

N-Channel 30 V (D-S) MOSFET

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A) ^{a, b}	Q_g (Typ.)
30	0.026 at $V_{GS} = 10$ V	8	4.2
	0.032 at $V_{GS} = 4.5$ V	8	

FEATURES

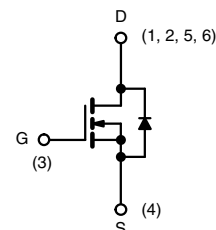
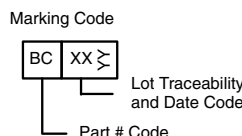
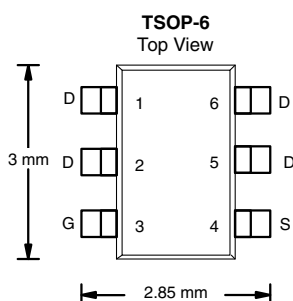
- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET® Power MOSFET
- 100 % R_g Tested
- Compliant to RoHS Directive 2002/95/EC



RoHS
COMPLIANT
HALOGEN
FREE

APPLICATIONS

- Load Switch for Portable Devices
- DC/DC Converters



Ordering Information: Si3424CDV-T1-GE3 (Lead (Pb)-free and Halogen-free)

N-Channel MOSFET

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_J = 150$ °C)	I_D	$T_C = 25$ °C	8 ^a
		$T_C = 70$ °C	7.7
		$T_A = 25$ °C	7.2 ^{c, d}
		$T_A = 70$ °C	5.7 ^{c, d}
Pulsed Drain Current ($t = 300$ μ s)	I_{DM}	20	A
Continuous Source-Drain Diode Current	I_S	$T_C = 25$ °C	3
		$T_A = 25$ °C	1.7 ^{c, d}
Maximum Power Dissipation	P_D	$T_C = 25$ °C	3.6
		$T_C = 70$ °C	2.3
		$T_A = 25$ °C	2.0 ^{c, d}
		$T_A = 70$ °C	1.3 ^{c, d}
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to 150	°C

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^e	R_{thJA}	50	62.5	°C/W
Maximum Junction-to-Foot (Drain)	R_{thJF}	28	35	

Notes:

- Package limited.
- Based on $T_C = 25$ °C.
- Surface mounted on 1" x 1" FR4 board.
- $t = 5$ s.
- Maximum under steady state conditions is 110 °C/W.

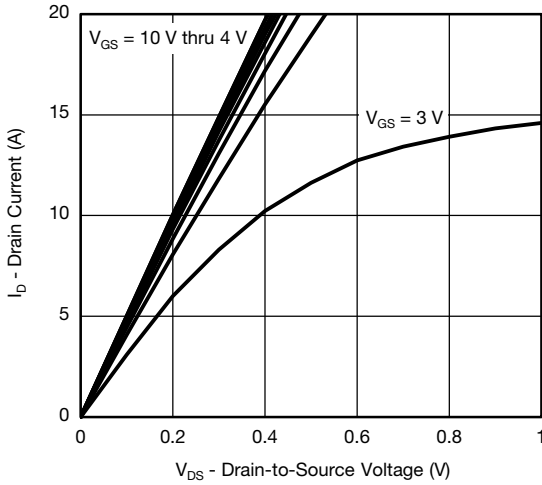
SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = 250 μA	30			V
V _{DS} Temperature Coefficient	ΔV _{DS} /T _J	I _D = 250 μA		28		mV/°C
V _{GS(th)} Temperature Coefficient	ΔV _{GS(th)} /T _J			- 3.7		
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	1		2.5	V
Gate-Source Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 30 V, V _{GS} = 0 V			1	μA
		V _{DS} = 30 V, V _{GS} = 0 V, T _J = 85 °C			10	
On-State Drain Current ^a	I _{D(on)}	V _{DS} = ≥ 5 V, V _{GS} = 10 V	20			A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 10 V, I _D = 7.2 A		0.021	0.026	Ω
		V _{GS} = 4.5 V, I _D = 6.5 A		0.026	0.032	
Forward Transconductance	g _{fs}	V _{DS} = 15 V, I _D = 7.2 A		17		S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{DS} = 15 V, V _{GS} = 0 V, f = 1 MHz		405		pF
Output Capacitance	C _{oss}			92		
Reverse Transfer Capacitance	C _{rss}			42		
Total Gate Charge	Q _g	V _{DS} = 15 V, V _{GS} = 10 V, I _D = 7.2 A		8.3	12.5	nC
		V _{DS} = 24 V, V _{GS} = 4.5 V, I _D = 7.2 A		4.2	6.3	
Gate-Source Charge	Q _{gs}			1.2		
Gate-Drain Charge	Q _{gd}			1.6		
Gate Resistance	R _g	f = 1 MHz	0.6	3	6	Ω
Turn-On Delay Time	t _{d(on)}	V _{DD} = 15 V, R _L = 2.6 Ω I _D ≅ 5.7 A, V _{GEN} = 10 V, R _g = 1 Ω		3	6	ns
Rise Time	t _r			12	20	
Turn-Off DelayTime	t _{d(off)}			16	24	
Fall Time	t _f			8	16	
Turn-On Delay Time	t _{d(on)}	V _{DD} = 15 V, R _L = 2.6 Ω I _D ≅ 5.7 A, V _{GEN} = 4.5 V, R _g = 1 Ω		10	20	
Rise Time	t _r			22	33	
Turn-Off DelayTime	t _{d(off)}			15	23	
Fall Time	t _f			9	18	
Drain-Source Body Diode Characteristics						
Continous Source-Drain Diode Current	I _S	T _C = 25 °C			3	A
Pulse Diode Forward Current ^a	I _{SM}				20	
Body Diode Voltage	V _{SD}	I _S = 5.7 A		0.8	1.2	V
Body Diode Reverse Recovery Time	t _{rr}	I _F = 5.7 A, dI/dt = 100 A/μs		13	20	nC
Body Diode Reverse Recovery Charge	Q _{rr}			5	10	ns
Reverse Recovery Fall Time	t _a			8		
Reverse Recovery Rise Time	t _b			5		

