

N-Channel Enhancement Mode MOSFET

TDM3420

**DESCRIPTION**

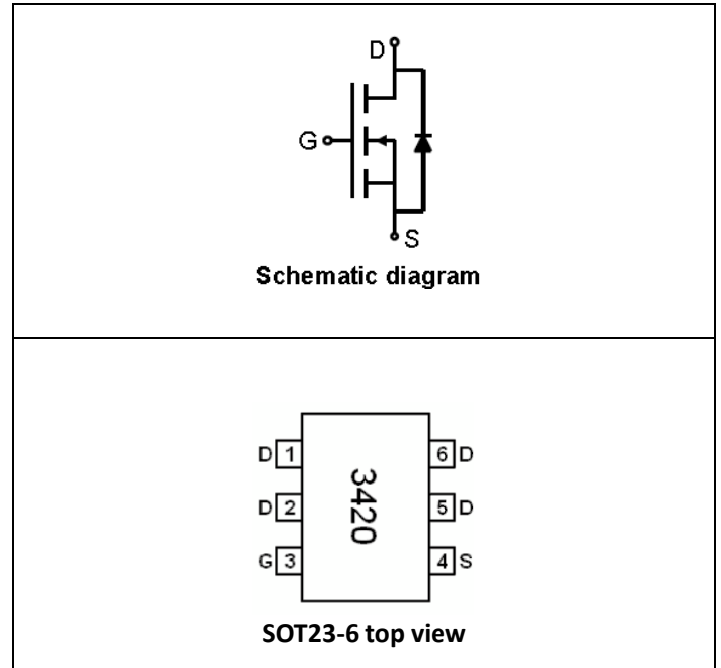
The TDM3420 uses advanced trench technology to provide excellent RDS(ON) and low gate charge .This device is suitable for use as a load switch or in PWM applications.

**GENERAL FEATURES**

- RDS(ON) < 32mΩ @ VGS=4.5V  
RDS(ON) < 23mΩ @ VGS=10V
- High Power and current handling capability
- Lead free product is available
- Surface Mount Package

**Application**

- PWM applications
- Load switch
- Power management



ABSOLUTE MAXIMUM RATINGS(TA=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V <sub>DS</sub>	30	V
Gate-Source Voltage	V <sub>GS</sub>	±20	V
Drain Current @ Continuous(Note 1)	I <sub>D</sub> ( 25°C )	6.3	A
	I <sub>D</sub> ( 70°C )	4.8	A
Drain Current @ Current-Pulsed (Note 1)	I <sub>DM</sub>	20	A
Maximum Power Dissipation (TA=25°C)	P <sub>D</sub>	1.6	W
Operating Junction and Storage Temperature Range	T <sub>J</sub> ,T <sub>STG</sub>	-55 To 150	°C

THERMAL CHARACTERISTICS

Thermal Resistance,Junction-to-Ambient (Note 2)	RθJA	78	°C/W
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**N-Channel Enhancement Mode MOSFET**
**TDM3420**
**ELECTRICAL CHARACTERISTICS** ( $T_A=25^{\circ}\text{C}$  unless otherwise noted)

