

N-Channel 250 V (D-S) MOSFET

PRODUCT SUMMARY

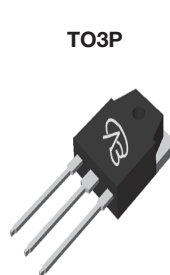
V_{DS} (V)	$R_{DS(on)}$ (Ω) MAX.	I_D (A)	Q_g (TYP.)
250	0.016at $V_{GS} = 10$ V	100	70nC

FEATURES

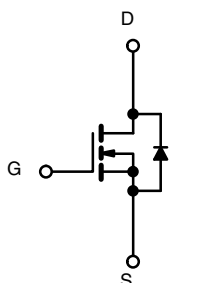
- SGT technology Power MOSFET
- 100 % R_g and UIS tested
- Maximum 150 °C junction temperature



RoHS
COMPLIANT
HALOGEN
FREE



Top View



N-Channel MOSFET

APPLICATIONS

- Power supplies:
 - Uninterruptible power supplies
 - AC/DC switch-mode power supplies
 - Lighting
- Synchronous rectification
- DC/DC converter
- Motor drive switch
- DC/AC inverter
- Solar micro inverter
- Class D audio amplifier

ABSOLUTE MAXIMUM RATINGS ($T_C = 25$ °C, unless otherwise noted)

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	V_{DS}	250	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current ($T_J = 150$ °C)	I_D	$T_C = 25$ °C 100	A
		$T_C = 70$ °C 80	
Pulsed Drain Current ($t = 100$ μ s)	I_{DM}	300	
Avalanche Current	I_{AS}	600	
Single Avalanche Energy ^a	E_{AS}	110	mJ
Maximum Power Dissipation ^a	P_D	$T_C = 25$ °C 300 ^b	W
		$T_C = 100$ °C 150 ^b	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to +150	°C

THERMAL RESISTANCE RATINGS

PARAMETER	SYMBOL	LIMIT	UNIT
Junction-to-Ambient (PCB Mount) ^c	R_{thJA}	40	°C/W
Junction-to-Case (Drain)	R_{thJC}	0.5	

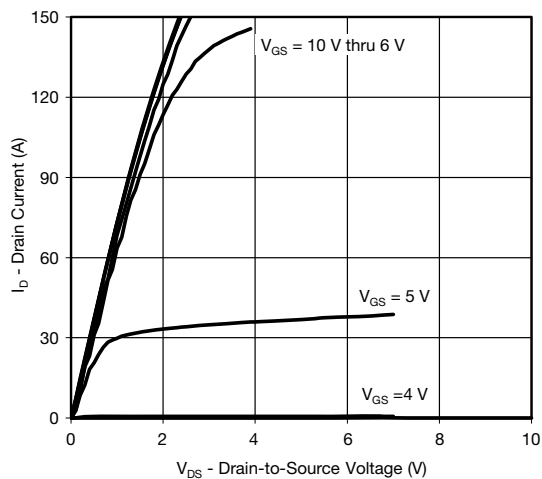
Notes

- Duty cycle ≤ 1 %.
- See SOA curve for voltage derating.
- When mounted on 1" square PCB (FR4 material).