Notes:

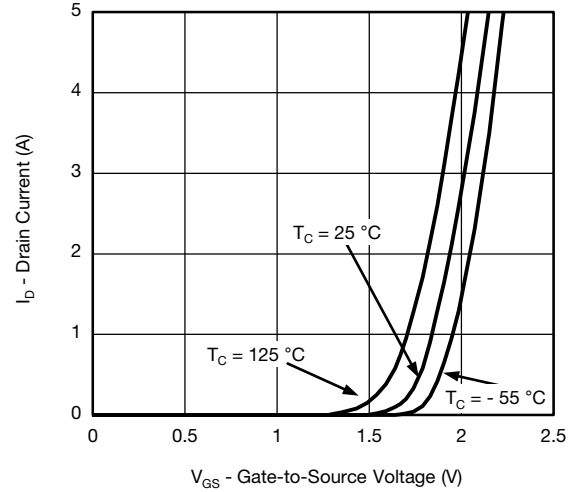
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
b. Guaranteed by design, not subject to production testing.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

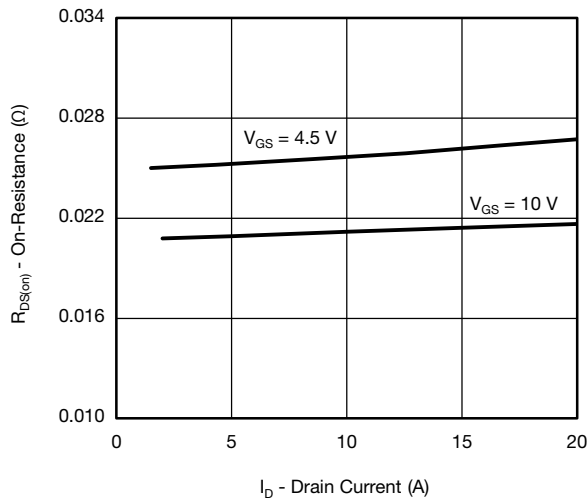
TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, unless otherwise noted)