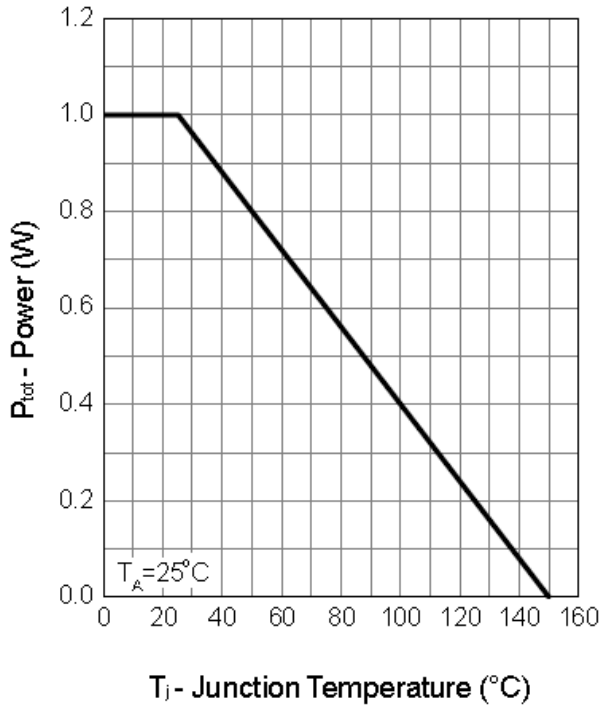
Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	30			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=24V, V_{GS}=0V$			1	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$			$\pm 100$	nA
<b>ON CHARACTERISTICS</b> (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	1.9	3	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=5A$		26	32	m $\Omega$
		$V_{GS}=10V, I_D=8A$		20	23	m $\Omega$
<b>DYNAMIC CHARACTERISTICS</b> (Note 4)						
Input Capacitance	$C_{iss}$	$V_{DS}=15V, V_{GS}=0V, F=1.0MHz$		410		PF
Output Capacitance	$C_{oss}$			70		PF
Reverse Transfer Capacitance	$C_{rss}$			40		PF
<b>SWITCHING CHARACTERISTICS</b> (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DS}=15V, V_{GS}=10V, R_{GEN}=6\Omega, I_D=1A$		8		nS
Turn-on Rise Time	$t_r$			9		nS
Turn-Off Delay Time	$t_{d(off)}$			14		nS
Turn-Off Fall Time	$t_f$			4		nS
Total Gate Charge	$Q_g$	$V_{DS}=15V, I_D=8A, V_{GS}=4.5V$		3.8		nC
Gate-Source Charge	$Q_{gs}$			1.3		nC
Gate-Drain Charge	$Q_{gd}$			1.6		nC
Body Diode Reverse Recovery Time	$T_{rr}$	$I_F=8A, di/dt=100A/\mu s$		12.8		nS
Body Diode Reverse Recovery Charge	$Q_{rr}$			3.8		nC
<b>DRAIN-SOURCE DIODE CHARACTERISTICS</b>						
Diode Forward Voltage (Note 3)	$V_{SD}$	$V_{GS}=0V, I_S=1A$		0.8	1.1	V

**NOTES:**

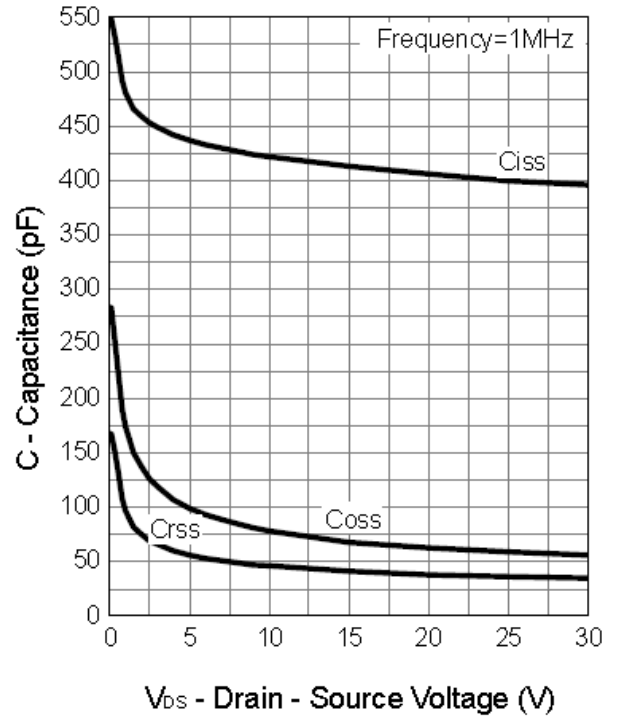
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on 1in2 FR4 Board,  $t \leq 10$  sec.
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production testing