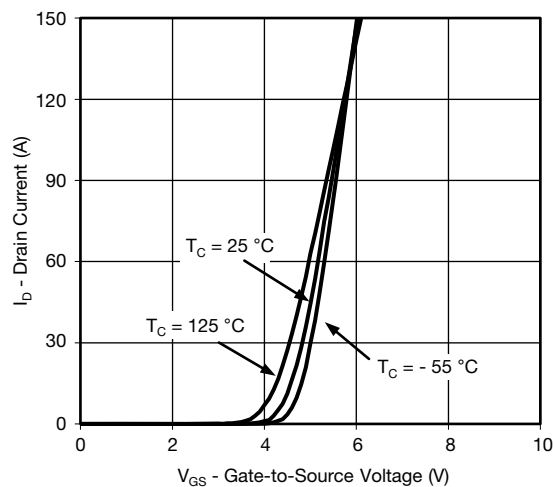
SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static						
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = 250 μA	250	-	-	V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	2.5	-	4.5	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V	-	-	± 250	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 200 V, V _{GS} = 0 V	-	-	1	μA
		V _{DS} = 200 V, V _{GS} = 0 V, T _J = 125 °C	-	-	150	
		V _{DS} = 200 V, V _{GS} = 0 V, T _J = 150 °C	-	-	5	mA
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≥ 10 V, V _{GS} = 10 V	90	-	-	A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 10 V, I _D = 30 A	-	0.016	-	Ω
		V _{GS} = 7.5 V, I _D =30 A	-	0.020	-	
Forward Transconductance ^a	g _{fs}	V _{DS} = 15 V, I _D = 30 A	-	75	-	S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 60 V, f = 1 MHz	-	2600	-	pF
Output Capacitance	C _{oss}		-	246	-	
Reverse Transfer Capacitance	C _{rss}		-	21	-	
Total Gate Charge ^c	Q _g	V _{DS} = 60 V, V _{GS} = 10 V, I _D = 60 A	-	75	96	nC
Gate-Source Charge ^c	Q _{gs}		-	16.7	-	
Gate-Drain Charge ^c	Q _{gd}		-	16.9	-	
Gate Resistance	R _g	f = 1 MHz	1.5	3	6	Ω
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = 60 V, R _L = 1.66 Ω I _D ≅ 60 A, V _{GEN} = 10 V, R _g = 1 Ω	-	21	33	ns
Rise Time ^c	t _r		-	30	55	
Turn-Off Delay Time ^c	t _{d(off)}		-	33	72	
Fall Time ^c	t _f		-	28	45	
Drain-Source Body Diode Ratings and Characteristics ^b (T _C = 25 °C)						
Pulsed Current (t = 100 μs)	I _{SM}		-	-	300	A
Forward Voltage ^a	V _{SD}	I _F = 10 A, V _{GS} = 0 V	-	0.8	1.2	V
Reverse Recovery Time	t _{rr}	I _F = 30 A, di/dt = 100 A/μs	-	35	-	ns
Peak Reverse Recovery Charge	I _{RM(REC)}		-	11	20	A
Reverse Recovery Charge	Q _{rr}		-	0.9	1.8	μC

Notes

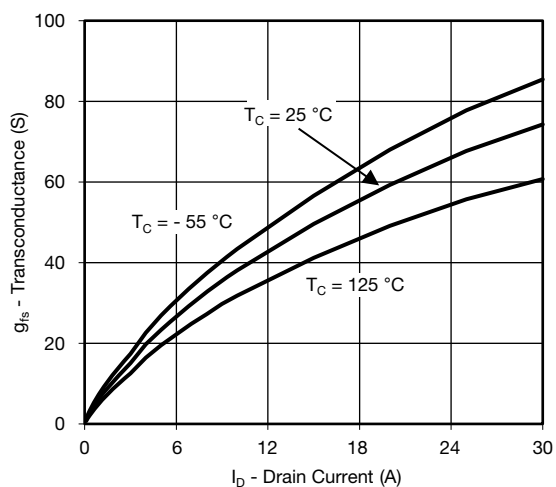
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)