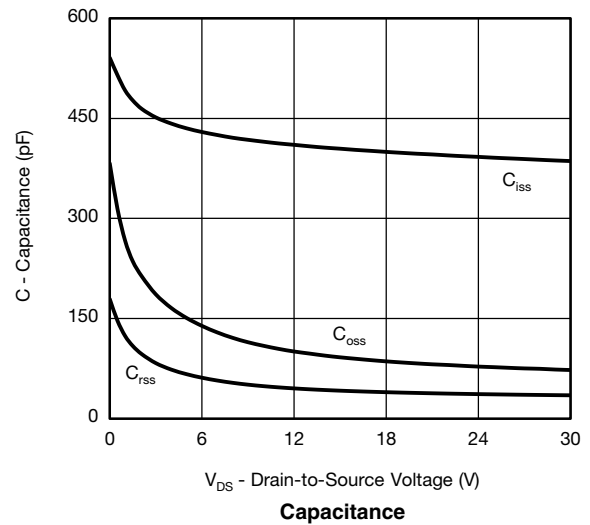
Output Characteristics



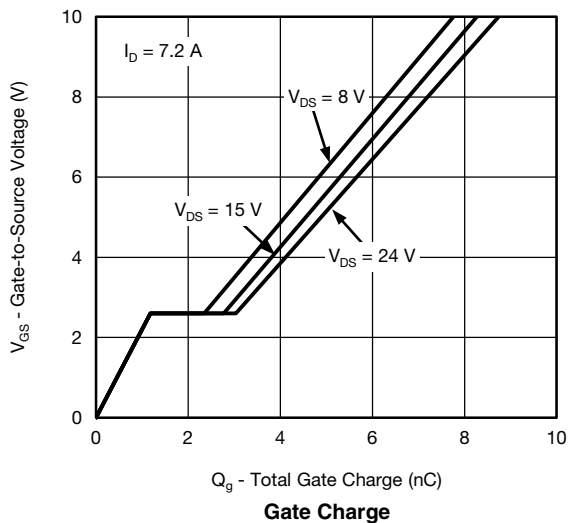
Transfer Characteristics Curves vs. Temp.