Typical Operating Characteristics

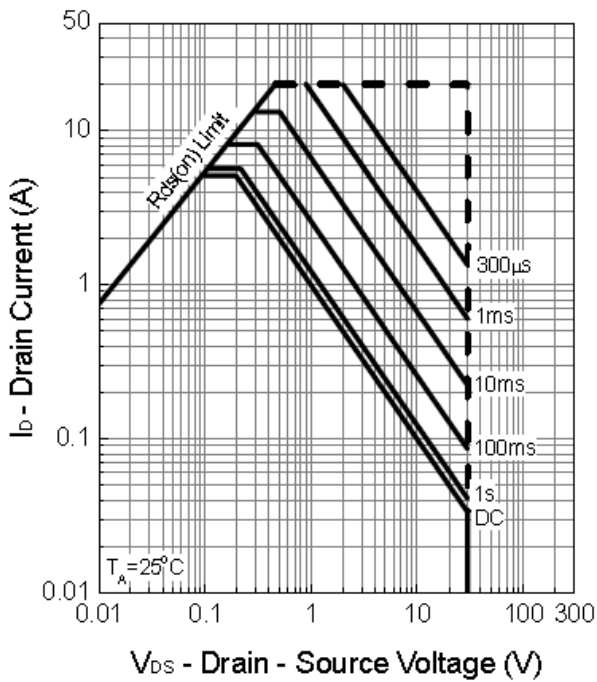
Power Dissipation



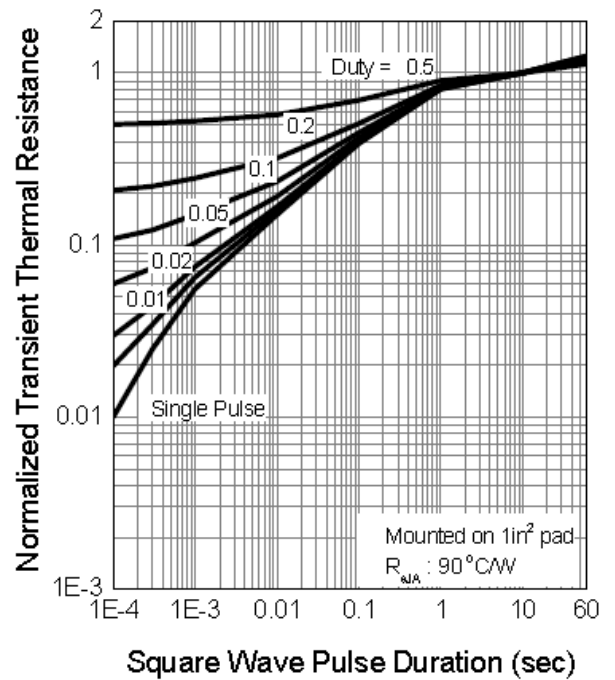
Capacitance



Safe Operation Area

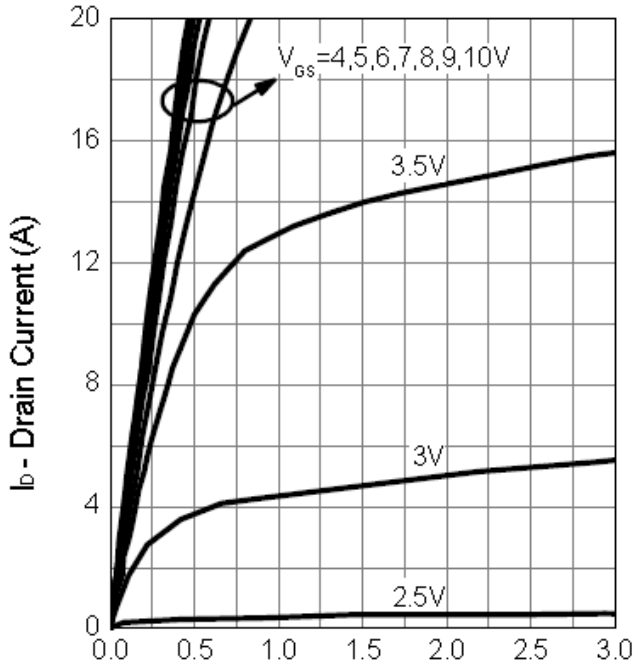


Thermal Transient Impedance



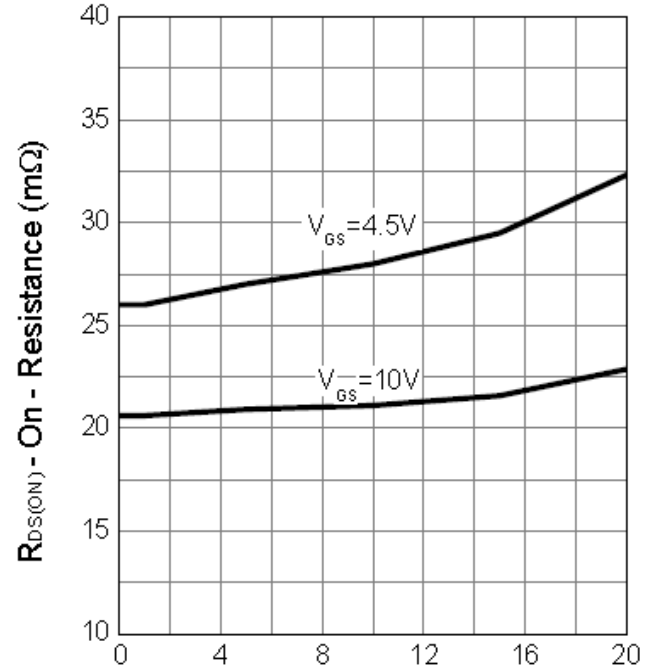