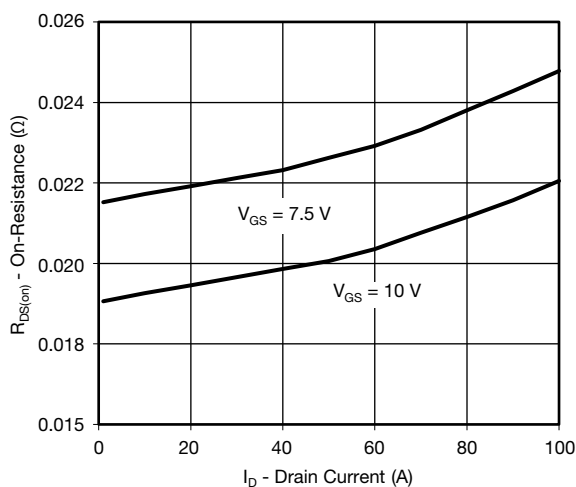
Output Characteristics



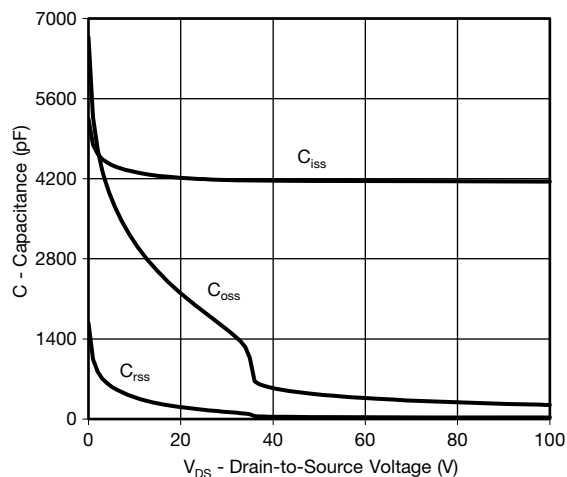
Transfer Characteristics



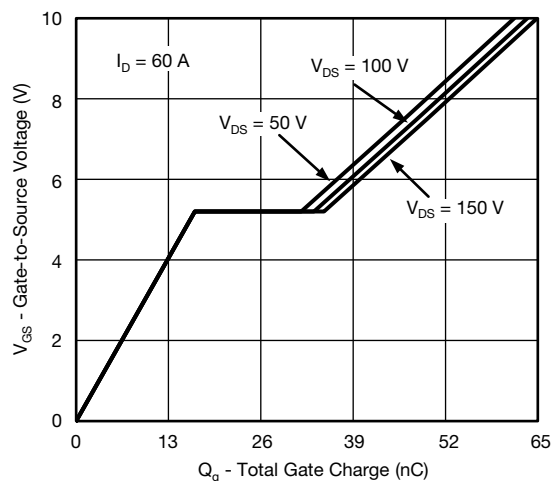
Transconductance



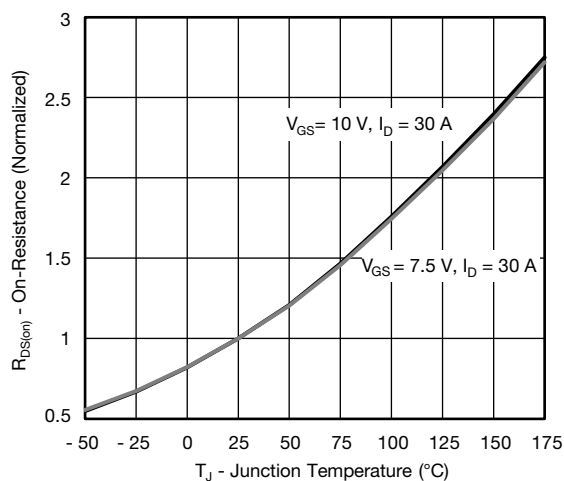