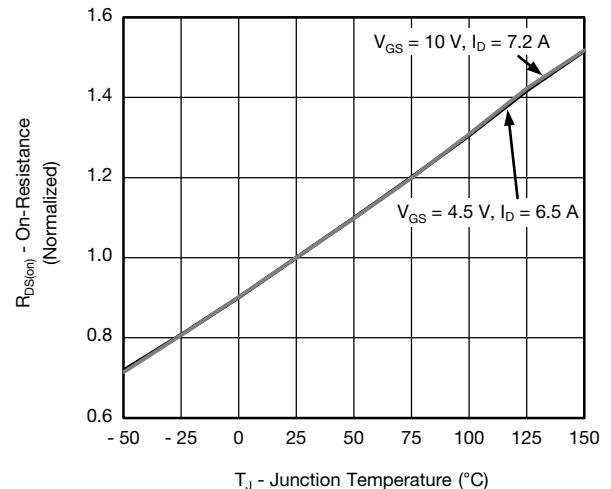
On-Resistance vs. Drain Current



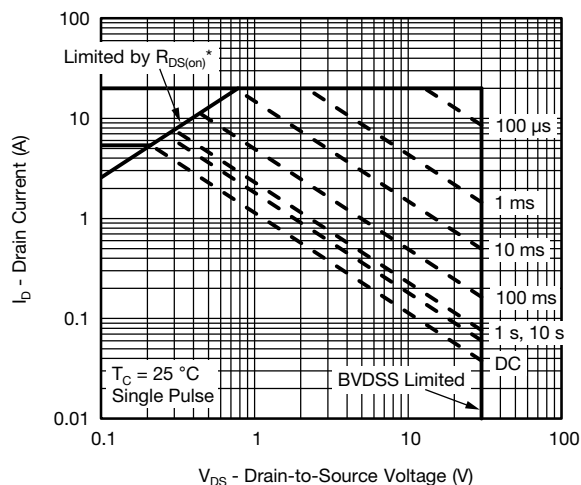
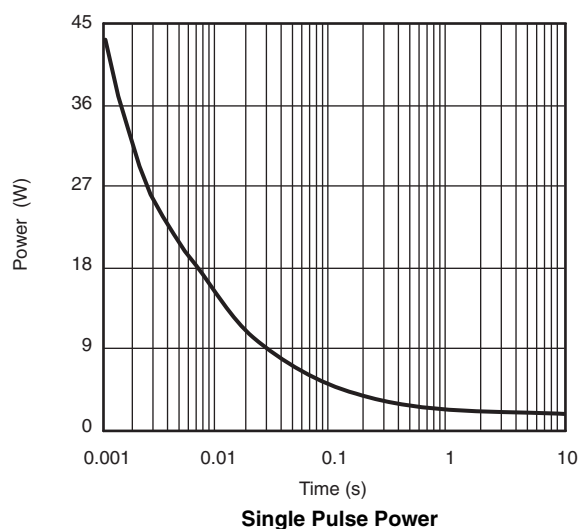
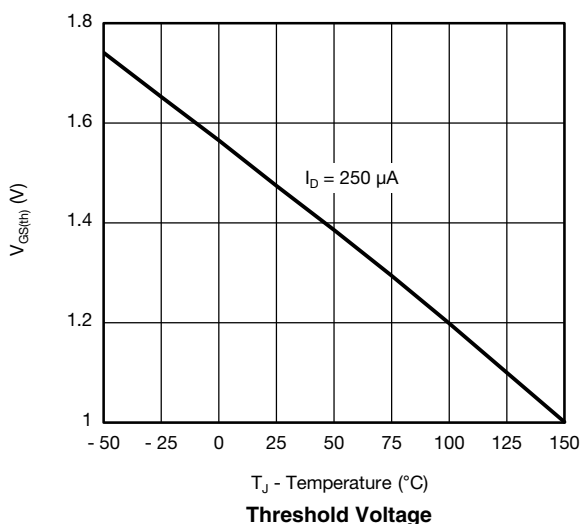
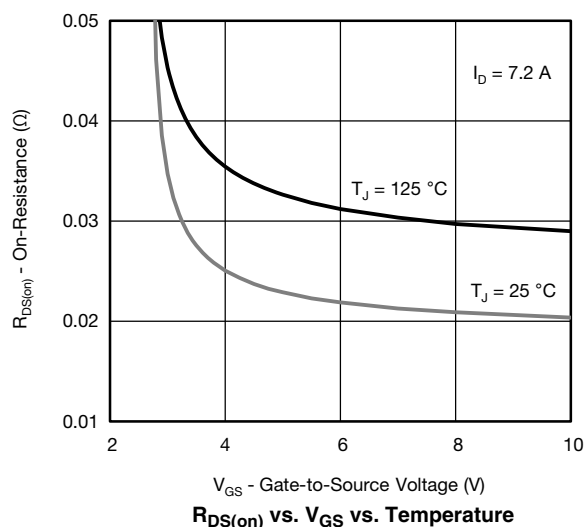
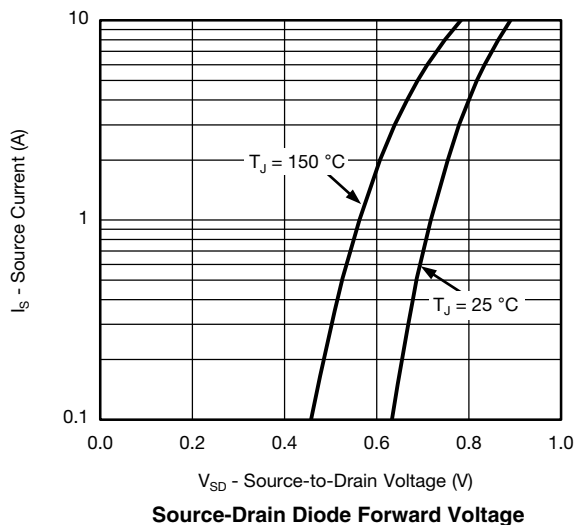
Capacitance