Typical Operating Characteristics(Cont.)

Output Characteristics



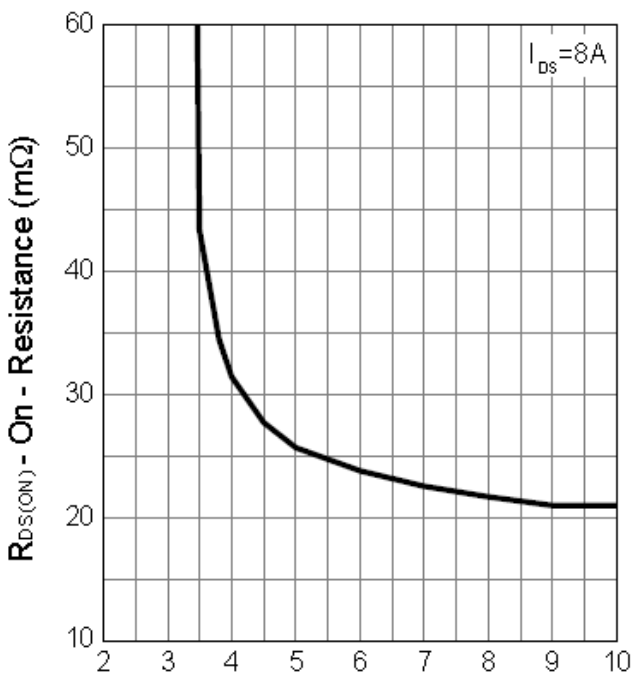
$V_{DS}$  - Drain - Source Voltage (V)

Drain-Source On Resistance



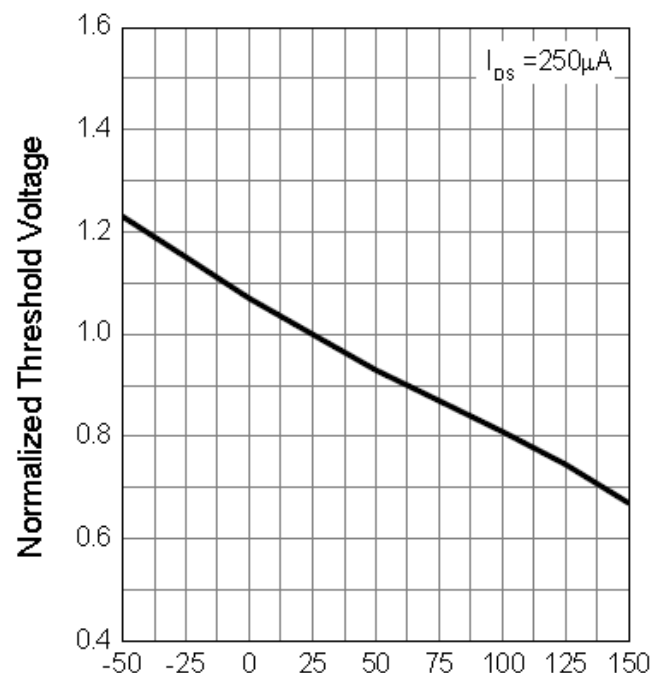
$I_D$  - Drain Current (A)

Gate-Source On Resistance



$V_{GS}$  - Gate - Source Voltage (V)

