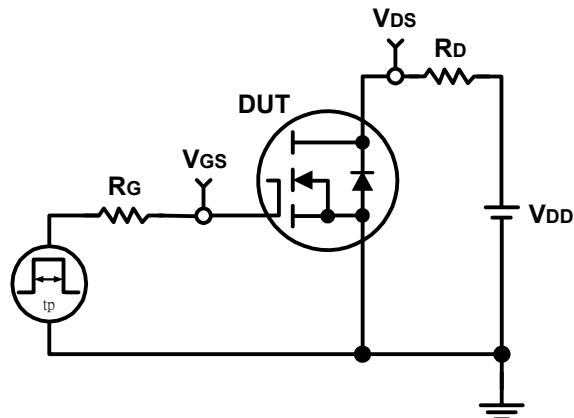
Typical Operating Characteristics(Cont.)

Capacitance

Gate Charge

Drain-Source On Resistance

Source-Drain Diode Forward


Avalanche Test Circuit and Waveforms

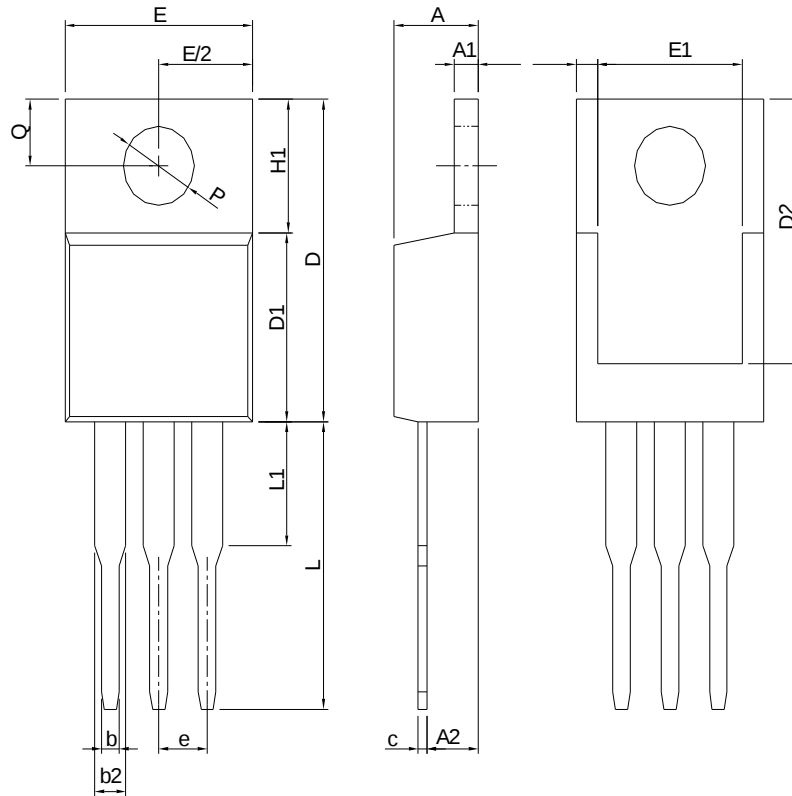


Switching Time Test Circuit and Waveforms



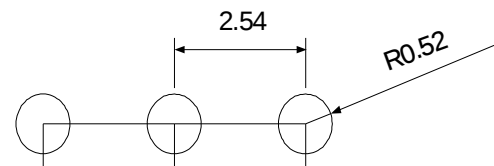
Package Information

TO-220



SYMBOL	TO-220			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	3.56	4.83	0.140	0.190
A1	0.51	1.40	0.020	0.055
A2	2.03	2.92	0.080	0.115
b	0.38	1.02	0.015	0.040
b2	1.14	1.78	0.045	0.070
c	0.36	0.61	0.014	0.024
D	14.22	16.51	0.560	0.650
D1	8.38	9.30	0.330	0.366
D2	12.19	13.65	0.480	0.537
E	9.65	10.67	0.380	0.420
E1	6.86	8.89	0.270	0.350
e	2.54 BSC		0.100 BSC	
H1	5.84	6.86	0.230	0.270
L	12.70	14.73	0.500	0.580
L1	-	6.35	-	0.250
P	3.53	4.09	0.139	0.161
Q	2.54	3.43	0.100	0.135

RECOMMENDED LAND PATTERN



UNIT: mm

Note: Follow JEDEC TO-220 AB.