Gate Charge



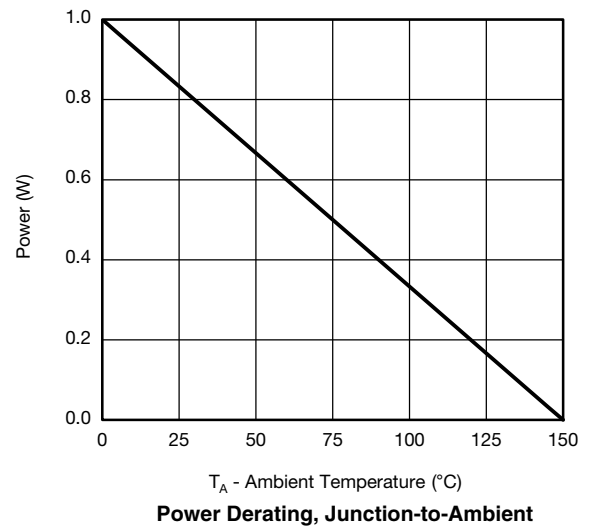
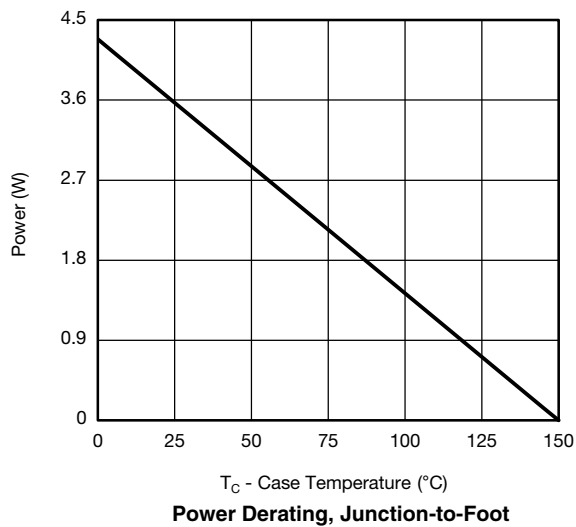
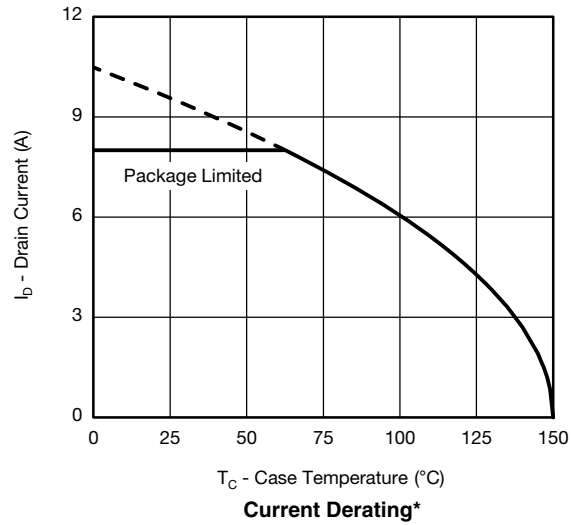
On-Resistance vs. Junction Temperature

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


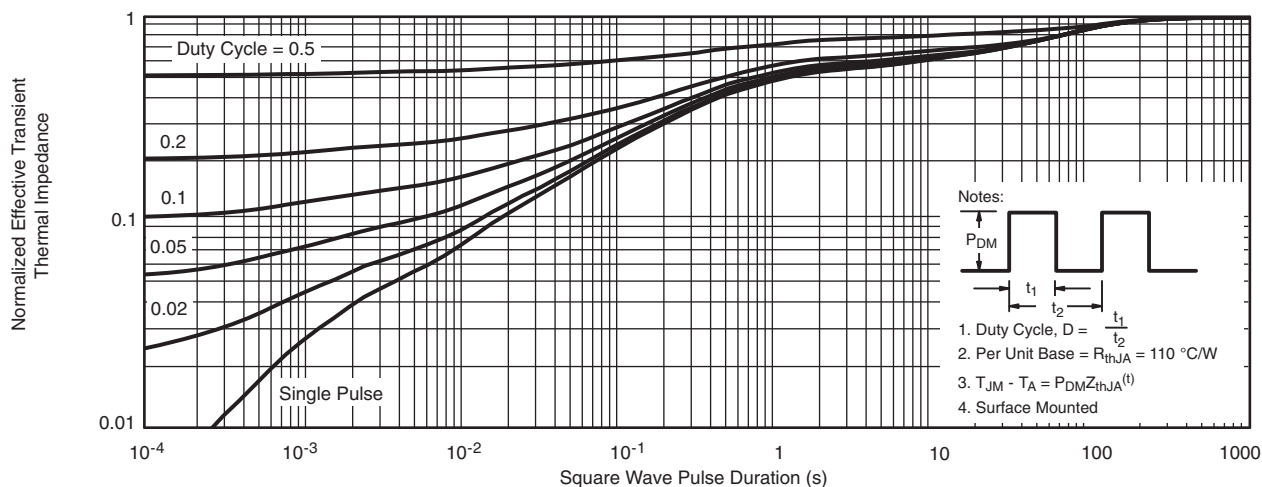
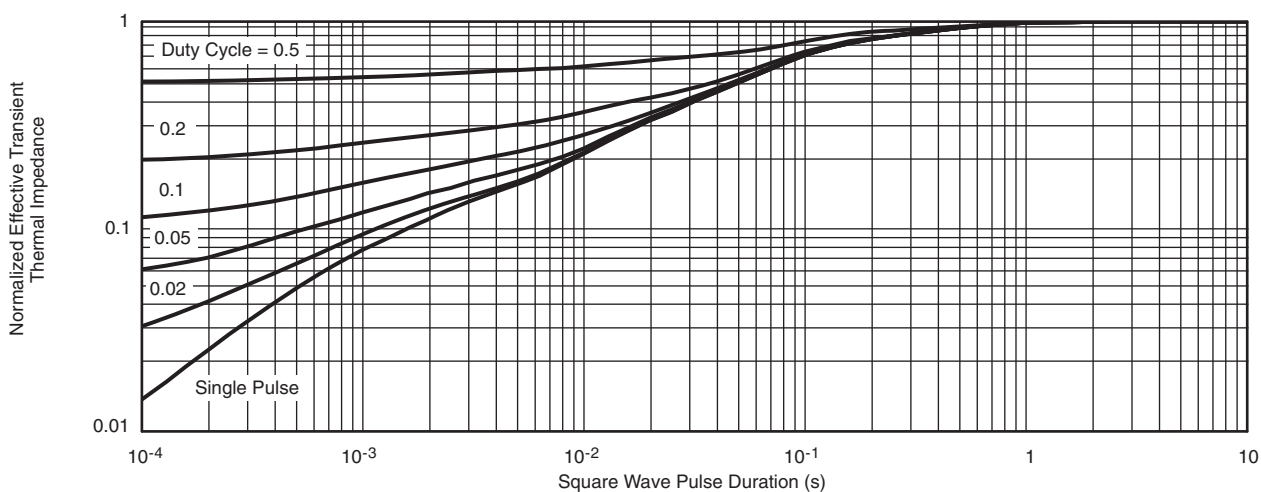
* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Ambient