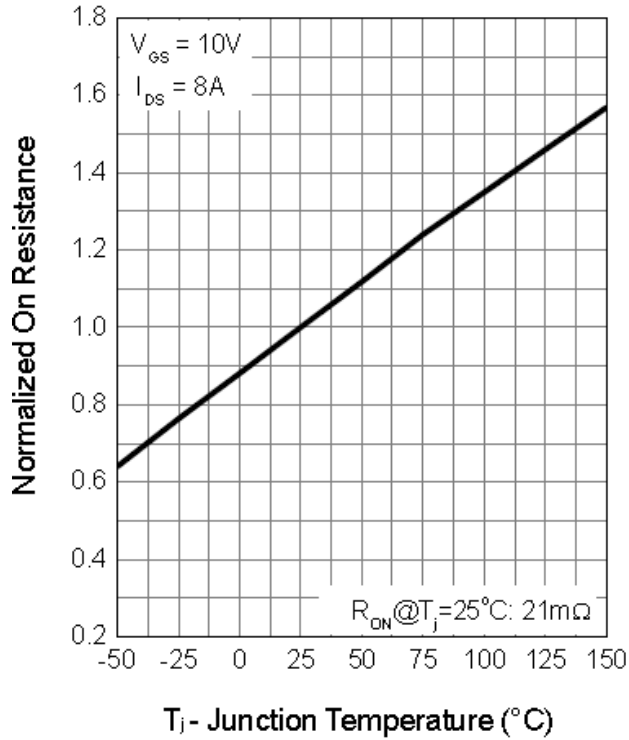
Gate Threshold Voltage



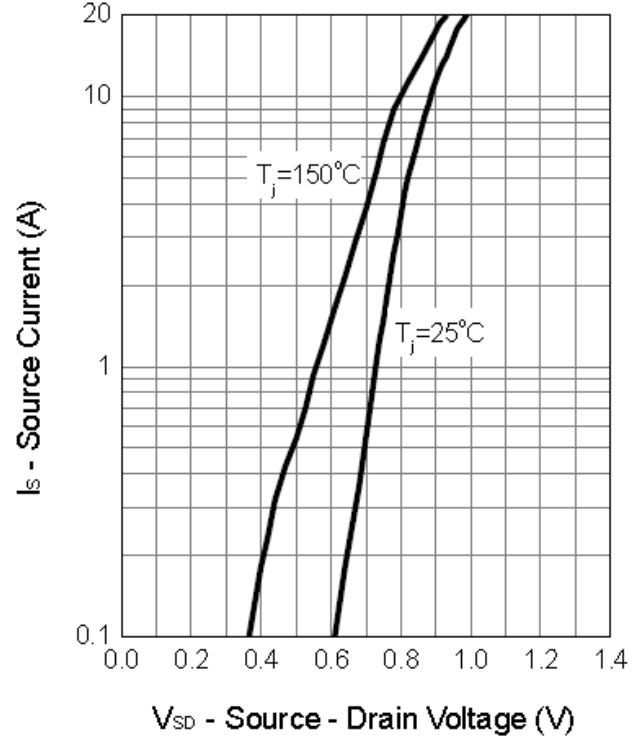
$T_J$  - Junction Temperature ( $^{\circ}C$ )

Typical Operating Characteristics (Cont.)