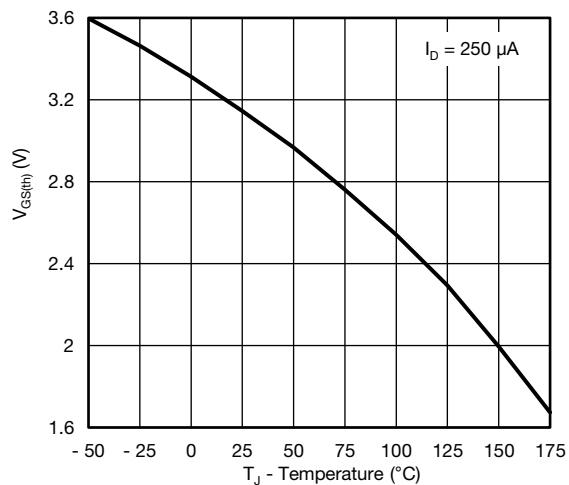
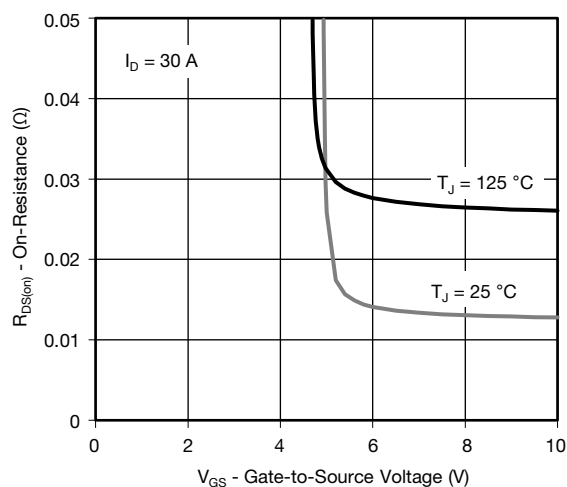
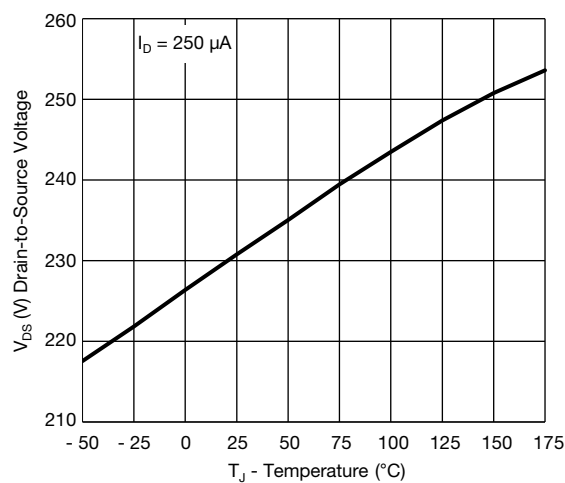
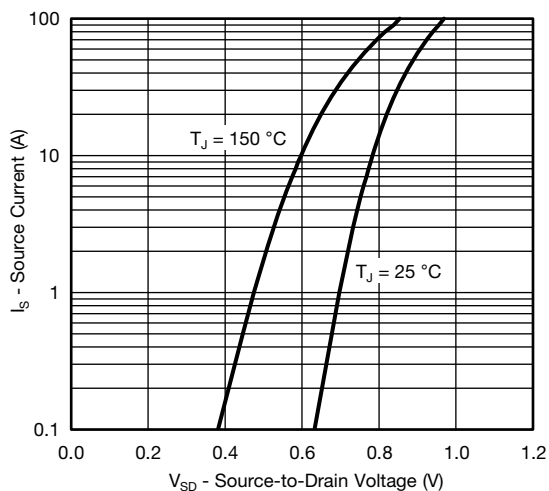
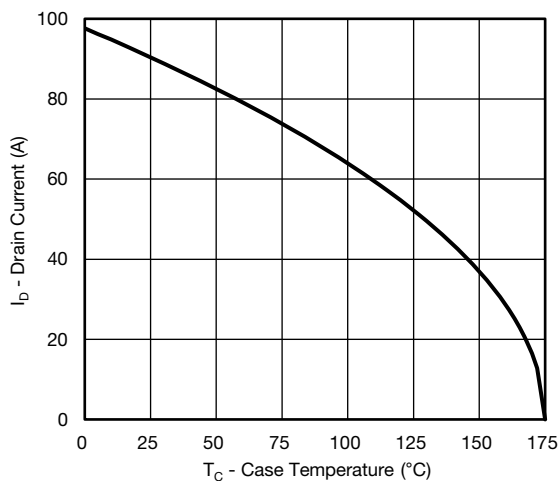
On-Resistance vs. Drain Current