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



* The power dissipation P_D is based on $T_{J(max)} = 150\text{ }^{\circ}\text{C}$, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

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

Normalized Thermal Transient Impedance, Junction-to-Ambient

Normalized Thermal Transient Impedance, Junction-to-Foot

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TSOP: 5/6-LEAD

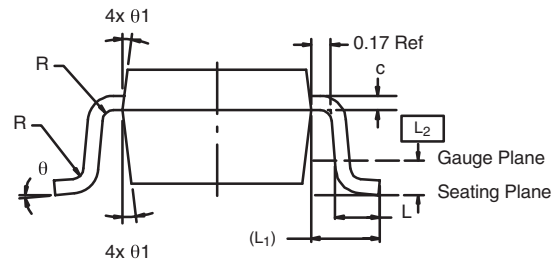
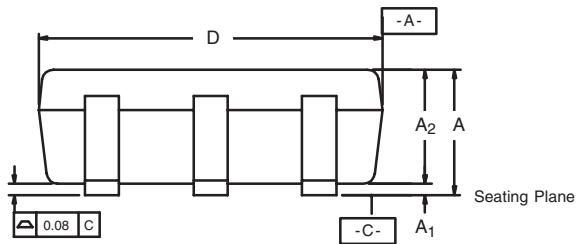
JEDEC Part Number: MO-193C



5-LEAD TSOP



6-LEAD TSOP



Dim	MILLIMETERS			INCHES		
	Min	Nom	Max	Min	Nom	Max
A	0.91	-	1.10	0.036	-	0.043
A ₁	0.01	-	0.10	0.0004	-	0.004
A ₂	0.90	-	1.00	0.035	0.038	0.039
b	0.30	0.32	0.45	0.012	0.013	0.018
c	0.10	0.15	0.20	0.004	0.006	0.008
D	2.95	3.05	3.10	0.116	0.120	0.122
E	2.70	2.85	2.98	0.106	0.112	0.117
E ₁	1.55	1.65	1.70	0.061	0.065	0.067
e	0.95 BSC			0.0374 BSC		
e ₁	1.80	1.90	2.00	0.071	0.075	0.079
L	0.32	-	0.50	0.012	-	0.020
L ₁	0.60 Ref			0.024 Ref		
L ₂	0.25 BSC			0.010 BSC		
R	0.10	-	-	0.004	-	-
θ	0°	4°	8°	0°	4°	8°
θ ₁	7° Nom			7° Nom		
ECN: C-06593-Rev. I, 18-Dec-06						
DWG: 5540						

Recommended Land Pattern For TSOP-5L / TSOP-6L



TSOP 5L



TSOP 6L


Note

- All dimensions are in inches (millimeter)

ECN: C22-0860-Rev. B, 24-Oct-2022
DWG: 3010



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