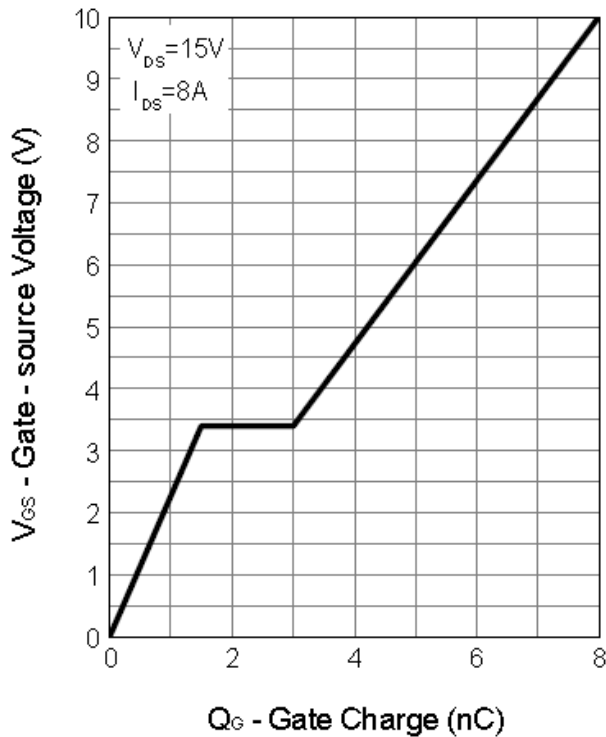
Drain-Source On Resistance



Source-Drain Diode Forward

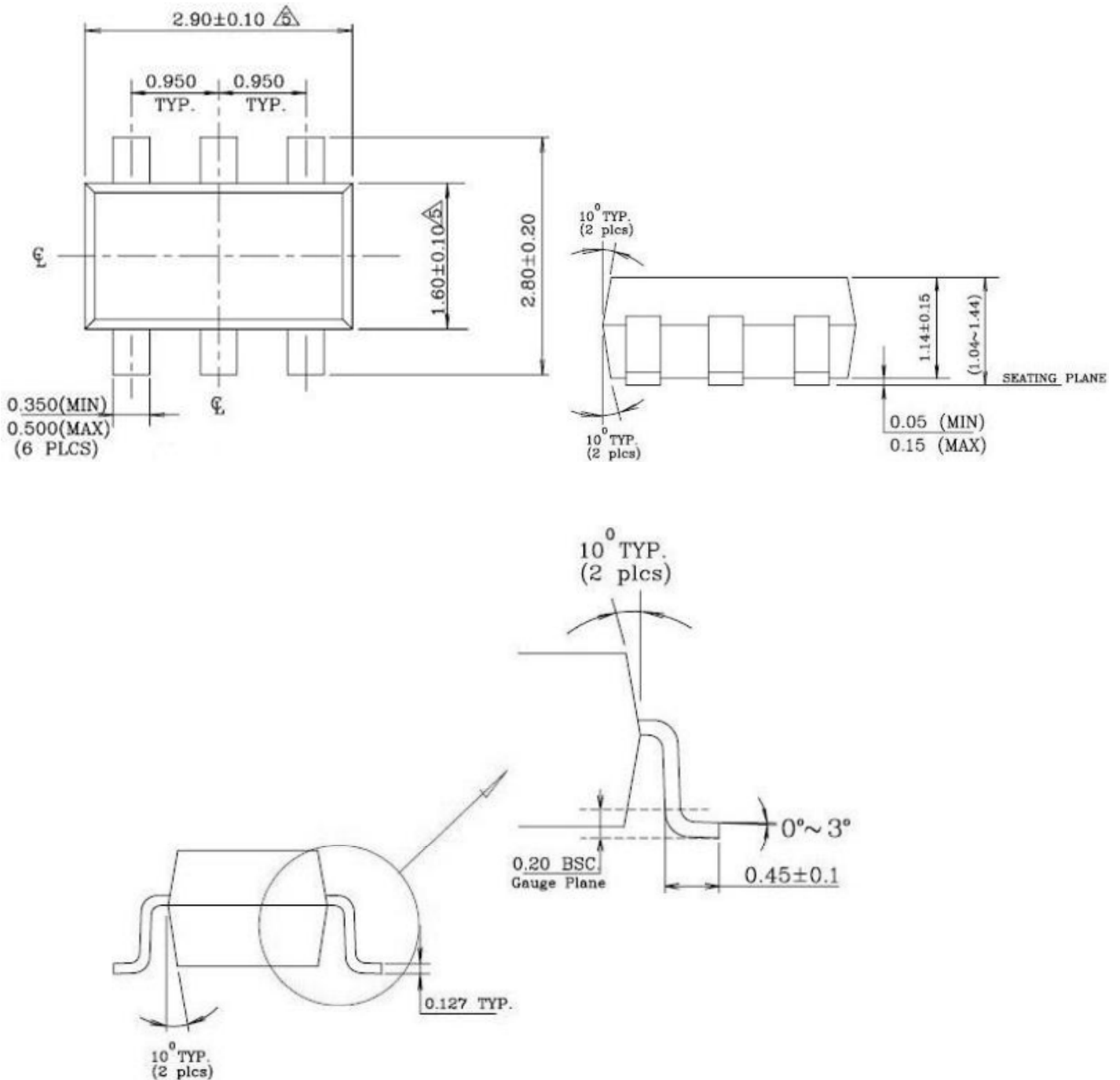


Gate Charge



Package Information

SOT23-6 Package



Design Notes