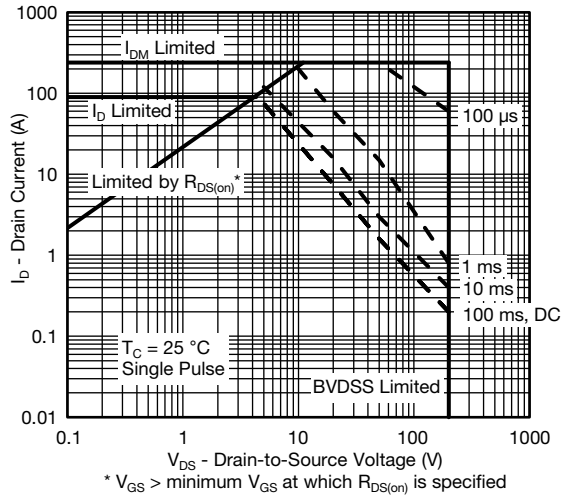
Capacitance



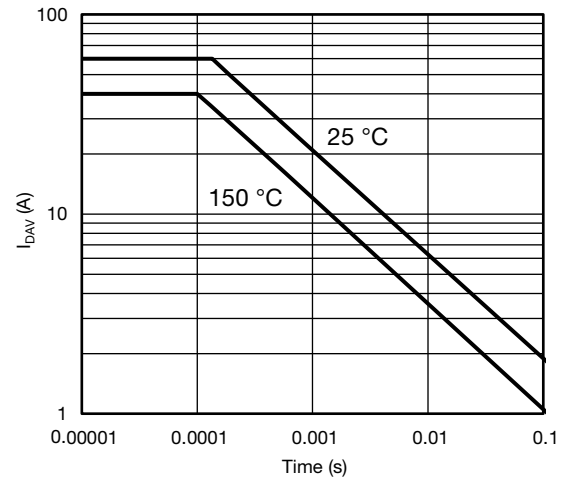
Gate Charge

TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)

On-Resistance vs. Junction Temperature

Threshold Voltage

On-Resistance vs. Gate-to-Source Voltage

Drain Source Breakdown vs. Junction Temperature

Source Drain Diode Forward Voltage

Current De-rating

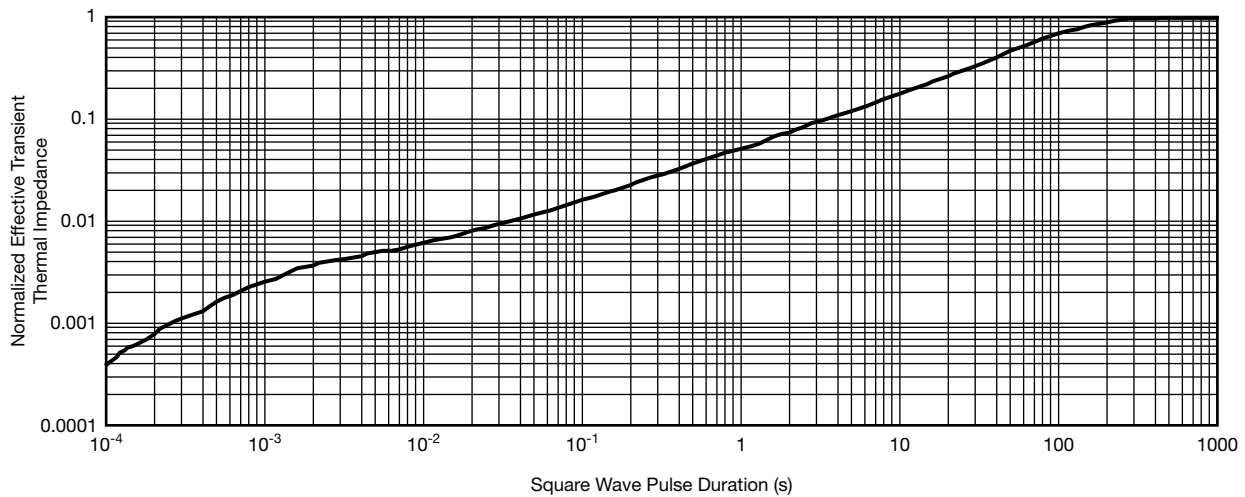
THERMAL RATINGS ($T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)



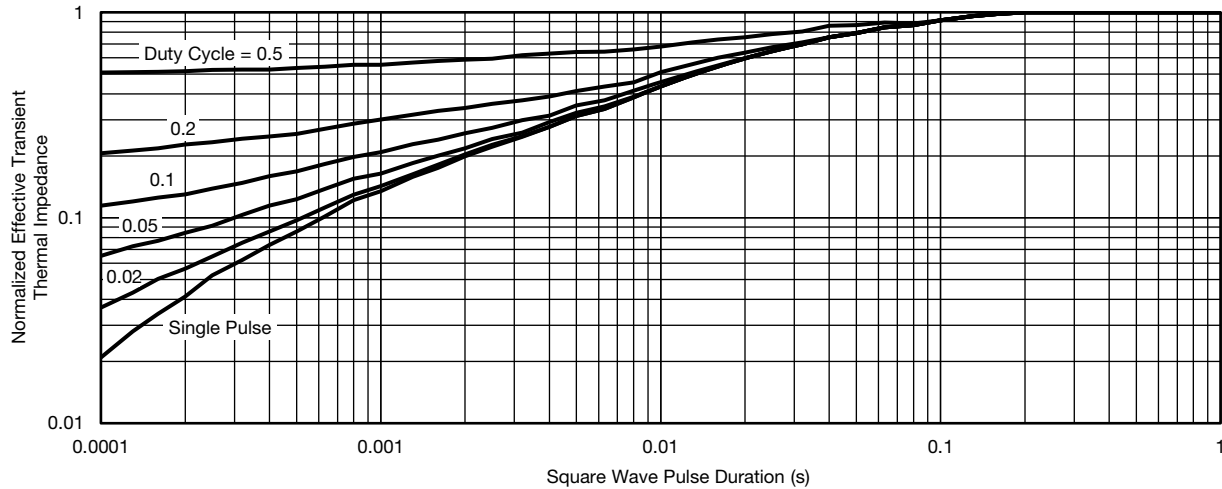
Safe Operating Area



Single Pulse Avalanche Current Capability vs. Time



Normalized Thermal Transient Impedance, Junction-to-Ambient

THERMAL RATINGS ($T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)


Normalized Thermal Transient Impedance, Junction-to-Case

Note

- The characteristics shown in the two graphs
 - Normalized Transient Thermal Impedance Junction to Ambient ($25\text{ }^{\circ}\text{C}$)
 - Normalized Transient Thermal Impedance Junction to Case ($25\text{ }^{\circ}\text{C}$)
- are given for general guidelines only to enable the user to get a "ball park" indication of part capabilities. The data are extracted from single pulse transient thermal impedance characteristics which are developed from empirical measurements. The latter is valid for the part mounted on printed circuit board - FR4, size 1" x 1" x 0.062", double sided with 2 oz. copper, 100 % on both sides. The part capabilities can widely vary depending on actual application parameters and operating conditions.

Technical drawing of a mechanical part, showing three views: front, side, and top.

Front View Dimensions:

- Overall Width: 15.60 ± 0.20
- Overall Height: 23.40 ± 0.20
- Top Flange Width: 13.60 ± 0.20
- Top Flange Height: 3.80 ± 0.20
- Central Circular Feature Diameter: $\varnothing 3.20 \pm 0.10$
- Base Width: 12.76 ± 0.20
- Base Height: 19.90 ± 0.20
- Pin Diameter: 5.45 TYP [5.45 ± 0.30]
- Pin Spacing: 3.50 ± 0.20
- Pin Length: 16.50 ± 0.30
- Pin Diameter: 2.00 ± 0.20
- Pin Diameter: 3.00 ± 0.20
- Pin Diameter: 1.00 ± 0.20

Side View Dimensions:

- Overall Height: 18.70 ± 0.20
- Base Width: 4.80 ± 0.20
- Base Height: $1.50^{+0.15}_{-0.05}$
- Pin Diameter: 1.40 ± 0.20
- Pin Diameter: $0.60^{+0.15}_{-0.05}$

Top View Dimensions:

- Overall Width: 15.60 ± 0.20
- Overall Height: 13.90 ± 0.20
- Top Flange Width: 13.60 ± 0.20
- Top Flange Height: 3.80 ± 0.20
- Central Circular Feature Diameter: $\varnothing 3.20 \pm 0.10$
- Base Width: 12.76 ± 0.20
- Base Height: 19.90 ± 0.20
- Pin Diameter: 5.45 TYP [5.45 ± 0.30]
- Pin Spacing: 3.50 ± 0.20
- Pin Length: 16.50 ± 0.30
- Pin Diameter: 2.00 ± 0.20
- Pin Diameter: 3.00 ± 0.20
- Pin Diameter: 1.00 ± 0.20

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